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Social innovations in forestry and innovations in non-wood forest products: the role of institutions and actors

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To my family

“Energy and persistence conquer all things” (Benjamin Franklin)

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I hereby declare that I am the sole author of this work. No assistance other than that permitted has been used and all quotes and concepts taken from unpublished sources, published literature or the internet in wording or in basic content have been identified by footnotes or with precise source citations.

Ivana Živojinović

Abstract

The forestry sector is increasingly seen as offering solutions to a range of nowadays challenges. Innovations play a crucial role in these solutions and are of ever-increasing interest to policymakers, forestry practice and academia. From being primarily concerned with technological and economic-oriented innovations, forestry research's focus expanded to institutional and social innovations related to new policy-level solutions and improved institutional arrangements with significant involvement by civil society actors. However, this orientation is still evolving and poor understanding of the innovations related to diverse forest products and services as well as connected social and intangible values persist. The study of innovations related to non-wood forest products (NWFP) and social innovations are examples that can help to fill this gap. Thus, the overall aim of this thesis is to explore the roles of various actors and institutions in such innovations and to provide new insights on the potential such innovations have for forestry and rural areas.

This thesis grounds on the innovation system approach and is complemented by an institutional void and a governance perspective and a focus on the role of policies in innovation. Other approaches, such as service-dominant logic and the concept of the experience economy, as well as examining innovations in the bioeconomy context allow insight into the further value and potential of the studied innovations. The thesis is based on a systematic analysis of literature and qualitative case study research conducted in Austria, Italy, Slovenia, United Kingdom, USA (developed economies) as well as in Serbia and North Macedonia (transition economies). Primary data collection was done via face-to-face semi-structured interviews with various actors, workshops and focus group interviews, questionnaires and the systematic collection of literature and policy documents, all being analysed using qualitative content analysis.

The analysed case studies show that NWFP and social innovations are usually conducted by forest owners, micro-, small- and medium-sized enterprises or rural communities who recognised the potential either to diversify production and fill a niche market or to meet the specific needs and challenges of their communities. The results indicate the need to widen actors' networks, to develop cross-sectoral approaches and to create explicit innovation-oriented policies. It further shows that traditional forestry sector organisations are ill-prepared to provide such cross-sectoral and cross-cultural links in comparison to regional development-oriented organisations. Innovations achieve the most when the relationships between the State, intermediary organisations and local actors and innovators work together synergistically. A key success factor of analysed innovations is the co-creation of value by innovators and users. This research argues that complex values that these innovations contain, even if intrinsically non-commercial, are relevant for rural businesses.

This research suggests the need to decompartmentalise organisational activity in forestry to enable innovation. Creating trust in institutions and a societal climate where individual self-expression, civic action and community empowerment are present is paramount for innovation to thrive. The analysis of various innovation cases highlighted that different histories, institutions and variations in social capital and trust between civil society, innovators and the State create significant differences in the specific environments for innovation. Thus, this thesis concludes that, ideally, policies designed to support NWFP and social innovation must be sensitive and customised to different institutional contexts. National, regional and local level support structures must be open and flexible to local actors' emerging ideas and provide information, networking and financial assistance in a tailor-made fashion. This research suggests that NWFP and social innovations can contribute to the wellbeing of rural communities and maintain their natural and cultural environment.

Zusammenfassung

An den Forstsektor werden zunehmend Anforderungen gestellt, um zur Lösung verschiedenster aktueller Herausforderungen beizutragen. Innovationen spielen bei diesen Lösungen eine entscheidende Rolle und sind für politische Entscheidungsträger, die Forstwirtschaft und die Wissenschaft von immer größerem Interesse. Der Schwerpunkt der forstlichen Forschung verlagert sich dabei von technologischen und wirtschaftsorientierten Innovationen zunehmend auf institutionelle und soziale Innovationen auf politisch-institutioneller Ebene mit Beteiligung von Akteuren oder Akteurinnen der Zivilgesellschaft. Unser Verständnis hinsichtlich dieser Innovationen im Bereich verschiedener Waldprodukte und waldbezogener Dienstleistungen und der damit verbundenen sozialen und immateriellen Werten ist noch sehr beschränkt. Diese neue Ausrichtung steht noch in Entwicklung. Untersuchungen von sozialen Innovationen und solchen im Bereich von Nichtholzprodukten (NHP) können dazu beitragen, diese Lücke zu schließen. Das übergeordnete Ziel dieser Arbeit ist es daher, die Rolle verschiedener Akteure und Institutionen bei solchen Innovationen zu untersuchen und neue Erkenntnisse über das Potenzial solcher Innovationen für die Forstwirtschaft und ländliche Gebiete zu gewinnen.

Diese Arbeit basiert auf dem Innovationssystem-Ansatz, der durch verschiedene Ansätze zur Analyse der Rolle der Politik in Innovationen ergänzt wird, bspw. eine Governance-Perspektive und die Analyse institutionellen Vakuums (institutional void). Weitere Ansätze, wie die nutzenorientierte Logik (service-dominant logic) und das Konzept der Erlebnisökonomie (experience economy) sowie die Untersuchung von Innovationen im Kontext der Bioökonomie, ermöglichen Einblicke in den Wert und das Potenzial der untersuchten Innovationen. Die Arbeit basiert auf einer systematischen Literaturanalyse und qualitativen Fallstudien, die in Österreich, Italien, Slowenien, Großbritannien, den USA (Industrieländer) sowie in Serbien und Nordmazedonien (Transformationsländer) durchgeführt wurden. Die primäre Datenerfassung erfolgte über halbstrukturierte face-to-face Interviews mit verschiedenen Akteuren, in Workshops und Fokusgruppeninterviews, mittels Fragebögen und die systematische Erhebung von Literatur und politischen Dokumenten, die alle mithilfe von qualitativer Inhaltsanalyse analysiert wurden.

Die Fallstudien der vorliegenden Arbeit zeigen, dass NHP und soziale Innovationen in der Regel von Waldbesitzern und -besitzerinnen, Kleinst-, Klein- und Mittelunternehmen oder anderen Akteuren in ländlichen Gebieten durchgeführt werden, die das Potenzial erkannt haben, entweder die Produktion zu diversifizieren und einen Nischenmarkt zu bedienen oder die spezifischen Bedürfnisse und Herausforderungen von Bevölkerungsgruppen zu erfüllen. Die Ergebnisse zeigen, dass für eine bessere Unterstützung von Innovationen sektorübergreifende Ansätze und explizit innovationsorientierte Strategien entwickelt werden müssen. Das betrifft auch eine Verbindung von ländlichen Produzenten und Produzentinnen und städtischen Konsumenten und Konsumentinnen in den Akteursnetzwerken. Die Ergebnisse zeigen weiters, dass traditionelle Organisationen des Forstsektors im Vergleich zu regionalentwicklungsorientierten Organisationen schlechte Voraussetzungen haben, solche sektorübergreifenden Interaktionen und Verbindungen über gesellschaftliche Gruppen hinweg herzustellen. Innovationen werden am besten gefördert, wenn Staat, zwischengeschaltete Organisationen und lokale Akteure und Akteurinnen synergistisch zusammenarbeiten. Ein wesentlicher Erfolgsfaktor für die hier analysierten Innovationen ist die Zusammenarbeit von Innovatoren und Anwendern in der Wertschöpfung und der Entwicklung der neuen Produkte (Ko-Kreation/co-creation of value). Diese Studien machen deutlich, dass viele der komplexen Werte, die mit den Produkten zusammenhängen, auch wenn sie an sich nicht kommerziell sind, für die Geschäftsmöglichkeiten relevant sein können.

Diese Forschungsergebnisse weisen darauf hin, dass die starke sektorale Trennung im Bereich dieser nicht-traditionellen forstlichen Produkte aufgelöst werden müsste, um Innovationen zu ermöglichen. Die Schaffung von Vertrauen in Institutionen und ein gesellschaftliches Klima, in dem individueller Ausdruck, partizipatorisches Handeln und die Stärkung der Gemeinschaft gefördert werden, ist für diese Innovationen von größter Bedeutung. Die Analyse der Fallstudien zeigt auch, dass unterschiedliche geschichtliche Hintergründe, Institutionen und Unterschiede im Sozialkapital und Vertrauen zwischen Zivilgesellschaft, Innovatoren und dem Staat das Umfeld für Innovationen grundlegend prägen. Daher kommt diese Arbeit zum Schluss, dass Strategien zur Unterstützung von NHP und sozialer Innovation auf unterschiedliche institutionelle Kontexte zugeschnitten sein müssen. Unterstützungsstrukturen auf nationaler, regionaler und lokaler Ebene müssen offen und flexibel für neue Ideen lokaler Akteure sein und Informationen, Vernetzungsmöglichkeiten und finanzielle Unterstützung auf maßgeschneiderte Weise bereitstellen. Die Ergebnisse der Forschung legen nahe, dass NHP und soziale Innovationen zur Entwicklung der ländlichen Regionen und zum Erhalt der natürlichen Umwelt und der kulturellen Errungenschaften beitragen können.

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Acronyms

AT	Austria
BOKU	University of Natural Resources and Life Sciences, Vienna
CAP	Common agricultural policy
CLLD	Community-Led Local Development
DAFF	Agricultural Development Fund Fenomena
EaSI	Employment and Social Innovation programme
EIP	European Innovation Partnership
ESF	European Social Fund
EU	European Union
FP7	7th Framework Programme for Research and Technological Development
H2020	Horizon 2020: EU Programme for Research and Innovation
IS	Innovation Systems
IT	Italy
LAG	Local Action Group
LEADER	Liaison Entre Actions de Développement de l'Économie Rurale (Links between activities for the development of the rural economy)
MPT	Multi-purpose trees
NGO	Non-governmental organisation
NIS	National Innovation System
NTFP	Non-timber forest product
NWFP	Non-wood forest product
OECD	The Organisation for Economic Co-operation and Development
RDP	Rural Development Programme
RIS	Regional Innovation System
R&D	Research and development
SDG	Sustainable development goals
SDL	Service-dominant logic approach
SILEA	Social Innovation in LEADER 14-20 (project in Austria)
SIMRA	Social Innovation in Marginalised Rural Areas (EU H2020 project)
SIPRU	Social Inclusion and Poverty Reduction Unit (governmental body in Serbia)
SIS	Sectoral Innovation System
SMEs	Small- and medium-sized enterprises
SI	Social innovation
StarTree	Multipurpose trees and non-wood forest products: a challenge and opportunity (EU FP7 project)
UK	United Kingdom
USA	United States of America
VET	Vocational Education and Training
WoS	Web of Science

List of appended research articles (PART B)

Number of the article in the thesis	Full Reference
Article 1	Weiss, G., Ludvig, A., Živojinović, I.* 2020. Four decades of innovation research in forestry and the forest-based industries – A systematic literature review. <i>Forest Policy and Economics</i> , 120, 102288. https://doi.org/10.1016/j.forpol.2020.102288
Article 2	Živojinović I. , Nedeljković J., Stojanovski V., Japelj A., Nonić D., Weiss G., Ludvig A. 2017. Non-timber forest products in transition economies: Innovation cases in selected SEE countries. <i>Forest Policy and Economics</i> , 81: 18-29. https://doi.org/10.1016/j.forpol.2017.04.003
Article 3	Živojinović I. , Ludvig, A., Hegl K. 2019. Social Innovation to sustain rural communities: Overcoming institutional challenges in Serbia. <i>Sustainability</i> , 11, 7248. doi:10.3390/su11247248
Article 4	Weiss G., Ludvig A., Živojinović I. , Asamer-Handler M., Huber P. 2017. Non-Timber innovations: How to innovate in side-activities of forestry - Case study Styria, Austria. <i>Austrian Journal of Forest Science</i> , 134. Jahrgang (2017), Sonderheft 1: 231 – 250
Article 5	Ludvig A., Weiss G., Sarkki S., Nijnik M., Živojinović I. 2018. Mapping European and forest related policies supporting social innovation for rural settings. <i>Forest Policy and Economics</i> , 97: 146–152. https://doi.org/10.1016/j.forpol.2018.09.015
Article 6	Lukesch, R., Ludvig, A., Slee, B., Weiss, G., Živojinović, I. 2020. Social Innovation, societal change and the role of policies. <i>Sustainability</i> , 12(18), 7407; doi:10.3390/su12187407
Article 7	Živojinović I. , Weiss G., Wilding M., Wong J.L.G., Ludvig A. 2020. Experiencing forest products – an innovation trend by rural entrepreneurs. <i>Land Use Policy</i> , 94, 104506. https://doi.org/10.1016/j.landusepol.2020.104506
Article 8	Weiss, G., Emery, R.M., Corradini, G., Živojinović I. 2020. New values of non-wood forest products. <i>Forests</i> , 11, 165. doi:10.3390/f11020165
Article 9	Ludvig, A., Hujala, T., Živojinović I. 2019. Social innovation as a prospect for the forest bioeconomy: Selected examples from Europe. <i>Forests</i> , 10, 878. doi:10.3390/f10100878

PART A - FRAMEWORK OF THE THESIS

1 Introduction

The promotion of innovation is a central feature of European Union (EU) policy. This is highlighted by a range of Commission priorities, in particular, the European Green Deal, which is designed to create an economy that works for people and readies Europe to fully embrace the digital age, as well as in many other programmes and sectoral policies, such as the Cohesion Policy programmes for 2014-2020 and the Common agricultural policy (CAP). Thus, the focus of the EU is to build a smart, sustainable and inclusive economy, which can innovate, transform and adapt to an ever-changing and increasingly competitive environment (EU, 2020a). Since the Lisbon Strategy for Growth and Jobs and the financial crisis of the 2000s, structural weaknesses have been revealed in the EU and shown that economic growth, traditionally seen until then as the key factor for generating employment and wealth, is not the only way to achieve sustainable development. Accordingly, the EU has broadened its focus from being essentially economically and technologically centred to include social innovations (SI) as well. SI is seen as a way to lift people from poverty as well as promote growth and well-being not only for but also with, citizens (EU, 2020c; Hubert, 2010). The EU is thus devoted to the creation of systems that encourage innovation of all types, support research and development (R&D) and entrepreneurship in the broadest sense. In this regard, the 2030 Agenda for Sustainable Development also promotes entrepreneurship, creativity and innovation, and encourages the formalisation and growth of micro-, small- and medium-sized enterprises (SMEs), as reflected in many of the 17 sustainable development goals (SDG, 2020).

Innovation is generally understood as the specific process when an idea, invention or novelty is practically applied or introduced to the market or some other practical field of activity (Schumpeter, 1983; Nelson et al., 1977). This broad understanding of innovation is also espoused by the OECD where innovation is defined as “the implementation of new or significantly improved products (goods or services) or processes, new marketing methods, or new organisational methods in business practices, workplace organisation or external relations” (OECD, 2005, p.46). Over time, with changes in both practice and policy, new types of innovation have been researched and defined, such as institutional innovations that look at new policy-level solutions (Ludvig et al., 2016) and social innovations that look at innovation processes where civil society actors play a significant role (Nijnik et al., 2018).

This focus on innovation development is now being reflected in many sectors, including forestry, where innovation was previously typically directed towards rationalisation and less towards diversification or higher value products (Breschi and Malerba, 1997; Hansen et al., 2014; Hirsch-Kreinsen and Jacobson, 2008). Forestry was for a long time perceived as a so-called mature sector that was traditionally not very innovative (Weiss, 2019). However, in recent times this perception has begun changing as forestry is increasingly seen as a “future sector” which can offer solutions for a range of modern-day challenges (Weiss, 2019). Forestry and the forest-based sector are seen as a cornerstone of the European bioeconomy and a major contributor to climate change mitigation. This role is, in turn, stimulating the emergence of a range of new and innovative bio-products and related services as well as the development of niche markets (Winkel, 2017). Innovations are necessary for virtually all economic sectors to remain competitive and attuned with 21st-century societies and economies. In forestry, a specific lack of innovations oriented towards intangible values related to diverse forest products and services is noted. Innovations in the field of non-wood forest products (NWFPs) and social innovations are examples of this and where there is currently a profound lack of attention by innovation system (IS) actors (Wolfslehner et al., 2019; Richter et al., 2020; Nijnik et al., 2019). Innovative products or processes related to NWFPs and social innovations can indeed support forestry (Mavsar et al., 2008; Wolfslehner et al., 2019) and rural economies by providing not only new jobs and income but also by bringing valuable

and competitive products and/or services to the marketplace (Richter et al., 2020; Nijnik et al., 2018, 2019).

The forest-based sector has traditionally developed with a focus on wood products due to their relatively high economic importance and well-developed value-chains (Wolfslehner et al., 2019). Even though there are findings that emphasise the importance of NWFPs in forestry marketing and rural development (Lovrić, et al. 2020a; Mantau et al., 2007; Lawrence, 2003), the full potential of various NWFPs has not been scrutinized in great detail (Wolfslehner et al., 2019). In the context of the bioeconomy paradigm that aims to contribute to smart, sustainable and inclusive growth in the EU, NWFPs could make an important contribution by, among other aspects, increasing the socio-economic opportunities and competitiveness of rural economies. In this regard, it is important to understand the roles of the actors involved in non-wood forest product (NWFP) innovations and the relevance of the political and institutional frameworks which regulate NWFPs and that foster a supportive environment for such innovations (Weiss et al. 2019). Furthermore, it is widely viewed that innovative approaches will play a vital role in transforming traditional business models, as is currently occurring in forestry, into more modern forms utilising new production processes and marketing methods coupled with the development of new products and services (Wolfslehner et al., 2019). Thus, analysing and understanding existing innovations in NWFPs potentially opens the door to additional opportunities for forestry to provide greater added value for rural economies.

Social innovations, as another type of innovation, hold significant potential to contribute to both rural development (Richter et al., 2020) and the forestry sector (Nijnik et al., 2019). The concept of social innovation relates to new responses to pressing social demands which are not addressed by markets or existing institutions. Social innovations aim to improve societal well-being primarily by introducing changes in social interaction practices. As Hubert (2010) notes, such innovations are social in both their ends and their mean. According to Moulaert et al. (2007), the objective of social innovation is the satisfaction of material and non-material needs, promoting a better redistribution of resources and changing the power relations pertaining to production and reproduction of social exclusion dynamics. Over time numerous definitions of social innovation have been proposed, each focusing on different aspects such as new actor-relationships, new interactions and new decision-making processes (Hämäläinen and Heiskala, 2007; Phills et al., 2008; Bock, 2012; Howaldt and Knopp, 2012; Cajaiba-Santana, 2014; EU, 2014; Sinclair and Baglioni, 2014). For most of these definitions, a common focus has been on various “new arrangements” to address societal needs and problems (Moulaert et al., 2013). For this thesis, a definition developed by the SIMRA¹ project consortium is followed, which states that social innovation is “the reconfiguring of social practices, in response to societal challenges, which seeks to enhance outcomes on societal well-being and necessarily includes the engagement of civil society actors” (Polman et al., 2017, p. 1).

Concerning social innovations in forestry and related sectors, there is limited knowledge and empirical evidence about the extent, outcomes of and political/institutional support for innovative environment especially with regards to marginalised rural areas (Melece, 2015; Neumeier, 2012, Knill & Lenschow, 2000) which are often characterised by fragile social and institutional structures. Although scholars have developed approaches to assess social innovation processes much remains to be done to clarify the links between social innovations, the diverse range of relevant policies and the desired policy outcomes (Secco et al., 2019; Koontz & Thomas, 2006). To study policy aspects of social innovations, it is essential

¹ The H2020 Project SIMRA - Social innovation in marginalised rural areas. Explained more in the chapter 2.

to consider the specific local conditions and intermediating factors, however, more is required as an analysis of the governance of social innovation reveals the growing predominance of civil society actors in key roles (Diaz-Garcia et al., 2015). The role of these and other actors in the transformation of governance through social innovation has still not been studied in detail in rural contexts.

The two projects in which the author of this thesis was involved specifically dealt with the range of innovation types related to NWFPs (The StarTree project) and social innovations in forestry and rural areas (The SIMRA project). Both projects looked at various aspects of actor involvement, policy support and the institutional background that either foster or hinder the development of innovations (see chapter 2). The nine articles² presented later which make up the core of this thesis were written as a result of these two projects (see chapter 6 and part B of the thesis framework) and aim to fill gaps in the literature, which serves to highlight the need to better understand innovation systems around social innovations and NWFP innovations in more depth.

Through the analysis of existing literature (Article 1), empirical case studies (in Articles 2,3,4,6,7 and 8) and policies (Article 5 and 9) this thesis advances our knowledge about social and NWFP innovations in specific contexts based on the primary data on the influence of socio-political and institutional conditions in empirical case studies. It identifies supportive and hindering factors while also providing recommendations for different groups of stakeholders (e.g. policymakers, forest authority, forest owners, farmers, SMEs) to further develop innovation-friendly environments.

1.1 Research interest

Having in mind the research gaps elaborated on above and the growing awareness of the possibilities that NWFP and social innovations can bring to forestry, forest-related sectors and rural communities generally, the overall aim of this thesis is to explore the roles of various actors and institutions in these innovations based on a systematic analysis of scholarly literature and the analysis of empirical case studies in developed and transition economies. The thesis furthermore aims to provide new insights into the potential that such innovations can contribute to the development of both forestry and rural areas. In striving to achieve this, the thesis complements innovation system analysis with additional and theoretical perspectives (i.e. a service-dominant logic, experience economy, and the concept of institutional voids) and analyse innovation in the context of the bioeconomy.

To reach the overall goal, three specifics but connected research aspects were considered. Step one investigated how scientific evidence tackles the factors that influence innovation processes in the forestry sector. Furthermore, empirical case studies were conducted to analyse different aspects related to innovation processes in detail. Research was conducted on (i) respective policy frameworks' impacts on innovation in NWFP and social innovations by looking at various policies at different levels (i.e. at the EU, national, and regional levels), (ii) the actors and their roles in NWFP and social innovations, and (iii) the various institutional and actor-related factors that supported or hindered the initiation, implementation and diffusion of NWFP and social innovations. Finally, research for this thesis also explored the potential and opportunities that NWFP and social innovations offer to forestry and rural communities in meeting various challenges which they face.

² The nine articles which form the core of this thesis framework are referred to as "Article 1-9", so the readers can easier track relations to or contributions from each of the research articles.

Specific NWFP and social innovation-related institutions and actors are analysed empirically in case studies to scrutinise the role of local institutions and governance arrangements in which they have to operate. Through these empirical examples drawn from various geographical contexts, this research explores the potential of forestry and forest-related sectors to contribute to and deliver NWFP and social innovations.

1.2 The Research Questions of the Thesis

To address the overall aim of this thesis five interrelated research questions were formulated that mirror the above-mentioned research aspects. These questions are dealt with in nine peer-reviewed articles that form the core of this thesis. They are presented below in Table 1, including an indication of which articles address which research question.

Table 1. Overview of research aims, questions and related articles

Research aim	Research questions of the thesis	Articles where RQs are answered
To explore the roles of various actors and institutions (formal and informal rules) in social and NWFP innovations in forestry and forest-related sectors	1. How innovation processes are addressed in forestry innovation research?	Article 1
	2. How existing sectoral policy frameworks impact social and NWFP innovations at various levels?	Article 2, 3, 4, 5 and 6
	3. Who are the main actors involved and what are their roles in social and NWFP innovations in forestry and forest-related sectors?	Article 2, 3, 4, 6, 7 and 8
	4. Which institutional and actor-related factors support and hinder social and NWFP innovations in forestry and forest-related sectors?	Article 2, 3, 4, 6, 7 and 8
To provide new insights into the potential that such innovations can bring to these sectors	5. What are the new opportunities and roles that social and NWFP innovations could have in forestry and forest-related sectors?	Article 7, 8 and 9

A brief, focused summary for each article is presented below:

Article 1 addresses the first research question through the use of a systematic literature review. It provides an overview of innovation research in forestry from a social science perspective for the last four decades by analysing 230 articles from around the world.

Articles 2 and 4 apply an innovation systems approach to analyse the actors and institutions in case study research designs. These two articles address research questions 2, 3, and 4 with the first article looking at innovation systems for NWFP innovation in transitioning countries (Serbia and North Macedonia) and a developed country (Slovenia) while Article 4 analyses NWFP innovations in Austria.

Article 3 focuses on the institutional aspects of social innovation in Serbia by taking an institutional voids perspective. This contributes to the answer of research questions 2, 3 and 4.

Articles 5 and 6 help answer research question 2 by examining the influence of policies on social innovations, the influence of both EU policies (Article 5) and national policies in the context of developed and transitioning economies (Austria, the United Kingdom and Serbia). Article 6, in addition to the above, addresses the role of various actor activities and provides a model for improving actor-related factors that influence social innovations. Thus Article 6 also contributes to the answers of research questions 3, 4 and 5.

Finally, Articles 7, 8 and 9 provide answers to research question 5. They analyse various aspects of the involved actors and institutions, based on other conceptual approaches which emphasise the added value of these innovations for forestry. These articles make the case for paying greater attention to the potentially beneficial role that innovation can have in forestry, especially in the context of the bioeconomy, and which are not addressing forestry technologies and/or timber products. Article 9 conceptually explores the potential role of social innovations in the bioeconomy context, using an analysis based on EU policies. Articles 7 and 8 focus on an analysis of case studies involving innovations in NWFPs in EU countries (i.e. Austria, the United Kingdom and Italy) and beyond (i.e. in the United States of America), and thus these latter two articles address as well research questions 3 and 4.

A more detailed synopsis of the nine articles of this thesis is provided in chapter 6 while the full articles can be found in part B of this thesis.

1.3 The Structure of the Thesis

This thesis is comprised of two major parts. Part A is the thesis framework which introduces, structures, and discusses the nine research articles that jointly serve as the cumulative doctoral thesis. Part B presents the nine peer-reviewed articles that make up the core of this doctoral thesis (from page 111).

Part A is organised into eight chapters. Chapter 1 outlines the purpose and topics that are addressed by this thesis, also pointing to gaps in the existing research. This is followed by a presentation of the research aims and questions of the thesis, with a brief overview regarding how each of the nine articles addresses the various research questions. Chapter 2 details the context in which this thesis has been written and explains the contributions of the thesis author to each of the nine articles referred to above. Furthermore, chapter 3 presents the state-of-the-art with regards to research on the topic at hand, while chapter 4 explains the reasoning behind the selection of the conceptual approaches to the study of innovation in forestry which is applied in this thesis. Chapter 5 presents and justifies the methods used in the research articles. Following on from this, chapter 6 then provides short summaries of the nine research articles while also providing a final short paragraph on the articles' contribution to the state-of-the-art at the end of each summary. Chapter 7 brings all the findings together and discuss them concisely and coherently before discussing the theoretical perspectives, concepts, and methods used in the research for this thesis. Finally, chapter 8 provides some concluding remarks and observations to indicate promising directions for future research.

2 Context of the Thesis and Contributions of the Author

This chapter details the context in which this doctoral thesis has been undertaken. It provides background information on the projects in which the author of the thesis was involved while working on the thesis (see chapter 2.1) as well as an overview of the work carried out in the research articles that were selected for this thesis (see chapter 2.2).

2.1 Research Projects and The Thesis

While working on the thesis, the author was involved in several European research projects, namely:

- FP7 StarTree (*Multipurpose trees and non-wood forest products: a challenge and opportunity*),
- H2020 SIMRA (*Social innovation in marginalised rural areas*),
- H2020 CLEARINGHOUSE (*Collaborative learning in research, information-sharing and governance on how urban forests as nature-based solutions support Sino-European urban futures*),
- Erasmus+ Vet4Bio (*Innovative Vocational Education and Training (VET) for key competences in the emerging field of forest bioeconomy*);
- COST Action FP1201 Facesmap (*Forest land ownership change in Europe: significance for management and policy*);
- COST Action FP1204 GreenInUrbs (*Green infrastructure approach: linking environmental with social aspects in studying and managing urban forest*).

The dissertation specifically draws on research conducted for the following two projects:

- **The FP7 Project StarTree (Multipurpose trees and non-wood forest products: a challenge and opportunity)**

The StarTree project was designed to provide a better understanding, knowledge, guidance and set of tools to support stakeholders in both optimising the management of multi-purpose trees (MPT) and developing innovative approaches to increase the marketability and profitability of non-wood forest products, hence contribute to more competitive rural economies. The project was coordinated by the European Forest Institute's Mediterranean Regional Office (EFIMED) based in Barcelona (Spain) between 2012 and 2016. The University of Natural Resources and Life Sciences, Vienna (BOKU) was a partner in the project and responsible for a work package entitled "Innovation systems and processes". The overall aim of this work package was to gain a better understanding of the innovation processes in the management of multipurpose trees and in the production of NWFPs, the roles of the various actors in the innovation systems and to develop practice-oriented guidelines and tools to support innovation (see <http://www.star-tree.eu/>). The thesis author worked as a researcher in a team conceptualising and conducting the tasks required by the work package. The work of our group resulted in six research articles of which four were employed to contribute to this thesis (Articles 2, 4, 7 and 8).

- **The H2020 Project SIMRA (Social innovation in marginalised rural areas)**

The SIMRA project was designed to address the knowledge gap caused by our limited understanding of social innovations in marginalised rural areas while also advancing the state-of-the-art in social innovation and connected governance mechanisms in the agriculture and forestry sectors as well as rural development in general. This project ran from 2016 to 2020 under the coordination of the James Hutton Institute Aberdeen (United Kingdom). The University of Natural Resources and Life Sciences,

Vienna (BOKU) was again a project partner responsible for a work package entitled “Policy and practice”. This work package examined the current political framework conditions and analysed how far and in which way policy designs support or hinder social innovations. Thus, in essence, it analysed social innovation-related policies and governance based on empirical case studies. Special attention was given to the role of institutional and political conditions as well as the policy instruments influencing businesses and entrepreneurial behaviour and attitudes which then had flow-on effects for the creation of new markets and investment opportunities. Furthermore, the work package team developed guidelines and recommendations for defined target groups in the realms of policy-making and practice (see <http://www.simra-h2020.eu/>). As was the case with the other cited projects, the thesis author worked in a team of researchers which planned, conceptualised and undertook the various tasks required by the work package. Part of the outcome of this endeavour was nine scientific articles on the results, of these, three are included in this thesis (Articles 1, 5 and 9).

Supported by the SIMRA project, the thesis author undertook further empirical research in Serbia, conducting expert interviews at various levels (local to national) to explore the institutional background and conditions suited for developing social innovations in rural areas. These additional efforts have resulted in two further research articles thus far, both of which form a part of this thesis (Articles 3 and 6).

2.2 Scientific Outputs and Contributions of the Author

The research articles which resulted from the above-mentioned projects and are part of this thesis and are briefly presented in Table 2 to indicate the specific contributions of the author of this thesis.

Table 2. Specific contributions of the author to the scientific papers in this thesis

Article	Specific contributions of the thesis author	Impact factor (year of publication)
Article 1 Weiss, G., Ludvig, A., Živojinović, I.* 2020. Four decades of innovation research in forestry and the forest-based industries – A systematic literature review. <i>Forest Policy and Economics</i> , 120, 102288	<i>corresponding author</i> <ul style="list-style-type: none"> • Major contributions to the formulation of the research questions • Major contributions to the conceptual structure • Lead role in data collection • Major contribution in the selection process of articles to be reviewed and of their analysis • Lead role in the preparation and revision of all versions of the manuscript and supplementary materials 	3.139
Article 2 Živojinović I. , Nedeljković J., Stojanovski V., Japelj A., Nonić D., Weiss G., Ludvig A. 2017. Non-timber forest products in transition economies: Innovation cases in selected SEE countries. <i>Forest Policy and Economics</i> , 81: 18-29 https://doi.org/10.1016/j.forpol.2017.04.003	<i>first and corresponding author</i> <ul style="list-style-type: none"> • Lead in the formulation of the research questions and conceptual structure • Lead in the literature review regarding conceptual and empirical work • A major contribution to the development of the overall structure and the analytical framework • Sole responsibility for the preparation and revisions of all drafts and the final publication 	2.748

<p>Article 3 Živojinović I., Ludvig, A., Hegl K. 2019. Social innovation to sustain rural communities: Overcoming institutional challenges in Serbia. Sustainability, 11, 7248 doi:10.3390/su11247248</p>	<p>first and corresponding author</p> <ul style="list-style-type: none"> • Lead in the formulation of the research questions and conceptual structure • Sole responsibility for the review of the literature and empirical work • Responsible for the case study selection and data collection • Lead in data analysis and interpretation of the results • Lead in the preparation and revision of all draft versions of the manuscript 	<p>2.576</p>
<p>Article 4 Weiss G., Ludvig A., Živojinović I., Asamer-Handler M., Huber P. 2017. Non-Timber innovations: How to innovate in side-activities of forestry - Case study Styria, Austria. Austrian Journal of Forest Science, 134. Jahrgang (2017), Sonderheft 1: 231 – 250</p>	<p>co-author</p> <ul style="list-style-type: none"> • Significant contributions to the formulation of the research questions • Contributions to the conceptual structure • Contributions to the preparation and revision of all versions of the manuscript 	<p>0.862</p>
<p>Article 5 Ludvig A., Weiss G., Sarkki S., Nijnik M., Živojinović I. 2018. Mapping European and forest related policies supporting social innovation for rural settings. Forest Policy and Economics, 97: 146–152 https://doi.org/10.1016/j.forpol.2018.09.015</p>	<p>co-author</p> <ul style="list-style-type: none"> • Significant contributions to the formulation of the research questions • Contributions to the conceptual structure of the article • Significant contributions to the preparation and revision of all versions of the manuscript 	<p>3.17</p>
<p>Article 6 Lukesch, R., Ludvig, A., Slee, B., Weiss, G., Živojinović, I. 2020. Social Innovation, societal change and the role of policies. Sustainability 12(18), 7407</p>	<p>co-author</p> <ul style="list-style-type: none"> • Significant contributions to the formulation of the research questions • Contributions to the article by providing a case study (including data collection and analysis) • Significant contributions to the preparation and revision of all versions of the manuscript 	<p>2.576</p>
<p>Article 7 Živojinović I., Weiss G., Wilding M., Wong J.L.G., Ludvig A. 2020. Experiencing forest products – an innovation trend by rural entrepreneurs. Land Use Policy, 94, 104506 https://doi.org/10.1016/j.landusepol.2020.104506</p>	<p>first and corresponding author</p> <ul style="list-style-type: none"> • Lead in the formulation of the research questions and conceptual structure • Lead in the literature review of the existing conceptual and empirical work • The main responsibility for the development of the overall structure and the analytical framework • Sole responsibility for the preparation and revision of all draft versions of the manuscript 	<p>3.682</p>

Article 8 Weiss, G., Emery, R.M., Corradini, G., Živojinović I. 2020. New values of non-wood forest products. <i>Forests</i> , 11, 165 doi:10.3390/f11020165	co-author <ul style="list-style-type: none"> • Significant contributions to the formulation of the research questions • Contributions to the conceptual structure of the article • Contributions to the preparation and revision of all versions of the manuscript • Preparation of all figures in the paper 	2.221
Article 9 Ludvig, A., Hujala, T., Živojinović I. 2019. Social innovation as a prospect for the forest bioeconomy: Selected examples from Europe. <i>Forests</i> , 10, 878 doi:10.3390/f10100878	co-author <ul style="list-style-type: none"> • Significant contributions to the formulation of the research questions • Contributions to the conceptual structure of the article • Contributions to the preparation and revision of all versions of the manuscript • Preparation of all figures in the paper 	2.116

In addition to the above-listed articles, Table 3 presents the additional output of the author which also relates to the subject matter of the present research. These outputs have not been selected for the thesis, as some of them are book chapters, thus do not qualify for PhD thesis. Others are related to the innovation process in forestry, but not to social or NWFP innovations, while some were published after the process of the framework writing started.

Table 3. Additional scientific outputs with topical relevance by this thesis' author (not included in this thesis)

Article	Specific contributions of the thesis author	Impact factor (year of publication)
Ludvig, A.; Sarkki S.; Weiss, G.; Živojinović, I. 2021. Policy impacts on social innovation in forestry and back: Institutional change as a driver and outcome. <i>Forest Policy and Economics</i> , 122, 102335.	co-author	3.139
Ludvig, A.; Rogelja, T.; Asamer-Handler, M.; Weiss, G.; Wilding, M.; Živojinović, I. 2020. Governance of social innovation in forestry. <i>Sustainability</i> , 12, 1065.	co-author	2.576
Poduška, Z., Nedeljković, J., Nonić, D., Ratknić, T., Ratknić, M., Živojinović, I.* 2020. Intrapreneurial climate as a momentum for fostering employee innovativeness in state forest enterprises. <i>Forest Policy and Economics</i> , 119, 102281.	corresponding author	3.139
Weiss, G., Pelli, P., Orazio, C., Tykka, S., Živojinović I. , Ludvig, A. 2017. Forest industry clusters as innovation systems: Analysing innovation support frameworks in five European regions. <i>Austrian Journal of Forest Science</i> , 134(2). Jahrgang (2017): 119-148.	co-author	0.862
Weiss, G.; Ludvig, A.; Asamer-Handler, M.; Fischer, C.; Vacik, H.; Živojinović, I. 2019. Rendering NWFPs innovative. In: Wolfslehner, B., Prokofieva, I. and Mavsar, R. (Eds.) <i>Non-Wood Forest Products in Europe – Seeing the Forest Around the Trees. What Science Can Tell Us 10</i> ; European Forest Institute: Joensuu, Finland, 77–98.	co-author	-

Ludvig A., Hujala T., Živojinović I. , Weiss G. 2019. Social and Institutional innovations in family forestry. In: Hujala, T., Toppinen, A., Butler, B. (Eds.) Services in Family Forestry, Springer International Publishing, p. 269-285 (ISBN 978-3-030-28998-0)	co-author	-
Amici, A; Beljan, K; Coletta, A; Corradini, G; Constantin Danila, I; Da Re, R; Ludvig, A; Marčeta, D; Nedeljković, J; Nichiforel, L; Nonić, D; Pettenella, D; Posavec, S; Riedl, M; Sisak, L; Stojanovska, M; Vidale, E; Weiss, G; Živojinović, I. 2020. Economics, marketing and policies of NWFP. In: Vacik, H; Hale, M; Spiecker, H; Pettenella, D; Tomé, M (Eds.) Non-Wood Forest Products in Europe - Ecology and management of mushrooms, tree products, understory plants and animal products, 125-202; Books on Demand, Norderstedt; ISBN 978-3-7494-7546-9	co-author	-

Contributions to various conferences by the thesis author and her involvement in teaching activities on the topic of innovations, as well as other scientific outputs arising from project activities during the period of thesis writing, are listed in Annexes (A1, A2, A3).

3 Research background

This section sets the stage for the subsequent analysis by outlining the strands of literature upon which the research for this thesis is based. The chapter starts with a brief overview of the meanings of innovation and the different interpretations that have been assigned to this term over time. Then the chapter proceeds with a presentation of key aspects of innovations in forestry, with a specific focus on new forest products and services, such as non-wood forest products and social innovations. Finally, the chapter ends with an account of the institutional and actor-related factors influencing the relevant innovation processes.

3.1 The Changing Discourse on Innovation Over Time

Use of the term ‘innovation’ dates back to the seventeenth century when it was used in political and ideological debates in England where its connotations were social, political and cultural (Moulaert, 2019). Starting in the eighteenth century, the usage had evolved to the point that innovation was largely synonymous with social innovation, as evidenced by the fact it was frequently used in the debates and struggles centred on changing the world and promoting different forms of social advancement (Godin, 2015). Thus, innovation was considered at this point as a benevolent force or agency leading to an improvement of the human condition (Moulaert, 2019). In the early decades of the twentieth century, modernism became the predominant ideology of society where science and technology became the main drivers of human progress (Moulaert, 2019). This induced another change in the understanding of innovation arising from its close association with technical advancement, and broad acceptance was, even if not verbalised as such, one of technological innovation that thus emphasised its economic aspects. From around the 1950s onwards, policymakers adopted this technological focus of innovation as their dominant paradigm (Eder, 2018; Madureira and Torr , 2019) and in this way, the meaning of innovation lost its connection to its historical interpretation (Godin, 2015, Jessop et al. 2013). This change and narrowing of the scope of innovation’s meaning have influenced how such development is conceived and materialised, especially the role of development from bottom-up (Moulaert, 2019; Nelson, 1987). This resulted in a decades-long period when innovation research was conducted almost solely following the neoclassical economic tradition, an approach which aimed to highlight the link between innovation as a source of productivity growth and economic growth, as produced by innovative firms (Nelson, 1987). Since the return of institutional and evolutionary economics at the end of the 1980s, the role of institutions in innovation and development, especially in spatial approaches and other dimensions or types of innovation, has become more relevant (Moulaert and Sekia, 2003). In his discussions on creative destruction, Schumpeter (1983 [1934]) also carefully considered the role of social factors when studying innovations in parallel with economic and institutional factors. In the examination of national and regional innovation systems, the analysis of culture and institutions has become increasingly prominent over time and the focus has expanded from just innovation’s impact on competitiveness to include co-learning and learning regions. This has been supplemented by new approaches for studying innovation development that stress the importance of having a diversity of assets, the role of social relations and empowerment and power (Hubert, 2010; Moulaert, 2019). Even though the connotation of innovation is still dominated by technological advancement, the last decade has seen socially innovative approaches become a more entrenched part of the broader picture, stressing the importance of social relations, the involvement of local communities and the necessity of implementing socio-political transformations to support local development (Hubert, 2010, Do Adro and Fernandes, 2019; Moulaert, 2019).

Innovation, irrespective of its specific connotation, is still clearly identified as a key driving force for

economic growth (EU, 2020b). This fact is reflected in many EU policies (EU Green Deal, Cohesion Policy programmes for 2014-2020, Lisbon Strategy 2020), as well as in innumerable national innovation policies in various countries. In order to accelerate its modernisation processes, the EU sees the uptake of product and service innovations, use of innovative manufacturing technologies and the introduction of new business models as necessities (EU, 2020b). The Lisbon Strategy for Growth and Jobs, as well as the financial crisis of the early 2000s, have revealed structural weaknesses in Europe's developmental plans and shone a light on many social aspects that were previously overlooked. Economic growth, which has traditionally been seen as the key to creating employment and wealth and thus alleviating poverty, has been challenged and the need for new, broader-based approaches has become evident. Thus the policy focus, in Europe at least, has now become more inclusive as it now aims to lift people out of poverty and promote growth and well-being not only for but also with the citizens (Hubert, 2010). This was first reflected in the key priorities of the Europe 2020 Strategy and of the Territorial Agenda 2020, which were adopted to build a smart, sustainable and inclusive economy in which there is an emphasised role to harness the thus far neglected potential of social issues. The EU's actions on social innovation stem from the Innovation Union Initiative (2010) and the Social Investment Package (2013), both of which were designed to facilitate the inducement, uptake and scaling-up of social innovation solutions along with the more traditional technological innovations (EU, 2020c). Thus one can now see the promotion and support of various types innovations is a central feature in a range EU policies and programmes such as European Green Deal, Cohesion Policy programmes for 2014-2020, Smart specialisation strategies, Common agricultural policy (EU, 2020a,b,c), as well as policies adopted around the globe (SDG, 2020, US, 2020). Academic work has to some extent influenced these developments and in last two decades become increasingly focused on the research of other innovation types (e.g. service, social, institutional, grassroot innovations) in parallel to the technological and market-oriented innovations (Van der Have and Rubalcaba, 2016; Do Adro and Fernandes, 2019).

3.2 Definitions and Types of Innovations

Both the term and the associated concept of innovation can embody two closely interrelated basic aspects depending on how the word 'innovation' is used. When innovation is used without an article and in the singular form, it refers to the phenomena and general process of discovering something new, as is found in concepts such as innovativeness, innovation diffusion or innovation orientation. The second usage, involving innovation being used in conjunction with an article and possibly in plural form, refers to the results and outcomes of a specific innovation, or number thereof, and may describe specific examples of innovations in qualitative or quantitative terms by referring to different types of innovations such as new products or production processes (Weiss, 2019).

Most commonly, innovation is understood as the specific process when an idea, invention or novelty is practically applied or introduced to the market or some other practical field of activity (Weiss et al., 2020a). Schumpeter (1947) describes innovation as the doing of new things or the doing of things that are already being done in a new way, noting that innovation is a process by which new products and techniques are introduced into the economic system. In his work, he distinguishes between new products, new services, new processes, new markets, new platforms, new organisational forms and new business models while simultaneously emphasising both the market-making and market-shaping activities of private, public and non-profit actors (Caulier-Grice et al., 2012). Technological innovation has been defined as "a non-trivial change in products and processes where there are no previous experiences" (Nelson et al., 1977) or "the first commercialization of an idea" (Fagerberg 2004). Scholars have gradually broadened their scope of understanding of what constitutes technological innovations to

include organisational innovations in their studies (Lundvall, 1992). This broader understanding of innovation found also its way into practice, one example being the OECD (2005, p.46) which defines innovation as “the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations”. In recent decades, researchers have also focused on institutional innovations where a spotlight is shone on the new policy-level solutions and improved institutional arrangements (Ludvig et al., 2016b) and on social innovations when referring to innovations where civil society actors are significantly involved in innovation processes (Nijnik et al., 2018).

Innovations can also be distinguished based on the degree of novelty they employ. The novelty of innovations relates to the concept of innovation diffusion through which innovations penetrate the market and where their novelties are adopted (and adapted) by firms in one or more economic sectors (Rogers, 1995). In this regard, one can distinguish between radical and incremental innovations, discontinuous (basic) and continuous (interrelated) innovations, or innovations that are simply new to the firm (as the minimum requirement), new to a market, sector or even new to the world (OECD, 2005, p.57). According to Rametsteiner et al. (2005), all these innovation types are important parts of innovation processes when viewed from a macro-economic, institutional or sectoral view.

3.3 Innovations in Forestry

Forestry is usually perceived as a traditional and mature economic sector which is not very innovative (Weiss, 2019). However, this image is currently undergoing a transformative process. Growing attention by policymakers, increased interest from science and evolving behaviour from involved actors have highlighted the importance of the forestry sector in creating economic growth as well as the beneficial role of innovation in promoting many aspects of forestry while enhancing the quality of life in rural areas (Poduska et al., 2020; Jarský, 2015; Ludvig et al., 2016a; Rametsteiner et al., 2005; Rametsteiner et al. 2010; Tunzelmann and Acha, 2004; Weiss et al., 2011). In the light of the new bioeconomy paradigm and other challenges that our society is facing today (Weiss, 2019; Secco et al. 2018a), the traditional image of forestry is currently changing from staid and static to a “future sector” which can offer solutions to a range of these challenges. In this vision, innovations play a key role and are seen as a way to enable the sector to fully exploit its potential in this promising new role (Weiss, 2019). It is also shown that low and medium-technology sectors still play a major role in job creation and growth, especially in rural areas (Hirsch-Kreinsen and Jacobson, 2008). The forest sector has a wealth of yet untapped potential to provide a range of ecosystem services and amenities which contribute to the quality of life in rural areas (Weiss, 2019). Another key aspect pushing forestry to the foreground is that forest-based products are renewable resources and thus contribute to sustainability goals, a factor which makes the entire sector increasingly recognised by policymakers and new policy programmes (FAO, 2019; Weiss, 2019).

In scientific terms, the study of innovation has become its own distinct research field, a situation mirrored when it comes to innovation in forestry and forest-based industries (Hansen et al., 2014; Weiss, 2019). This can be illustrated with a range of innovation-related public research programmes where innovation has been one of the specific research topics in various interdisciplinary programs or projects. Several topic-specific books (Rametsteiner et al. 2005, 2010; Weiss et al. 2011; Niskanen et al. 2007) and special journal issues related to innovations in forestry have been published, such as in the Forest

Chronicle (2002) and Forest Policy and Economics (2006; 2018, 2020)³, all of which illustrate the relevance of this topic for the sector.

Thus far, a significant body of literature has dealt with innovations in the forest sector around the globe (Hansen et al., 2014) with specific emphasis placed on the factors influencing innovations in the wood industry (Korhonen, 2006; Stendahl and Roos, 2008). Furthermore, studies were often focused on innovation strategies, innovative working climates, learning orientation and innovativeness at the company level (Nybakk, 2012; Nybakk and Jenssen, 2012). Many of the European studies to date have used the systems of innovation research approach (Rametsteiner and Weiss, 2006a), while studies in North America have been predominately focused on organisational innovativeness (Hansen et al., 2014). To date, several literature reviews have been conducted on the topic (Kubeczko and Rametsteiner, 2002; Spilisbury and Kaimowitz, 2002; Hansen et al., 2006; Niskanen et al., 2007; Hansen, 2010; Weiss, 2011; Weiss, 2013; Hansen et al., 2014; Nybakk et al., 2015; Lindroos et al., 2017; Guerrero and Hansen, 2018; Korhonen et al., 2018) however no recent, systematic and comprehensive literature review for the whole forest sector had been undertaken until that situation was rectified by research Article 1, which is used in this thesis.

3.3.1 Innovations in Diversified Forest Products and Services

Even though timber products are considered the main product line of forestry due to their great economic importance and well-structured, competitive value chains (Lawrence, 2003), many forest enterprises have started to diversify and expand their portfolios of products they offer. This diversification has resulted in various NWFPs being sold into the marketplace (Ludvig et al. 2016a, b; Nedeljković, 2015; Wolfslehner et al., 2019; Wong and Wiersum, 2019) alongside a proliferating number of ecosystem services that forests are now providing, such as recreation, health services (Niskanen et al., 2007; O'Brien Mee, 2009; Pettenella et al., 2007) or even various nature-based experiences that customers can participate in (Helles and Vedel, 2006).

As an area of interest, topics related to non-wood forest products innovations as well as social innovation in forestry and forest-related sectors have received focus with an increased number of pertinent articles being published in the last decade. This has been boosted by two recent EU FP7 and H2020 projects: StarTree which looked at the production, institutional, marketing and innovation aspects related to non-wood forest products (Vacik et al., 2020; Wolfslehner et al., 2019) and the SIMRA project which was devoted to the exploration of social innovations in marginalised rural areas and where forestry was one of the considered sectors (Nijnik et al., 2019, Vercher et al., 2020).

3.3.1.1. Non-Wood Forest Product-Related Innovations

Wolfslehner et al. (2019, page 9) define NWFPs as “wild and semi-wild non-wood forest species and products thereof, as well as products in early stages of domestication, e.g. fruit trees, bushes, orchards, and with reference to specific services related to NWFPs such as wellbeing and tourism”. Non-wood forest products have a long and well-known history as trade commodities; however, they were

³ The Forestry Chronicle (2002), Volume 78(1), “Science and Technology and Innovation”, <https://pubs.cif-ifc.org/toc/tfc/78/1>; Forest Policy and Economics (2006), Volume 8 (7), “Innovation and entrepreneurship in the forest sector”, <https://www.sciencedirect.com/journal/forest-policy-and-economics/vol/8/issue/7>; Forest Policy and Economics (2019), “Social innovation to increase the well-being of forest-dependent communities and promote sustainability in remote rural areas”, <https://www.sciencedirect.com/journal/forest-policy-and-economics/special-issue/10H9J184QXV>; Forest Policy and Economics (2020) “Innovation governance”, <https://www.sciencedirect.com/journal/forest-policy-and-economics/special-issue/104TQG6VK5>

commercially neglected after WWII as is evidenced by their decreasing share in international trade (Sills et al., 2011). However, offering and using NWFPs within many European countries represented and remained a traditional, cultural and popular activity (Mantau et al., 2007; Lawrence, 2003). Since the 1980s, there has been a revival of interest from both practitioners and scientists in NWFPs, a trend which has further strengthened since forest ecosystem services have become better acknowledged and appreciated (Janse and Ottitsch, 2005). Indeed, a whole raft of NWFPs (particularly products such as truffles, mushrooms etc.) have again become economically recognised and valued in recent times (Lovrić et al., 2020a; Nedeljković, 2019; Wolfslehner et al., 2019; Wong and Wiersum, 2019; Maso et al., 2011; Sisak et al., 2016).

An assessment of this aspect of forestry reveals that there is ever-increasing evidence that NWFPs are an important but underrated segment of forest goods and services (Lovrić et al., 2020a; Nedeljković, 2019). However, there remains a need to better scrutinise what can and should be done in this field to fully realise the potential of these products, not only in forestry but more broadly in a rural development context (Wolfslehner et al., 2019).

The importance and value of NWFPs were often associated with their commercialisation and export (Maso et al., 2011). NWFPs attract the attention of innovative businesses and entrepreneurs as they have shorter production cycles than timber and embody distinct local cultural and traditional values (Lawrence, 2003), thus are suitable as an additional source of income and activity to supplement common forestry activities such as timber production (Lovrić et al., 2020a). The social and cultural aspects of harvesting, use and marketing of NWFPs were for a long time neglected (Sills et al., 2011) despite such aspects having significant value in connection with the various products. These social aspects are diverse, ranging from those that relate to health, well-being and local cultural values such as maintaining traditions and identities, to those pertaining to the sociability of gathering products, knowledge transfer, ensuring long-term supply sustainability as well as market demand and volatility (Emery et al., 2006). With new economic situations and changing societal values, NWFPs are today becoming more connected to new urban demands (Amici et al., 2020), with NWFPs being integrated into new cultural lifestyles and gaining importance beyond just their economic value (Emery et al., 2006; Dyke, 2003). Their traditional or subsistence uses can be fundamentally transformed when a desire for health, natural or traditional products in the consumer supersede the sellers' need for income or basic provisioning (e.g. food supply) (Weiss et al., 2019). Nowadays, there is a wide variety of products and services related to NWFPs available to customers located far from such products sources (Janse and Ottitsch, 2005; Vedel, 2010; Wolfslehner et al., 2019). As a result of this increased availability and public visibility, they are now seen as representing an additional opportunity for the promotion and development of rural areas dependent on forest resources (Kathe et al., 2003; Niskanen et al., 2007; O'Brien Mee, 2009). This is a positive development as history has shown that innovative entrepreneurs tend to utilise such opportunities to fill certain market niches thus improving the economic conditions for themselves and those in their immediate surrounds (Šalká et al., 2006).

NWFPs are a part of complex social, institutional and economic systems which make the importance of their use for commercial purposes difficult to estimate (Mantau et al., 2001; Rametsteiner et al., 2005). There are a number of factors which influence this. For example, property rights are often not clearly defined or the formal definition differs from informal practice (Wolfslehner et al., 2019; Bouriaud, 2007). Furthermore, these products often have a public good character and are not cultivated but are taken from the wild, thus governments must decide whether to grant the public free access to these products (Mantau et al., 2001, Amici et al., 2020). Additionally, NWFPs do not belong to any established economic

sector which makes support for them limited as they are often not supported directly by either forest or agricultural policies nor by other sectors (Weiss et al., 2019). Innovating with NWFPs also face institutional barriers from established, powerful groups or inadequate jurisdictional and legal frameworks (Buttoud et al., 2001; Prokofieva et al., 2019; Weiss et al., 2019). As a consequence, innovations in NWFPs are usually developed outside formal support frameworks by enthusiastic entrepreneurs who find opportunities to innovate without much institutional support (Ludvig et al., 2016a) and where the success of these innovations largely depends on the skill of the entrepreneur and the intangible values intertwined with these products (Emery et al., 2006).

Different aspects and types of innovations related to NWFPs have been studied around the globe in the past four decades (Weiss et al., 2019), including some of the articles used in this thesis. Another specific example of NWFP innovation studies can be found in Zhang et al. (2014), who studied innovative aspects of mushroom cultivation as a mean of food security and rural development in China. The diversification of forest production through the introduction of a greater range of NWFPs has been studied in both developed and developing countries, often related to locally-based businesses where their success is often a result of local initiative and collective ownership that can draw on good institutional support (Macqueen et al., 2020; Nedeljković, 2019). In some studies, entrepreneurs have been found to be the main driving force in innovation and this points to the fact that policy support for commercialisation and upscaling needs to be tailored to each value chain (Te Velde et al., 2016). This interconnectivity between local initiatives and institutional support has been shown in studies dealing with NWFP innovations in developed countries as well. Nybakk et al. (2009) demonstrated that social networking and learning orientation of landowners significantly influenced the innovativeness and economic performance of NWFPs and services. What is also identified in many studies is that NWFP innovations are typically generated from the bottom-up in small, regional and often cross-sectoral “ad-hoc” networks with little policy support (Ludvig et al., 2016a; Schunko and Vogel, 2018; Weiss, 2019). Such studies point to the need for producers’ associations and policy support measures fitting local, bottom-up situations and initiatives that support cross-sectoral interaction and information exchange and could be effective even with low-level bureaucratic input and small-scale funding (Ludvig et al., 2016a; Schunko and Vogel, 2018). The importance of both formal and informal institutions as well as the various actors involved in innovations, be they local public administrations, multinational enterprises, international or national associations or even national research entities, was well highlighted in a study of cork production in Portugal (Ferreiro and Sousa, 2018). Need for recognition of the socio-cultural and economic relevance of gathering wild NWFPs has also been stressed as well in some papers (Schunko and Vogel, 2018).

3.3.1.2. Social Innovations in Forest and Forest-Related Sectors

Social innovations include new institutional environments (e.g. formal and informal rules) and arrangements (spatial and procedural), related actors’ relationships and interactions (e.g. new attitudes, collaborations, values, behaviour, skills, practices and learning processes) as well as new fields of activity (e.g. social entrepreneurship, social enterprises). Nicholls et al. (2015) wrote that social innovation can take the form of specific ideas, actions, frames, models, processes, services, rules and regulations, as well as new organisational forms. Social innovations are non-material in nature, their material outcomes are solely a by-product when they stop focusing on needs and turn instead to asset building. Usually, social innovations become manifest in changes of attitudes, behaviour or perceptions that result in new social practices (Cajaba-Santana, 2014). Interest in the field of social innovation is widespread as it cuts across governments, civil society as well as businesses and investors. Furthermore, this interest is

generated in different sectors of the economy and geographic regions thus covering multiple dimensions of society (Nicholls et al., 2015; Phillips, 2011).

In the last two years, social innovations have become an increasingly researched topic in forestry as it has in several other economic fields (Klůvanková et al., 2018). Within forestry, social innovations arise and can be studied in both urban and rural settings with a number of detailed studies appearing in the last few years, primarily due to the SIMRA project (Nijnik et al. 2018, 2019). The role of forestry social innovations in rural areas is highly relevant as it can foster rural development that can contribute to building a smart, sustainable and inclusive economy (Pereira et al., 2020; Melece, 2015). However, their region-by-region diversity (in terms of territorial, human, social, institutional, natural/physical and economic characteristics) and the often unbalanced manner in which they develop are major challenges that need to be addressed by social innovators (Nijnik et al., 2019). Tackling these various challenges that rural regions face demands new solutions that meet societal needs and lead to new or improved capabilities and relationships coupled with better use of local resources (European Commission, 2013). Given the ever-present budgetary constraints felt at all levels of government, social innovation is an effective way of mobilising people's creativity to develop novel solutions addressing rural issues while making better use of locally available resources and simultaneously promoting innovative and progressive societies (BEPA, 2011). This need also arises from the ongoing debate and critique on traditional innovation theory which does not assign sufficient value to society as a contextual factor that seriously influences the development, diffusion and use of innovations (Bock, 2012). Research on the practical experiences of rural development has shown that innovations have been understood in terms of social (to encourage local linkages and collective learning cultures) and cultural (to improve the rural milieu) innovations more often than in the sense of policy and technological innovations (Dargan and Shucksmith, 2008).

Nowadays, social innovations have secured a place as a key part of pan-European policies. The first EU action on social innovation was framed in the Innovation Union Initiative (2010) and in the Social Investment Package (2013), both of which aimed to facilitate the creation, uptake and scaling-up of social innovation solutions to various issues (EU, 2020c). Social innovations also became a recognised part of the Common Agricultural Policy (CAP) (European Council 2011) as well as in numerous national and regional policies in EU Member States. Despite steadily gaining in profile, a deficit in the implementation of and studies on social innovations can still be noted in some areas (Knill & Lenschow, 2000) and sectors (such as forestry and agriculture) (Melece, 2015; Science Communication Unit, 2014; Neumeier, 2012). Although scholars have developed approaches for measuring social innovation process characteristics, much remains to be done to link social innovations with the analysis of diverse policies and desired policy outcomes (Koontz & Thomas, 2006). When it comes to studying policy aspects of social innovation, it is essential to consider the local conditions and various intermediating factors. An analysis of social innovation governance reveals the growing predominance of certain mechanisms involving public-private participation where civil society plays a key role (Garcia et al., 2015). Numerous initiatives (LEADER groups, the integration of marginalised rural groups, local food initiatives, innovative ways of providing social services, social/urban forestry and farming, etc.) already show that different governance structures have been evolving in different rural and urban areas in parallel with the conventional approaches still employed to foster rural and agricultural development.

Studies dealing with the institutional and policy aspects of social innovations have revealed that existing and more traditional policy frameworks often hinder the development of social innovations due to their "top-down" nature (Ludvig et al., 2018b). Fragile institutional systems, in terms of weak governance

structures and weak enforcement of the rule of law, also have negative impacts on social innovations (Ludvig et al., 2018b; Rogelja et al., 2018). Analysis of policy framework impacts on the development of forestry-based social innovation initiatives in Slovenia showed that existing social innovations have to navigate through cumbersome policy framework conditions and survive using only their existing financial means (Rogelja et al., 2018). Literature has also demonstrated that social innovation initiatives are often developed through informal institutions where individual leadership and collective action, built on interpersonal trust among self-organised forest communities, play the most prominent roles (Klůvanková et al., 2018). In this bottom-up process, human values may be the primary catalysts (Sarkki et al., 2019), a claim supported by the fact that volunteer work often seems to be very helpful, if not essential, in initial phases of innovation development (Ludvig et al., 2018b). Other important factors for the success of social innovations in forestry are the availability of financial resources and, in some cases, even small amounts of temporary but well-targeted funding can be of crucial importance (Ludvig et al., 2018b). Bottom-up actions, the involvement and participation of various actors in decision-making to promote social innovation is also useful for reducing potential conflicts between actors and in designing policy and practice related measures (Nijnik et al. 2018; Wilkes-Allemann and Ludvig; 2018).

3.3.2 Institutional and Actor-related Factors Influencing Innovations in Forestry and Forest-Related Sectors

For a complete understanding of innovation processes, it is necessary to look at the spatial, sectoral, societal, institutional and political factors involved (Weiss, 2019). In the forestry sector, some of these factors can challenge innovation processes, especially when looking at innovations involving the provision of services or those that are site-specific. Many forest products and services are bound to a particular location, either because it is the place of production or only place that can provide a particular service or landscape (Slee, 2011). Social innovations are also often locally bound and connected to the territory on which they operate (Ferreiro and Sousa, 2018; Nijnik et al., 2019). The intangible nature of social innovations can make them hard to market (Sarkki et al., 2019; Secco et al., 2019), a problem that extends to the so-called “soft” forest values, which are often included in non-wood products or services, however, with some effort both innovations and their products can be transformed to be more marketable (Mantau et al., 2001; Mavsar et al., 2008). The previously mentioned territorial character of these products can be of great value in their marketing as it gives them a specificity and reputational boost, such as is the case with speciality forest-food products from “the wild” (Weiss, 2019).

The nature of property rights also has a significant impact on the potential for innovation as such rights are not always clearly defined or the formal definition differs from informal practice (Wolfslehner et al., 2019; Bouriaud, 2007). In principle, well-defined property rights guarantee the right to gain income from the assets owned or used (Salka et al., 2006), this minimises possible conflicts arising from multiple uses and users operating on the same piece of land (Bouriaud, 2007). When one looks at NWFPs, the forest owners’ rights in many countries do not contain exclusive rights that extend to such products. This can be illustrated with mushroom and berry picking that is an open-access activity in many countries (Prokofieva et al., 2019) but hunting and fishing is often the exclusive privilege of the owner of the land where the latter two occur (Bouriaud, 2007). Complicating the matter further is the fact that intangible values, such as contributions to the beauty of the landscape, are not subject to ownership at all (Bouriaud, 2007). Enforcement of property rights is an issue that falls to the legal and institutional domain (Nichiforel et al., 2018) and how effective enforcement can depend on the product or service in question (Bouriaud, 2007). Even though property rights are important for developing innovation, it can be observed that activities such as recreational services in forests have developed in quite diverse

institutional settings, including public and private land ownership as well as in connection with various business forms (Weiss et al., 2007). Indeed, going one step further along this path, one can note that a number of different business models and forms related to NWFPs have also been developed within very different institutional frameworks (e.g., Ludvig et al., 2016a, b).

When looking from an innovation system (IS) (as explained in chapter 4) perspective at developing and diffusing innovations, a broad spectrum of possible support functions needs to be in place, for example, funding/providing incentives, coordination and conflict resolution mechanisms as well as the provision of meaningful information to the actors (Rametsteiner and Weiss, 2006a,b; Jarský, 2015; Sterbova et al., 2018). Successful innovation implementation frequently requires that all core actors actively contribute and are well connected and all functions of the IS are fulfilled (Rametsteiner and Weiss, 2006a). However, this is at times not the case, which points to the certain gaps (often called hindering factors and barriers), which explain deficiencies in the system (Rametsteiner and Weiss, 2006a; Kubeczko et al., 2006; Belis-Bergouignan and Levy, 2010; Šipikal, 2014; Sterbova et al., 2018). Institutional and other barriers to innovation may also contribute to this problem and further explain the slow adoption rate of innovations in the forest sector (Innes, 2009).

Many studies have emphasised the important role of institutional frameworks and policies for innovation development (Rametsteiner and Weiss, 2006a, b; Tykkä et al., 2010; Buttoud et al., 2011; Hurmekoski et al., 2015; Jarský, 2015; Sterbova et al., 2018; Purkus et al., 2018; Rogelja et al., 2018). In certain regions, existing policies and institutional settings may be beneficial for certain forestry practices, while in other regions the same policies and settings may be too inflexible to enable the development and adoption of innovations (Innes, 2009). This has been observed in some countries where national schemes promoting innovation are developed but are not well translated into functional sectoral policies suited to areas such as forestry (Rametsteiner and Weiss, 2006a; Teder et al. 2007). Thus one can often observe in the forestry sector a lack of innovation specific measures and programmes, especially when it comes to the range of forest ecosystem services and products outside of timber, such as NWFPs or recreational services (Weiss, 2019), or social innovations (Ludvig et al., 2016a, b). Further barriers for innovation in forestry are related to the insufficient level of institutionalisation and formalisation of the IS (Jarský, 2015; Sterbova et al., 2018) and barriers created by the lack of coordination across sectors (Buttoud et al., 2011; Weiss et al., 2017b).

Another often emphasised barrier in the literature is the lack of sufficient interaction among the various types of actors. These interactions can take different forms, from those between research and practice (Stone et al., 2011), with and within public agencies (Aboal et al., 2018), between national and sectoral IS actors (Rametsteiner and Weiss, 2006a), cross-sectoral interactions, those along the value-chains (Rametsteiner and Weiss, 2006a; Kubeczko et al., 2006; Stone et al., 2011; Weiss et al., 2017b) or even between policy and markets (Buttoud et al., 2011). In addressing these interactive barriers and gaps, institutional innovations, such as the formation of associations or clusters and new forms of governance (Buttoud et al., 2011; Hynynen, 2016; Ludvig et al., 2020), are currently seen as among the most effective of remedies (Ng and Thiruchelvam, 2012; Bayne et al., 2016; Weiss et al., 2017b). Yet another barrier which is observed in literature is that innovators often lack the expertise and funding to effectively develop their innovations (Duduman and Bouriaud, 2007). It is widely accepted that knowledge and human resources are at the heart of any innovative process (Cote, 2002). Having at least some prior knowledge is also an important factor, if not precondition, for successful innovation development as is the ongoing learning process that happens during innovation (Shane, 2000). Prior knowledge in this context would include knowledge about the market, how to serve the market and about the customer

needs (Shane, 2000). In this learning process, the role of information exchange is more than relevant and can be done through technology transfer and extension services (Cote, 2002; Van Horne et al., 2006; Stone et al., 2011), two-way information flows among IS actors (Rametsteiner and Weiss, 2006a; Christensen et al., 2011; Sterbova et al., 2018; Aboal et al., 2018), exchanges among forest holdings (Rametsteiner and Weiss, 2006a), entrepreneurs (Ludvig et al., 2016a) or among interconnected industry companies (Hansen and Coenen, 2016; Aboal et al., 2018).

In terms of finances, securing sufficient financial sources is one of the main support function of IS (or policies) to ensure the viability of any innovation (Rametsteiner and Weiss, 2006a, b; Jarský, 2015; Weiss et al., 2017b; Sterbova et al., 2016; Sterbova et al., 2018). However, in many cases, innovators are dependent on self-financing (using their own savings or taking bank loans) due to the limitations and requirements prescribed by certain policy measures (Belletti et al., 2007; Nybakk et al., 2009; Ludvig et al., 2016 a, b). Thus, it can be observed that innovations largely develop due to the high level of interest and enthusiasm of innovators in establishing their project and the personal efforts they put forth in using their own financial resources to get started. In the beginning, innovators are primarily driven by a personal desire for profit and autonomy, which has been recognised as among the major driving forces for innovation in the literature (Hessels et al., 2008). In some cases, innovators are forced into entrepreneurship because they have no other options and this is undertaken without the specific goal of starting an innovative business to create jobs or foster economic growth for either their local area or the nation as a whole (Hessels et al., 2008). What numerous studies made clear, when comparing the importance of different support mechanisms, is that financing is not the indispensable resource but rather this role is held by the availability of information and access to actors in the system (Rametsteiner and Weiss, 2006a,b; Buttoud et al., 2011; Stone et al., 2011; Ludvig et al., 2016a; Ferreira and Sousa, 2018).

In summary to this section then, the current main weaknesses of forestry innovation systems include the lack of openness across sectors for new products and innovations, the lack of explicit innovation-oriented policies and the lack of systemic thinking regarding innovation support measures. Current innovation support is best described as piecemeal, fractured and often not coordinated (Weiss, 2019). Successful forestry innovation examples are best supported by a framework that offers comprehensive policy approaches, cross-sectoral openness and flexible, often regionally oriented support measures that combine various policy instruments including financing, information provision and coordination (Rametsteiner and Weiss, 2006a,b; Ludvig et al.; 2016a; Weiss et al, 2017b). The most successful examples of social innovations are those that have benefited from all three policy dimensions: the sectoral, structural, and institutional dimensions (Slee and Mosdale, 2020). As such, it seems more than advisable that innovation policy instruments must be designed carefully and based on a system perspective that is problem-solving so they can be combined in ways that address the complex range of issues confronting innovation processes (Borrás and Edquist, 2013). Furthermore, trust in institutions and the beneficial framework they provide is considered to be an invaluable factor in driving the successful development and adaptation of innovations (Webb et al., 2019).

4 Approaches to the study of innovations

In this chapter, the main characteristics of approaches used in the articles are briefly presented with more details provided in the summaries of the research articles (see chapter 6) and in the articles themselves (see part B of this thesis). In conceptual terms, the majority of the articles in this thesis are grounded on an innovation system (IS) approach and, in some of the articles, this IS approach is complemented by an institutional void, governance perspective and a focus on the role of policies in innovation. Other theoretical approaches, such as service-dominant logic and the concept of the experience economy are as well used.

4.1 Innovation systems

In the last two decades, approaches to the study of innovations have gone through a gradual but steady shift (Lusch and Nambisan, 2015) from the idea of a linear value chain conceptualised by Porter (1985) to the systemic models approaches dealing with innovations (Edquist, 2001). Linear value chains described innovation development in the context of the dominant linear production and organisational systems existing today in developed countries, where a value chain is a set of activities that a commercial entity carries out to create value for its customers. It covers all the phases from doing research, prototyping, developing products, marketing diffusion and adaptation (Porter, 1985). In contrast to this, the innovation systems (IS) approach conceptualises innovation as a complex process arising from interactions between actors and institutions (Edquist, 2001; Lundvall et al., 2002; Moulaert and Sekia, 2003). It represents a collaboration within a network of actors ranging from suppliers and partners to the customers themselves (Chesbrough, 2003; Nambisan and Sawhney, 2007). Thus it is increasingly seen that innovations are composed of complex value constellations (Michel et al., 2008).

Given our limited systematic knowledge about the determinants of innovations in the field of non-wood forest products and social innovations in forestry in general, the selection of the IS approach proved to be a suitable option for analysing the determinants of specific innovations. The IS approach provided this research with a dynamic perspective as it captures how various factors influence specific innovation processes (Edquist, 2011). This allows the study of innovation processes systematically and in detail, which proves to be very important once the state-of-the-art has advances (Edquist, 2011). The IS approach looks beyond the marketplace and formal property rights dimensions to include the whole system of actors and institutions as well as their interactions. It takes into consideration that both public and private actors have a role in innovation processes. These actors include various governmental authorities, research institutes, training organisations and civil society actors as well as the institutional system in which they act (Rametsteiner et al., 2005). To undertake a better in-depth exploration of specific aspects of innovation systems that were analysed in this research, the IS approach was complemented by the: (i) institutional voids perspective, which allowed an understanding of the institutional gaps that hinder innovation in specific contexts; (ii) a governance perspective, which allowed an understanding of specific actor constellations in certain cases, or with (iii) the role of policies in innovation, which clarified the existent supporting or hindering policy measures that are in place and influence innovation development and diffusion. These specific approaches were used as they are well developed and best suited for the analysis of specific IS approach elements (actors and/or institutions) when compared to the analysis of those elements purely within the IS approach as such. All three of these supporting approaches are compatible with the IS approach and prove to be of great value when it comes to providing the analysis with more details. The other approaches used in this dissertation, such as the experience economy or service-dominant logic approaches, go further in terms of rethinking

producer-consumer relationships and, in particular, regarding changing urban-rural relationships in the co-creation of experiential offers and values connected with forest products. This allowed the present research to explore potentially new market opportunities through the accretion of experiences and new values pertaining to NWFPs. Thus, this thesis contributes to the body of scholarly research on innovations in forestry by providing new knowledge on the innovation systems for NWFP and social innovations in forestry while also yielding new perspectives on the future development of forest-related businesses.

4.1.1 The Innovation Systems (IS) Approach

The IS approach is considered as a conceptual framework rather than a formal theory (Edquist, 2001) and, according to some authors, it should not be too rigorous or 'over-theorised' to remain the basis for an inductive type of research strategy (Lundvall et al., 2002, p. 221; Lundvall 2003, p.9). Others argue that efforts should be made to provide the concept with a stronger theoretical foundation and enhanced applicability (Fischer, 2001; OECD, 2002). Edquist (2004) argues that given the limited systematic knowledge about the factors influencing innovations, conducting "case studies of the determinants (and consequences) of specific innovations or specific (and narrow) categories of innovations are very useful" (page 486). These same authors in particular see the benefits of conducting comparative case studies and analysing similarities and differences of innovation systems of various kinds.

The IS approach frames innovation as an institutional process (Edquist, 2001; Lundvall et al. 2002; Moulaert and Sekia 2003) where there is a collection of actors and institutions that share responsibility with the entrepreneur/innovator for the innovative process (Edquist, 2001). The main elements of IS are comprised of the actors and institutions as well as their interactions (Rametsteiner and Weiss, 2006b). The actors are represented by a set of institutional actors that act in concert to influence innovative performance. They are usually considered as organisations that are consciously created structures with explicit purposes (Weiss et al., 2011). In line with the institutional theory, the actors in IS are also known as "the players of the game" (North, 1991). Actors in IS can be of diverse types (public, semi-public or private organisations) and from different socio-economic systems (economy, research, state) (Küppers and Pyka, 2002) and are embedded in a system of institutions which can support or hinder them in the process of innovating. Institutions in IS represent "the rules of the game" by which the relationships between actors are maintained (Edquist, 1997). Following the reasoning of North (1991), institutions represent a set of habits, routines, rules, laws or regulations that regulate the relationships and interactions among individuals, groups and organisations. Institutions have a threefold role in the innovation process, namely the reduction of uncertainty by providing information, the management of conflict and cooperation as well as the provision of pecuniary and non-pecuniary incentives (Edquist and Johnson, 1997; Rametsteiner and Weiss, 2006b). Both actors and institutions in IS are open to and interact with the environments on which they depend and contribute to (Rametsteiner and Weiss, 2006b).

There are different levels at which IS can be studied: as an NIS (National Innovation System), an SIS (Sectoral Innovation System), and an RIS (Regional Innovation System) (Malerba, 2006). An NIS explains that company innovativeness is influenced by a range of national institutions and actors that can determine "whether and how national institutional settings have an impact on this phenomenon" (Acs et al., 2016, p. 2). An SIS is an analytical framework in which innovation systems are studied in the context of a specific sector (Malerba, 2006). Finally, an RIS looks at the support structures or networks at the sub-national or local level and how they influence innovation processes. According to Weiss and Rametsteiner (2005), forestry innovations are often not the result of established IS at the national,

sectoral or regional level but are rather developed as an *ad hoc* IS or a one-project IS. This particularly applies to innovations that are completely new to the sector, are not typical to the sector, or are produced in two or more related sectors. Thus these innovations usually occur between sectoral innovation systems, this is typified by the example of NWFPs and services which may include innovations involving nature conservation, recreation or tourism services, or other social innovations that are often found in areas of overlap between sectors.

When analysing innovations from an IS perspective it is not possible to talk of optimality, as an optimal or ideal system of innovation for all products cannot be identified. It is likewise difficult to talk of an optimal propensity to innovate (Edquist 2004). Thus, IS allows researchers to compare a system over time or different geographically (and/or sectorally) specified systems with each other. Making such comparisons allows the researcher to observe and determine what represents a high or a low propensity to innovate and, in doing so, identify the strengths and weaknesses in innovation systems. When studying innovations from an IS perspective it is important to draw distinctions among the various determinants of innovation, the propensity to innovate (or innovations as such), and the consequences of innovations (Edquist 2004). In an analysis process, it is important to look at the factors influencing the development and diffusion of innovations, that is to say, the so-called 'activities' in IS. These factors are R&D as a means of developing economically relevant knowledge that can provide a basis for innovations and the financing of the commercialisation of such knowledge, that is, its transformation into a practical innovation (Edquist 2004). In the IS approach, innovations are primarily based on knowledge and learning that is interactive among organisations meaning that a lack of knowledge can be a significant barrier to starting an innovation process (Cohen and Levinthal, 1990; Edquist, 2001).

The IS is evolutionary, just as innovation processes, and cannot be meticulously designed and planned due to the inherently spontaneous nature of innovation processes. However, the identification of strengths and weaknesses in certain IS is of relevance for both practice and policy purposes as this can help in the creation of adequate support mechanisms (Edquist 2001). In the context of the European Union, the creation of many new transnational and supranational institutions and organisations indicates the need to improve the existent framework conditions for innovation processes, a reaction that normally occurs as a consequence of perceiving gaps that need addressing (Edquist 2004).

The IS approach as a whole is used explicitly in three of the research articles used in this thesis (Article 2, 4 and 7), while several other articles (Articles 3, 5, 6 and 9) looked more in detail at some specific elements of IS, like institutional-political aspects, where the focus was on the gaps which exist in the institutional setting in which social innovations occur in Serbia (Article 3), at how specific policies target innovation (Article 5 and 9), or at the governance aspects and role of policies in social innovations (Article 6).

4.1.2 The Institutional Void Perspective

A review of the literature on social innovations showed that most of the literature focuses on social innovations in developed countries in Western contexts (McCarthy and Puffer, 2016). This context is markedly different from that in developing or transitioning economies where poverty, unemployment and a diverse range of social problems common to such countries are much more pronounced (Agostini et al., 2016; Turker and Vural, 2017). Such environments are characteristically burdened with a poorly functioning institutional framework that results in so-called institutional voids (Khanna and Palepu, 1997; Khanna et al., 2005) which are often reported as a hindering factor for the development of

innovations. One of the approaches that study these issues in more detail is the institutional void perspective.

The institutional void perspective originates from the institutional theory that assumes human behaviour is shaped jointly by the constraints, incentives and resources provided by institutions which can be more or less compatible with each other (Stephan et al., 2015). Institutions are defined as man-made rules that structure political, economic and social interactions and can be either formal or informal (North, 1990; Scott, 2005). Formal institutions are comprised of regulatory institutions, such as laws, official regulations, strategies, as well as the constraints and incentives arising from government regulations. Informal institutions refer to more implicit, slowly changing, culturally conveyed and socially created rules of behaviour which can be further divided into cognitive and normative institutions (Scott, 2005).

Institutional voids can be also divided into formal and informal, where formal institutional voids exist if there is a lack or failure of formal institutions (i.e., laws, regulations, infrastructures, and supporting apparatuses) to facilitate efficient and effective market transactions and operations (Khanna and Palepu, 1997). They can manifest as ill-defined regulations, a lack of well-defined property rights, minimal financial sources provided by the State, a lack of information channels or non-participative procedures by governmental bodies, the absence of or poorly developed infrastructure, or even a lack of formal educational organisations (Webb et al., 2019; Lehmann and Benner, 2015). Informal institutional voids do not necessarily manifest only when there are missing norms, values and beliefs but may also appear in settings in which there is a lack, suppression, or limited manifestation of very specific informal institutions that could support efficient and effective market transactions (Webb et al., 2013). By way of example, informal voids may relate to social exclusions or the marginalisation of certain societal groups based on their gender, ethnicity, age, or other demographic attributes (Khoury and Prasad, 2016). Such informal voids may also exist when dominant societal beliefs allow elites to leverage their power and misallocate public resources or be created by barriers arising from a lack of trust in society for various reasons (Webb et al., 2019).

Such voids differ between countries and even within a country because the implementation of formal and informal rules can vary significantly by location. In any case, they hamper development (Webb et al., 2013, 2019), especially in rural areas which often do not enjoy the same support in terms of infrastructure and other resources as urban areas.

Article 3 used in this thesis analyzed the institutional framework for developing social innovations in Serbia by taking an institutional void perspective to reveal existing gaps in the current innovation system. Serbia was specifically chosen for this research because of its current transition phase and EU accession process, both of which provide a wealth of empirical data to examine the relevant institutional context for innovations.

4.1.3 Governance of Innovations

Supporting governance mechanisms are needed for the systematic uptake and successful diffusion of innovations. These mechanisms provide different innovation policies, infrastructure and networks that are characterised by the involvement of many different actors (governments, private business, civil society, associations). Gaining more and clearer insight into the various possible governance mechanisms and their impacts on innovation provides a better understanding of how these mechanisms can be fine-tuned to further facilitate innovation processes.

Governance is primarily concerned with steering functions and structures whereas actors' involvement in governance entails a focus on ensuring cooperation between the various public, private and civil society actors takes place within their mixed networks (Mayntz, 1998; Ostrom, 1990; Mayntz, 2003). This notion of governance builds further on the theories of non-hierarchical governance processes (Ostrom, 1990; Mayntz, 2003), where especially non-state, private corporate and civil society actors participate and negotiate the formulation of public policy (Rhodes, 1997). One can already observe that the actual degree of involvement of public actors in fulfilling societal functions varies as individuals, civil society organisations and even local businesses can all be important providers of societal innovations. These mutual relationships, interdependencies and interactions with institutional systems vary across cases and can hinder or further innovation processes. Social innovations are often related to collective action and efforts in order to solve various pressing social, ecological and economic problems (Mulgan and Albury, 2003; Sinclair and Baglioni, 2014). It is particularly actors' inclusion and participation in collective decision-making and action that have governance implications as this leads to them forming novel alliances (Rhodes et al., 2008). Social innovation, as defined here (Polman et al., 2017), transforms social relations by employing principles of inclusion, empowerment and participation (Ostrom, 1990; Mayntz, 2003; Mulgan and Albury, 2003). These new modes of governance, such as policy networks, public participation, active stakeholder inclusion, community involvement, markets for ecosystem services and public-private partnerships, go beyond the normal boundaries of State procedure (Slee, 2011; Secco, et al., 2019; Weiss, 2011). The focus on changes in social practices and relationships is articulated in both social innovation literature (Mulgan and Albury, 2003; Murray et al., 2010; Sinclair and Baglioni, 2014; Polman et al., 2017) as well as in governance literature (Mayntz, 1998; Ostrom, 1990; Mayntz, 2003; Feiock, 2005).

A few of the research articles used in this thesis discuss who are the actors and what are their roles in various innovation case studies that were analysed. In particular, Article 6 took a governance perspective to provide a more detailed understanding of the specific actor constellations for social innovations and their relationship to the evolution of policies and in connection with the different stages of social innovations.

4.1.4 The Role of Policies in Innovations

The term policy is used as a synonym for public policies in this research and is broadly understood to indicate a plan of actions (Ludvig et al., 2017), although the term can also be used in public, corporate, and other societal spheres. Policy programs (in both written and negotiated form) are required to realise planned actions by using policy instruments as a means for delivery and implementation (Crabbe and Leroy, 2008; Fischer et al., 2006; Knoepfel et al., 2007). These policy instruments can be divided in three types: (i) regulatory policy instruments, e.g., laws and regulations; (ii) economic or monetary policy instruments, e.g., subventions, funding, access to cheap loans or preferential tax regimes; and finally, (iii) informational policy instruments, e.g., information campaigns, support through education and training, or the raising of awareness and understanding (Vedung, 1998). Baldwin and Cave (1999) introduced one further type of policy instrument for partnerships and cooperation, often referred to as networking instruments (Rogelja et al., 2018). A similar tripartite classification system distinguishes policies as "sticks, carrots, and sermons" (Bemelmans-Videc et al., 2013). In this system, "sticks" are instruments limiting the scope of actions by imposing sanctions on undesirable behaviour and manifest as laws and regulations. Monetary and other incentives are the "carrot", designed to reward and thereby promote or reinforce behavioural patterns that appear to support the plans of the legislator. The final category of instruments, "sermons", essentially provide explanation and encouragement to give an

ethical foundation and logical coherence to the other two instrument types, the UN Agenda 2030 is a high profile example of such an instrument. “Sermons” can also be delivered locally by advisers and change agents, such as local zero-carbon or food sovereignty strategies.

The role of policies and how they influence the innovation process are studied in greater detail in research Articles 5, 6 and 9. The analysis conducted in Articles 5 and 9 focused on the content of policy documents where the underlying analytical questions were related to three descriptive dimensions: what is the policy about, what are its intentions (i.e. how do policymakers justify what they do and what is the policy goal?), and finally, what are the impacts (i.e. what is the result of the policy and which instruments does it employ?) (Dye, 1977)? In addition to all the above, an assessment was made of how these policy dimensions relate to the innovation cases that were analysed.

4.2 Service-Dominant Logic and Value Co-creation

Newer innovation research that uses service-dominant logic (SDL) has shifted the focus from the features and attributes of innovative output to the value that the producer co-creates with the consumer (Vargo and Lusch, 2008). The SDL approach thus changes the conventional conceptualisation of the relationship between supply and demand which, according to this approach, is transformed as value is always co-created jointly by producers and consumers (Vargo and Lusch, 2004).

In the conventional goods-dominant logic, the primary factor driving economic activity is the exchange of products, be they goods or services. In contrast to this, SDL suggests seeing the exchange of service as the common denominator in the analysis of markets (Vargo and Lusch, 2004). SDL is a value-based analytical approach which understands service as the process of using one’s competences (knowledge and skills) for the benefit of another party (Toivonen and Kowalkowski, 2019). At this point, an important distinction must be highlighted, namely that services (in plural) are products just like goods, but service (as used here, in singular) is a different concept. In goods-dominant logic, value is a property of goods and services and is created by the producer. In the SDL, value is both personal and experiential, and is manifested only in use and is collaboratively co-created with the beneficiary who is, therefore, always an agent of value creation (Vargo and Lusch, 2016).

Value is always defined in specific social contexts that are constituted by complex, reciprocal links between unique sets of actors (Chandler and Vargo, 2011). The beneficiary (the customer or user) needs to integrate the good or service from one provider with other resources obtained through the market or by other private or public sources (Vargo and Lusch, 2004). Thus, value is socially co-constructed through direct and indirect interactions (Edvardsson et al., 2011; Vargo and Lusch, 2016). Value is created between a firm and its customers, but also in a wider network involving a range of private and public actors that all contribute to the value creation process (Vargo and Lusch, 2011). This means that an analysis of value creation can range from the micro-level, where two active participants serve each other directly in the service-for-service exchange, to vastly complex networks and contexts at the meso- and macro-scales that include multiple indirect exchange processes between various actors. According to Weiss et al. (2007), Pelli et al. (2017) and Hujala et al. (2019), the value co-creation approach of SDL would prove particularly useful in the analysis of services and innovations in the forestry sector.

In this thesis, this approach was applied in Article 8, where the use of SDL brought experiences associated with the creation of NWFPs and their use into focus. This revealed a spectrum of values and economic opportunities that these products contain and by using this analytical perspective it was possible to

better understand the roles of actors while observing value creation in practice when providing services for NWFP businesses (Wieland et al., 2016).

4.3 Experience Economy

In the experience economy concept, Pine and Gilmore (1999) introduced the emergence of customer experience as a new paradigm for the added value of products. In their approach, the focus is shifted from selling goods or services to offering experiences, which they call a “progression of economic value” (Pine and Gilmore, 1998, p. 98). According to the same authors, the experience is not an amorphous construct but is a real offering, just like any other service, good or commodity. These experiences are often a combined output, meaning that companies, to use a theatrical metaphor, use goods as props and services as a stage in order to engage customers in a way that will create memorable experiences (Pine and Gilmore, 1998). If one accepts this view, experiences become segmented and specialised with unique and interactive activities provided for a form of ‘consumption’ (Li and Lai, 2011; Novelli et al., 2006; Weiss et al., 2007).

The experience economy concept originates from the theory of experienced utility in behavioural economics (Kahneman, 2003). This concept emphasises the hedonistic quality that individuals enjoy (when using goods or services) and their willingness to pay accordingly to obtain higher value or longer-lasting experience utility (Chang, 2018).

In the experience economy concept, some intangible qualities associated with certain products and services come to the forefront as a result of their assuming a new value. For example, emotional factors are of great importance in the context of experiences, they are also very often embedded in local cultural contexts and traditions which stimulate an emotional response. Experiences are inherently personal, contrary to mass-produced or generic goods and services, which an immediately intimate connection to the buyer (Pine and Gilmore, 1998). This can then be beneficial for businesses as no two people will have the same experience even when enjoying the same offering (Pine and Gilmore, 2014). Sundbo et al. (2013) introduce the “total concept” as one of the characteristics of the experience sector, this concept is based upon the existence of combined products composed of several elements with their production, delivery process and marketing amalgamating into the total concept. Other authors argue that companies can achieve a competitive advantage only by bundling novelty goods with added value services to increase customer loyalty and retention (Durst et al., 2015). According to Cupchik and Hilscher (2008), experiences are something that leave an imprint on the person that is both memorable and unique. Many authors emphasise a user-centred approach in which experiences are co-created between businesses and customers in a way that the end-users are the leaders in value creation (Snyder et al., 2016; Pine and Gilmore, 1999). Whatever the specific view or approach one adheres to, it seems to be a common thread that experiences should lead to transformation and personal enrichment, thus, they need to be customisable and thereby avoid the commoditisation trap (Pine and Gilmore, 2014).

When analysing experiences, Pine and Gilmore (1999) proposed a framework which had a two-dimensional base formed by customer participation (active or passive) and the connection (or environmental relationship) of the customer to the event (absorption or immersion). Based on this participation and connection, experiences can then be divided into four different realms: entertainment, educational, escapist and esthetic, known as the 4E concept. The entertainment realm appeals to users with a desire to enjoy, the educational those who have a desire to learn and the escapist is a magnet for

individuals with a desire to enjoy in a certain place, while the esthetic experience is one in which participants are immersed but they have little or no effect on it (Pine and Gilmore, 1999).

Thus far, studies have used the four experiential realms primarily to quantitatively analyse tourist experiences from various perspectives (Oh et al., 2007; Hosany and Witham, 2009; Loureiro, 2014). Some studies have been done in the food sector (Sidalı et al., 2013), agriculture (Swinnen et al., 2012) and to explore the development potential of forest parks (Li and Lai, 2011). In Article 7 of this thesis, the experience economy concept is used in combination with an innovation system approach in order to highlight the potential of NWFP related businesses in adding value to the forestry sector and rural economy. This thesis, however, is one of the first studies (together with Helles and Vedel, 2006) that explicitly frame experiences as having significant potential for existent and future forestry businesses.

5 Research Design and Methods

In light of the foregoing conceptual considerations and the state-of-the-art, this chapter presents the research design and methods. This thesis, as well as all the articles employed, address the actors and institutions in both NWFP and social innovation processes through a qualitative case study research design (see 5.1) as well as qualitative and open methods of data collection and analysis (see 5.2). The case study approach is used in the majority of the articles (Article 2, 3, 4, 6, 7 and 8) meaning that data was collected mainly by means of interviews, complemented by a document analysis and literature reviews. Two articles build on the qualitative analysis of policy documents (Article 5 and 9). Article 1 in this framework is based on a systematic literature review. Quantitative analysis is applied as a complementary method in two articles (Article 1 and 8).

The selection of a research approach depends on the nature of the research problem or issue to be studied and on the researchers' personal expertise. Qualitative research is suitable if the topic is new and the subject has never been addressed with a certain sample or group of people (Morse, 1991). This approach aims to derive a comprehensive picture of the issue being studied and uses detailed descriptions to convey the findings. This involves reporting multiple perspectives, identifying the many factors relevant in a given situation and generally sketching out the larger picture that emerges (Creswell, 2003). Given all of the above, using a qualitative data method was seen particularly suitable for this thesis.

When this present research began, a qualitative research approach was decided upon as NWFP and social innovations in forestry had not previously been analysed in detail from the actors and institutional point of view. Sound empirically-based knowledge on innovation processes and patterns in the specific cases researched for this thesis was lacking and the qualitative approach best facilitated the in-depth study, understanding and description of the specific innovation topics and processes found in the case studies. Furthermore, a specific part of the thesis was devoted to understanding how innovations are occurring in transition economies (using the example of Serbia and North Macedonia) into which, up to this point, not much research has been done.

The research work for this thesis combines both deductive and inductive reasoning. Each article used draws on a specific theoretical background (see chapter 4) which provides different lenses when it comes to what to look at and assumptions about the interrelationships among factors and this, in turn, prompts various, specific questions to be asked (Creswell, 2003). Accordingly, research work started by deductively exploring the themes derived from these theory-backgrounds and in the course of the data collection process and analysis new themes emerged from the data (inductively) (Creswell, 2003).

Through all the phases of the data collection and its analysis, the goal was to assure the validity of the research and its reliability. Qualitative validity means that the researcher checks the accuracy of the findings, while qualitative reliability requires that the researcher's approach is consistent across different researchers and different projects (Gibbs, 2007). In terms of validity strategies, for the majority of the articles (Articles 2, 3, 4, 6, 7 and 8), triangulation of different data sources was used, meaning evidence collected using different data collection techniques was examined and cross-checked to allow a valid and coherent justification of the findings (Morse, 1991, Mayring, 2000, Creswell, 2003). Furthermore, in some articles "member checking" was used to determine the accuracy of the qualitative findings by asking interview partners to look at the outcomes (e.g. for Article 2 and 3). The research method employed in Article 1 used coding by more than one researcher, thus allowing inter-coder reliability

checks. Use of a rich, thick description to convey the findings also increased the validity of findings. In order to assure that the research was transparent and repeatable the procedures that were undertaken were clearly documented.

The value of the qualitative research of this thesis lies in the particular description and themes developed in the context of specific sites rather than its ability to be generalised (Gibbs, 2007, Greene & Caracelli, 1997). Thus, individual articles in this collection intentionally explore, describe and explain specific situations. Within this framework text, insights gained from the nine articles provide the basis for describing patterns of similarities and differences between the analysed cases.

5.1 The Qualitative Case Study Approach and Case Selection

Both projects, in which the articles of this thesis were originally published, utilised case study approaches with cases drawn from a number of the partner countries involved. Case study research designs are found in many fields of science. Yin (2012) defines such research as an in-depth empirical analysis of a specified entity, namely, a case. Of course, analysis can build on a single case or on a number of cases that are used for comparative purposes. The main strength of the case study approach is the analysis of real-world complexities and its potential to uncover new and unexpected aspects. Cases are necessarily bound by time and activity, and researchers collect detailed information using a variety of data collection procedures over a sustained period (Stake, 1995; Yin, 2009, 2012). According to Gerring (2004, p. 341), “the case study method is correctly understood as a particular way of defining cases, not a way of analysing cases or a way of modelling causal relations”.

The selection of case countries and/or case study regions was predefined by the projects. In the StarTree project, the identification of innovation cases was done within each of the project partner countries. The work package the present author was involved with provided detailed instructions for the case selection process (by a “Handbook of data protocols”). In term of the logic of case-selection, the overarching goal was to collect different types of innovations related to NWFPs across the partner countries. These innovations could be related to products, processes, marketing, organisational or institutional innovations. The research was not only interested in radical innovations but also those that were incremental in character and where small improvements or adaptations could be expected to be observed. In terms of innovation novelty, interest was spread across a range of innovations, those that were new to a country, to a region, or new to a specific sector. The number of cases was proposed by each project partner responsible for a specific case study region based on a questionnaire regarding “innovation and development policies”. Representatives from project partner countries answered based on various resources (e.g. expert knowledge, interviews with relevant actors, literature). All these cases were documented in the “Innovation case database” (<http://policydatabase.boku.ac.at>). Based on the initial proposals and descriptions, the project partners together with the work package research team jointly selected the “sample” of cases that were then subject to detailed analysis.

In the SIMRA project, the selection of cases of social innovation was also done by means of a coordinated effort involving all the project partners. The first step of the selection-procedure saw potential cases validated according to the definition of SI developed by SIMRA (Polman et al., 2017, p.1; see also chapter 1). For this purpose, a checklist of four criteria was used, checking whether i) there is a reconfiguration of social practices (relationships/collaborations/networks/institutions/governance structures) in response to societal challenges, ii) that the act of novel reconfiguration involves civil society members as active participants, that (iii) this novelty/reconfiguration takes place in marginalised rural areas and/or

concerning previously disengaged social group(s), and (iv) that the respective innovation meets the social, environmental or economic aims/goals and promises to improve societal wellbeing (Valero et al., 2017).

For each article used in this thesis, different countries and cases were selected according to the individual research needs and the logic employed by the research team. In the framework of the SIMRA project, additional case studies in Serbia were conducted by the thesis author specifically to add to this thesis. Overall, the majority of research articles used in this thesis (Articles 2, 3, 4, 6, 7 and 8) draw on a qualitative case study design to obtain in-depth insights regarding innovation processes. Each one captures unique complexities of the innovation processes in different settings (e.g. country contexts) and allows a meaningful comparison of the different cases in order to derive insightful findings and conclusions.

5.2 Methods

Each of the nine articles used in this thesis applies similar methods for data collection and analysis. They draw primarily on semi-structured qualitative interviews as well as literature and document analyses. An overview of the specific data collection techniques and data analysis methods applied in the research that resulted in these articles is presented in Table 4 and the following sub-chapters (5.2.1 and 5.2.2). Further details can be found in the summary of the articles (chapter 6.2) and the full article (Part B of this thesis).

Table 4. Methods Applied for the Research Articles

Nr. of the Article	Data collection methods	Data analysis methods
Article 1	<ul style="list-style-type: none"> A systematic search of peer-reviewed articles from Scopus and Web of Science databases 	<ul style="list-style-type: none"> Systematic literature review of 230 research articles: <ul style="list-style-type: none"> Quantitative analysis (descriptive statistics) Qualitative content analysis of selected articles
Article 2	<ul style="list-style-type: none"> A systematic search of policy documents Semi-structured interviews (face-to-face) 	<ul style="list-style-type: none"> Qualitative content analysis of policy documents, interview transcripts and protocols, workshop protocols and focus group transcripts, literature Quantitative analysis (descriptive statistics) of questionnaires (article 4,8)
Article 3	<ul style="list-style-type: none"> Semi-structured interviews (face-to-face) Search in organisations websites and materials A search of scholarly literature 	
Article 4	<ul style="list-style-type: none"> A systematic search of policy documents Survey - questionnaires (via email) Semi-structured interviews (face-to-face) 	
Article 5	<ul style="list-style-type: none"> A systematic search of policy documents Semi-structured interviews (face-to-face) 	
Article 6	<ul style="list-style-type: none"> Semi-structured interviews (face-to-face) Focus groups A search of scholarly literature 	
Article 7	<ul style="list-style-type: none"> Semi-structured interviews (face-to-face) A search of scholarly literature 	
Article 8	<ul style="list-style-type: none"> Semi-structured interviews (face-to-face) Survey – questionnaires (phone) Workshops A search of scholarly literature 	
Article 9	<ul style="list-style-type: none"> A systematic search of policy documents Scholarly literature 	

5.2.1 Data Collection

In the course of different research phases, primary and secondary data was collected.

5.2.1.1. Primary Data Collection

Research for this thesis draws on primary data collection (Hox and Boeijs, 2015), gathered from face-to-face semi-structured interviews with various actors involved in innovation processes (Articles 2, 3, 4, 5, 6, 7 and 8), focus group interviews (Article 6), questionnaires (quantitative and qualitative, phone and email) (Article 4 and 8) as well as workshops (Article 8). In Article 1 collected scientific literature served as primary data for systematic literature review, while in some other articles collected policy documents were used as primary data source (Article 2, 4, 5, and 9).

All the primary data used for this thesis was collected in the period from 2014 to 2020 and sourced from different countries: (i) from developed countries such as Austria, the United Kingdom, Italy, Slovenia and the United States of America; and (ii) also from the countries in transition, i.e. Serbia and North Macedonia. The thesis author and co-authors of the nine research articles conducted a total of 58 semi-structured interviews (for Articles 2, 3, 4, 5, 6, 7 and 8), 89 questionnaires (Articles 4 and 8), organised two workshops (Article 8) and two focus groups (article 6). Furthermore, a systematic literature review of 230 research articles was conducted for Article 1. For four articles (Articles 2, 4, 5 and 9) analyses of 45 policy documents was undertaken in total (see Table 4 for details of the data collected for each research article).

Semi-Structured Interviews

In seven of the nine articles in-depth semi-structured interviews were conducted where the respondents for the case studies were selected purposefully to best help the researchers understand the problems at hand and to address the research question. Table 5 below provides summarised details of the semi-structured interviews conducted for the different articles. All interviews were done face-to-face by the various authors who contributed to the writing of the articles. For Article 3 the thesis author alone conducted all interviews.

In these interviews, open-ended questions were used, which necessitated having a set of predetermined questions addressing special topics of interest (Berg, 2001). The specific goal of the interviews for each article is also summarised in Table 5. This kind of interview allowed for more flexibility, meaning it allowed respondents to change the order of questions or topics according to how the interview developed and the relevancy of the conversation as new topics arose. Questions were used to steer the conversation and allowed the respondents to provide detailed answers (Gideon 2012). Semi-structured interviews proved to be very appropriate for the case studies, particularly because they provided the flexibility to be cautious when necessary yet receptive to information that may not have been anticipated when planning and structuring the interview guidelines (cf. Berg, 2001). The drawbacks of the method are that it is rather time-consuming and that some open questions may remain unanswered or may evoke irrelevant responses that may side-track the interview process (Berg, 2001; Gideon, 2012), as occurred in some of the interviews under discussion here. Differences were observable in the interviews in terms of the priorities given to certain questions by respondents. In cases where inadequate information was received or explanations were not provided, an opportunity was provided for other respondents to fill the gaps if they could be expected to do so for those topics. If information gaps persisted once the interview process was complete, external sources of data, such as reports and websites, were consulted from which missing information could be extracted.

Table 5. Details of semi-structured interviews

Number of the Article	Sample	Number of interviews	The period when interviews were conducted	Duration (min)	The goal of the interviews
Article 2	People responsible for innovation, i.e. innovators/owners of the case	3	September 2014	90	Understanding of the innovation cases - idea generation, supporting and hindering factors, finances, aspects of coordination, interactions and conflicts, assessment of the general economic situation in the region in regards to NWFPs
	Experts/representatives of organisations offering support for NWFPs	6	October 2014	45	Understanding of institutional set-up, national/regional support mechanisms (information, cooperation, monetary or non-monetary incentives) for NWFP innovations; differences in the NWFP sector between the times of Yugoslavia and after its disintegration
Article 3	Key representative of each social innovation case	9	September 2018 - February 2019	60	Understanding of the innovation cases - idea generation, support and hindering factors, individual perspective on institutional set-up for social innovations
Article 4	Central innovation system actors and with innovators	7	October 2014 - February 2015	45-60	Understanding of supporting policies and measures, financial, research and development, education, training and information activities related to non-wood forest product innovation
Article 5	International policy experts and scientists	6	March - August 2017	60	Understanding of what social innovation is, the content of current regulations, implementation of regulations, enabling and constraining factors, the role of the organisation in the policy field and future of social innovation
Article 6	Core and network actors related to social innovations	18	2016 - 2019	60	Understanding of the social innovation cases - idea generation, support and hindering factors, perspectives on policies and institutional set-up for social innovations
Article 7	People responsible for innovation, i.e. innovators/owners of the case	4	September 2014	90	Understanding of the innovative aspects of the businesses and the innovation processes; the key actors and institutional conditions that contributed to the innovations, fostering and hindering factors
Article 8	People responsible for innovation, i.e. innovators/owners of the case, and representatives from producers' associations	5	September 2014	90	Understanding of the roles of companies, actor networks, innovation processes, institutional frameworks, policy means, and fostering and impeding factors within historic and regional economic and social contexts

Semi-structured interviews for articles 2, 4, 5, 7 and 8 were based on the interview structure developed in the StarTree project (work package 5 in which the thesis author was involved). Interview questions followed the previous steps in the projects, which were questionnaires on innovation and development

policies (Q1) and on innovation system actors (Q2). However, the interviews sought to yield a much greater depth and detail to the understanding of the innovation system in each selected case. Questions were grouped into six blocks: (i) the background and objectives of the innovation case, (ii) a description of the case and its chronology, (iii) information, (iv) finances, (v) coordination, cooperation and conflicts among actors during the innovation process and finally, (vi) a summary analysis where the results of the innovation and success factors were identified. These interviews were conducted by the responsible persons in each respective country with the selected actors (the list of actors selected was from Q2). For each specific case, sub-questions under these six blocks were adapted to suit the specificities of the case at hand. For example, in article 2, except for the interviews with people responsible for the innovation (i.e. owners of the cases), 6 additional interviews were conducted with experts/representatives of organisations offering support for NWFPs in order to better understand the institutional set-up and actors active in the NWFP sector and how this developed over time (the situation in Yugoslavia before its disintegration was analysed and this was re-assessed in three countries that emerged post-disintegration). In addition to two project countries, Serbia and Slovenia, a case from North Macedonia was also analysed where the same data collection method was applied. In article 5, questions were also directed to policy experts and scientists, thus questions related purely to the overall institutional environment were posed rather than those related to a specific case. Articles 4, 7 and 8 examined cases from Austria and Italy, economically developed nations where research organisations were partners in the StarTree project.

Semi-structured interviews for Articles 3 and 6 originated from the SIMRA project, the so-called Tool 7 ("Interview guidelines for innovators and persons involved in the innovation process") and Tool 8 ("Interview guidelines for policy experts and other external experts") (Secco et al., 2019b, p. 92). In Article 3, data was collected based on Tool 7, while in Article 6 both tools were used. Tool 7 addressed the key actors of the social innovation initiatives identified during the desk work phase (Tool 1) or during the first part of the focus group interviews (Tool 2), which was used in Article 6 as well. The people interviewed were the innovator(s) and actors involved in the key phases of the social innovation initiative. The proposed interview questions provided the basic framework for the interview which was then adapted to suit the respective expert and context. It follows an inductive logic approach with questions designed to stimulate a story about the social innovation case. There were 10 overall questions with each having sub-questions that were proposed but that were meant to be tailored to each case. Questions were related to the topics of (i) the idea and chronology of the social innovation initiative, (ii) the role of the respondent in the initiative, (iii) the actors involved in the initiative, (iv) what information was important for developing and carrying out the initiative, (v) financial aspects, (vi) cooperation successes and failures, (vii) available policy support, (viii) innovative aspects of the initiative, (ix) achievements, and (x) any other information that was missed during the interview process. Tool 8 addressed policy experts and other external actors (key informants) and included four questions on the role played by the interviewee in relation to the social innovation initiative, the types of support offered, the actual work done by the organisation/programme and the innovation's most important achievements. Each question included several sub-questions that could help the interviewer to obtain all the relevant information. At the end of the interview, the interviewer asked if the respondent wished to provide any additional information they consider relevant.

All interviews were done in the national languages of the specific cases with the results reported in English in the data protocols developed by the work package leaders responsible for data collection in each project. These data protocols were structured to align with the main research questions relating to the semi-structured interviews. The English language results did not strictly follow the interview guide

because the interviews were done in a conversational style and often used colloquial language whereas the reports needed to be structured to fit the analytical logic of the evaluation framework. Hence, the answers were interpreted from the interview transcripts by the authors of the reports. Data protocols were then used for the analysis process in the different articles.

Focus Group Interviews

For Article 6, two focus group interviews were conducted, one in the United Kingdom and one in Austria. They were conducted to gather qualitative in-depth data to understand some of the issues of interest for the project. The focus group format allowed data to be obtained from purposely selected groups of individuals (Nyumba et al., 2018) by discussing specific topics with them in moderated interactions and draw on their personal experiences, beliefs, perceptions and attitudes (cf. Cornwall and Jewkes, 1995).

The principles and procedures employed when conducting these focus group interviews were developed in the SIMRA project as part of the Tool 2, entitled “Future search conference and focus group with actors in the social innovation initiative” (Secco et al., 2019b). The focus groups interviews were conducted with a small number of individuals who shared common interests or characteristics. Participants were key informants who had a wider vision of the social innovation initiative they were involved with. They were selected from the representatives of the social innovation initiative (e.g. innovators, project managers, donors), experts within the region (e.g. from local associations), policymakers (e.g. local authorities), or external actors with a deep knowledge of the social innovation initiative. The interviewer was given instructions on preparing for the meeting, the guiding questions to lead the discussion and the materials to be presented in the meeting (Secco et al., 2019b, p.40). However, both interviewers and moderators had a flexible and adaptive approach to the procedure so it could be modelled according to the specificities of the case and conditions. Topics which were covered in focus group interviews were related to (i) activities of the social innovation, (ii) its main outputs, (iii) its outcomes and impacts, including those which are not immediate and often not tangible results of the SI’s implementation, (iv) the main aspects and elements which were indications of problems related to the physical geography of the area, access to infrastructure and the social and/or economic conditions present. Based on the procedure provided by the SIMRA project, the focus group in the United Kingdom case (Braemar Community Ltd) was held in May 2018 with four participants who were the key actors in developing the social innovation and was moderated by only one interviewer since the group was rather small. The whole interview was recorded and transcribed and any omissions were obtained in face-to-face interviews with the same actors later on.

The focus group in Austria followed the procedure of another project, SILEA⁴, that was happening in parallel to SIMRA project at the national level in Austria (Lukesch et al., 2019). Since the same partner was involved in both projects the data retrieved was utilised for joint publications. In the SILEA project, three focus groups were convened and the data for the case analysed in the Article 6 (LAG⁵ Zeitkultur Oststeirisches Kernland) originated from focus group “East”, conducted in January 2019, in which actors (local stakeholders, experts and project promoters) from three LAGs were present. The presence of the actors from different LAGs allowed for peer learning between participants. The group’s discussions were

⁴ Soziale Innovation in LEADER 14-20 – project conducted in Austria (<https://www.zsi.at/de/object/project/5069>)

⁵ LAG (Local Action Group) is a network of local partners which through its strategy and activities promotes links between local actors and others in the development chain. These Local Action Groups are the main tool for the application of the LEADER approach (https://enrd.ec.europa.eu/leader-clld/leader-toolkit/leaderclld-explained_en).

divided into two parts and ran by one moderator with the support of one observer who took the notes. Topics for the first discussion were related to the interfaces of LEADER/LAG and projects, such as (i) achievements of the LEADER/LAG (e.g. support, funding, networking, passing on know-how); (ii) the supporting and hindering factors, (iii) alternative funding mechanisms available instead of LEADER, and (iv) areas where possible improvements could be made so that the projects are even better supported (rules, support, networking, education, etc.). In the second discussion, the focus was on topics related to the mission, namely strategy and operations of the LAGs in terms of social innovation. In total, each focus group lasted about two and a half hours.

Survey - questionnaires

In Articles 4 and 8, a portion of the gathered data was collected by a survey using questionnaires that were developed in the StarTree project.

Article 4 is based on a case study conducted in the Austrian region of Styria, where the questionnaire was sent in 2014 by email to 19 potentially relevant public and private sector organisations, of which five who explicitly considered the theme relevant for them responded. The other actors explicitly or implicitly considered themselves not relevant for this topic. This questionnaire was developed in work package 5 (in which thesis author was involved). This questionnaire was related to innovation actors and contained both qualitative as well as quantitative questions. The questionnaire aimed to collect data on the organisations that play important support roles in innovation processes in NWFP. It consisted of 25 questions divided into seven groups: (i) the role of the organisations in supporting innovation and development in forestry, NWFP and rural development, (ii) the sources of the information that organisation receive about NWFP, (iii) the subsequent distribution of information from the organisation, (iv) the main sources of finance that organisations use to support innovation and start-ups in NWFP, (v) the collaboration aspects used in support of innovation, (vi) personal opinions on the innovation potential of NWFP, and (vii) the respondents/organisations' other efforts in innovation activities. This data served as a part of the basis for selecting respondents and preparation of subsequent in-depth, semi-structured interviews.

Data collection for the Austrian case, which is the subject of Article 8, was done as part of the action research in the Austrian region of Styria. One of the methods of data collection was a phone survey regarding NWFP use. It was carried out in Austrian Nature Parks with the 70 producers of nature park specialities being drawn from the 48 such Nature Parks in Austria. First, the managers of the parks were contacted and they identified the most important NWFP producers among the broader group of producers of the nature park specialities (using a snowball principle). Phone surveys were conducted between July and September 2014 with durations that ranged from a just few to fifteen minutes. The questionnaire contained both quantitative as well as qualitative questions and provided descriptions on which NWFPs are produced, and which services are offered by producers, which sales channels exist, how legal rules affect them, whether there are issues with nature conservation and, finally, how they see the market further developing for NWFPs. These answers provided information on trends and attitudes as well as the opinions of the respondents toward the use of NWFPs in the region.

Workshops

Part of the data for Article 8, as mentioned previously, was collected as a part of action research in the Austrian region of Styria. One of the methods used for data collection was conducting workshops. Two workshops were held to share information, raise awareness and collect ideas about the use of NWFPs in

the region. Based on this information, three nature parks were selected for further action research and project work. In the workshops themselves, the world café method was used, which provided a simple, effective, and flexible format for dialogue, knowledge sharing and the collecting of ideas related to the use of NWFPs in the region of Styria. These two events actively involved 25 people. The first one was held in Innsbruck in October 2014 specifically for the managers of the five Nature Parks that are located in Tyrol. The second event was in November 2014 and took place during the yearly General Assembly of Austrian Nature Parks and primarily involved Nature Park representatives, honorary representatives, farmers and members of local governments responsible for the nature protection in Eastern Austria. Workshop results were reported in the form of data protocols which were then used in subsequent analyses.

Literature review

For Article 1, a systematic literature review of journal articles on innovation in forestry and forest-based industries was conducted. Thus, the collection of articles for this purpose served as the primary data source for the analysis.

As a part of the identification (search) stage when conducting the systematic review (cf. Siddaway, 2014; Booth, 2016), articles were retrieved from Scopus and the Web of Science (WoS) scientific databases, for the period from 19 March 2019 and going back as far as those databases allowed. These databases were chosen due to their interdisciplinary content and comparatively high data quality (Mongeon and Paul-Hus, 2016). To extract the articles the search queries “(“innovation*” OR “innovativeness”) AND (“*forest*” OR “*wood*” OR “*timber*”)” were run in both databases. Then refinement options (filters) were used, such as limiting the sample to the social sciences, relevant document types (i.e. research articles) and sources (i.e. forestry relevant journals). In the refinement process, articles were not just selected from forest sector journals, however, articles connected to blatantly irrelevant fields, such as computing sciences or geochemistry, were excluded. All journals addressing the “forest sector and innovation” or “rural and regional development” were kept. After applying the filtering process an initial set of 1700 articles remained. In the next step, these articles were reduced to 230 articles, all of which dealt with the specific topics under consideration (this selection procedure is explained in detail in chapter 5.2.2.).

Policy documents

For Articles 2, 4, 5 and 9 policy documents were collected related to the specific innovation systems of interest. These documents were analysed in terms of their content and how they addressed specific topics of interest of each article.

In the StarTree project, the set of policies to be analysed was compiled by those who were directly responsible for the case studies, by completing a questionnaire on innovation and development policies (Q1). This questionnaire was developed in the work package in which the author of the thesis was involved and consisted of four parts for collecting specific data on (i) actors/relevant organisations that are important for supporting innovation processes of NWFPs in the region, (ii) policy programmes in the country or region which support innovation in NWFPs by specifying the goals and measures of each policy programme and identifying hindering policies, (iii) research, training and information activities related to NWFPs in the region, and (iv) examples of innovation in NWFPs. These documents were used in the research for Articles 2 and 4.

Similarly, specific policy documents that were identified in the SIMRA project through the collection of data by means of Tool 10, "Policy document content analysis" (Secco et al., 2019b), were used for Articles 5 and 9. Using this tool, data was collected on policy documents which were directly or indirectly relevant for the social innovation case studies. The tool was filled in by the project partners responsible for case studies. The aim was to identify the role of policies in the cases in combination with information from the interviews and to analyse how effective the policies were. This was considered from the early stages of policy formulation to the question of how they are implemented by the respective authorities and how they are perceived by target groups. Additional documents for the analysis were found through the snowball technique.

5.2.1.2. Collection of Secondary Data

For this thesis, secondary data collection involved the gathering of scientific articles on specific topics of interest as well as official reports, the content of relevant websites and some other material. For a couple of the research articles used in this thesis, policy programmes and documents were collected and were employed as secondary sources of information. In other cases, policy documents (e.g. laws, policy programmes, regulations) were used as another source of primary data, e.g. for Articles 2, 4 5 and 9 (see above).

Secondary data served the purpose of establishing the importance of the study as well as setting benchmarks for comparing the results of this research with the findings of others (Creswell, 2003). It also allowed the identification of research gaps, strengths and weaknesses (Cooper, 2010; Marshall and Rossman, 2011). Furthermore, insights from the literature and other material were used to triangulate the results and to validate the data obtained through the primary data collection process (Creswell, 2003).

A standard review of the scientific literature was done for each of the articles, based on a search using specific keywords in relevant databases such as Scopus and ScienceDirect. The scientific literature base used was constantly expanded during the research and writing process by regularly reading and analysing scholarly works, e.g. mentioned by other scholars and appearing as a useful contribution to the various article's research focus.

Other secondary material, such as official reports from or related to case studies, were collected via direct contact with case representatives and interview partners while further material concerning the cases was collected by internet searches. All these sources data provided additional information and details to develop a deep understanding of the cases and their contextual conditions.

5.2.2 Data Analysis

5.2.2.1 Qualitative content analysis

For all the research articles used in this thesis, a qualitative content analysis of the collected material (e.g. literature, policy documents, interview transcripts and data protocols) was applied. According to Mayring (2000), qualitative content analysis is defined as an approach of empirical and methodologically controlled analysis of texts within their context of communication and a process that follows content analytical rules and procedures without rash quantification.

Analysis of Literature

For Article 1, a systematic literature review was conducted where work was structured around key stages, namely: scoping (definition of the research focus), planning (considering the trade-off between the comprehensiveness, practicability and reproducibility), identification (searching process), screening (exclusion of articles) and eligibility (qualitative analysis of abstracts/papers) (see Siddaway et al., 2019; Booth, 2016; and Article 1, p.3). The process of the identification of articles is explained in the chapter above (5.2.1.1). All the steps of the review are reported in the form of the Preferred Reporting Items for Systematic Review and a Meta-Analysis Statement (PRISMA) (Moher et al., 2009), including the flow diagram of the literature search and sifting process (Article 1, p. 4). The process of screening and checking for eligibility, as well as the later qualitative analysis, was done by two researchers in order to reduce the potential for individual bias and increase the reliability of the results. From an initial number of 1700 articles, the number of articles was steadily reduced in three steps, according to certain criteria, allowing the final tally to be 230 articles which were then taken into the final analysis.

In the analysis process, both quantitative (explained below in 5.2.2.2) and qualitative analyses of the 230 articles was undertaken. The focus of the qualitative analysis was on the content of the articles in terms of their applied research approaches and main insights. Based on this analysis, the historical development of the research field, as well as the main insights in central research themes and selected topical fields, were described. In order to allow for replicability, all the criteria for inclusion and exclusion of research article were documented and a detailed protocol of all the steps has been provided. These procedures are described in detail in the annex of Article 1.

Analysis of Policy Documents

A qualitative analysis of policy documents was conducted at various levels ranging from the European (Articles 5 and 9), to the national (Article 2) and down to the regional (Article 4).

For the qualitative document analysis, systematic procedures for reviewing and analysing the content of documents were applied (Bowen, 2009). This was done after documents were examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge in relation to the research aims of each article. These analyses, structured and documented by using MS-Excel, served chiefly as a complement to other research methods and as a means of triangulating research results (such as in Article 2 and 4) but it was also used as a stand-alone method (in Article 5 and 9).

For each article, a set of criteria was developed regarding which policy documents were analysed. For example, for Article 5, starting from the definition of social innovation by Polman et al. (2017), a deductive approach was applied to identify three key themes in the policies: (i) a social dimension primarily targeting vulnerable groups, (ii) a societal challenges dimension targeting regional and rural development, and (iii) an institutional change dimension targeting civil society inclusion.

For Article 9, the topics for document analysis were defined by the parallel literature analysis and were strongly linked to the research interest, namely the reflection of social innovation in the EU Bioeconomy Strategy (EU, 2018) and the notion of forestry in the objectives of that strategy. The steps of analysis were determined by qualitative analysis procedure as exemplified in the work of Mayring (2007) and addressed the questions of : (i) from what level do the documents originate, (ii) how social innovation is described in the policy documents, (iii) how the forest bioeconomy is described, (iv) what policy instruments are suggested for social innovation and the forest bioeconomy, (v) who are the main

audiences or beneficiaries of the social innovation and the forest bioeconomy strategy, (vi) how is the budget allocated to specific measures, and (vii) how the role of public institutions is defined in the strategies?

In Articles 2 and 4, policy documents such as programmes, laws, and strategies were examined that are important for supporting innovation processes in the field of NWFPs. Such documents have been qualitatively analysed in order to determine their relevance regarding NWFP innovations, including their respective aims, measures and activities. This analysis followed similar steps as in a previously described procedure (for Article 9) to determine in which way policy documents mention NWFPs and if there are specific measures and tools described which are of relevance for NWFP innovations.

Analysis of Interview transcripts and protocols

The qualitative content analysis of interviews comprised of the following steps: transcribing recorded interviews, coding, interpreting and describing findings. Transcribing the interviews was done primarily in MS Office Word, and for Article 3 specifically, by use of the software programme NCH (<https://www.nchsoftware.com>). For all the interviews conducted in both projects data protocols (including all the associated instructions) were created and used for the reporting of results in English. These data protocols were used for the analysis instead of interview transcripts because of the language barriers that arise otherwise and to avoid the time-consuming task of transcribing full interviews in various national languages into English.

The analysis of these materials was done by combining deductive and inductive coding. An initial set of codes for analysis was identified from the specific theoretical perspectives of individual articles while allowing additional codes to be inductively derived in the course of the analysis (e.g. regarding aspects or topics which had not been considered). Beyond identifying the themes during the coding process, this qualitative researcher method of analysis was useful for interconnecting themes into coherent storylines as different themes were analysed for individual cases and across different cases before being fed into general descriptions (Creswell 2003).

For some of the research articles (Articles 2,4,7 and 8), analysis codes were derived from the elements of the innovation system approach. These cover topics such as key actors and institutional conditions that contributed to the innovations, the fostering and hindering factors as well as relevant support structures and measures that influenced innovations, the provision of information, the role of cooperation and monetary or non-monetary incentives. In Article 7, an additional analysed theme relates to the identification of experiences and aspects of the co-creation of values. In other articles, the focus was more on the specific gaps in the respective institutional set-up for social innovations (Article 3) or the role of policies for social innovations (Articles 5 and 6).

In the analysis employed in Article 3, the author of this thesis used the text analysis software ATLAS.ti for coding interview transcripts (<https://atlasti.com>). This better facilitated the analysis and subsequent use of results for the nine interviews that were conducted for that particular research project. The coding process for other articles did not use such specialised software but as the coding was simply documented in MS-Excel. This was sufficiently practicable because of the comparably low number of cases to be analysed (3-4 cases) (Articles 2,4, 6,7 and 8).

5.2.2.2 Quantitative analysis

Quantitative data analysis is only done for Articles 1 and 8, and even then this was done solely to derive descriptive statistics and to complement the qualitative content analysis.

In the literature review article (Article 1), quantitative synthesis was used to provide an overview of the existing landscape of scholarly research, e.g in terms of institutional affiliations, the scientific approaches and thematic orientation, the year of publication, the publication venue, the target countries of studies, the applied theoretical approaches and methods. By way of contrast, in Article 8 quantitative data was used to provide basic numeric descriptions on the use of NWFPs in the Austrian region of Styria.

6 Summary and Main Insights of the Research Articles

This section presents a summary of each of the nine research articles used in this thesis and the relationships among the articles. The contributions of the thesis author are presented in sub-chapter 2.2.

6.1 The Relationships between the Research Articles

All the articles in this collection were published in peer-reviewed journals with an impact factor and are both self-contained and comprehensible without the need to make any reference to the other articles. Since they broadly deal with the same topic and target to some extent the same countries or regions, overlap in their lines of argument or content is possible. The conceptual relationships between the articles are presented in Figure 1.

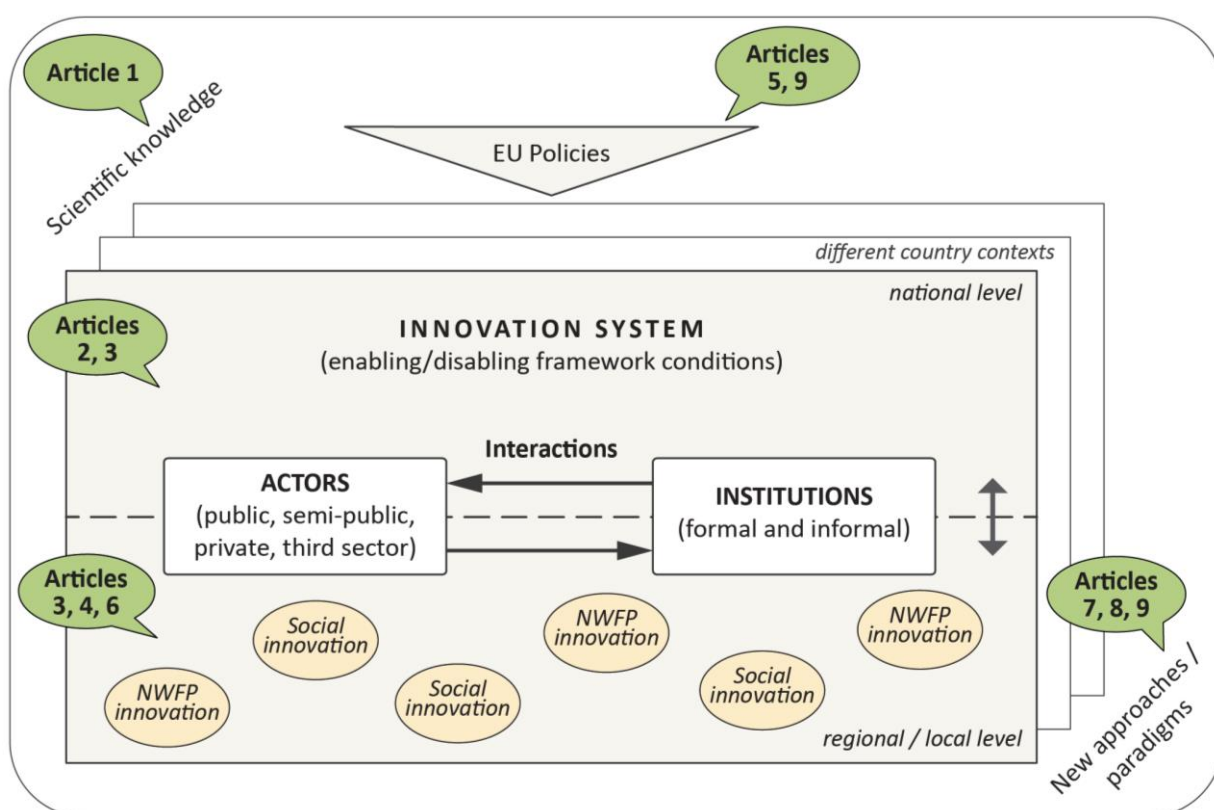


Figure 1. The conceptual relationships between the articles

Article 1 in this collection reviews the state-of-the-art of innovation research in forestry and provides an overview as well as a background understanding of the problematic conditions that exist therein. Four articles (Articles 2, 3, 4 and 6) deal with understanding innovation processes, involved actors and institutions as well as their interactions (as explained in the innovation system approach, see chapter 5) at the national, regional or local levels in different country contexts. They aim to understand the underlying institutional support and hindering factors for innovation cases and, in doing so, identify possible means for improvements in this field. The other three articles (Articles 7, 8 and 9) employ newer approaches and paradigms and reveal how NWFP and social innovations in forestry are created in multiple constellations of values and how they contribute to the ongoing changing paradigm shifts, as the bioeconomy in forestry. Articles 5 and 9 go into more detail by exploring how different EU policies influence social innovations in forestry (some of them being relevant for NWFP innovations as well).

6.2 The Research Articles

In this chapter, the main results of each article are presented following the same logic, presentation of research questions, methods and analytical dimensions before the main findings and contributions to the state-of-the-art are elucidated. A detailed presentation of the conceptual frameworks and the articles' findings can be found in the articles themselves (see Part B).

6.2.1 Article 1 - Four decades of innovation research in forestry and the forest-based industries – A systematic literature review

Weiss, G., Ludvig, A., Živojinović, I. * 2020. *Four decades of innovation research in forestry and the forest-based industries – A systematic literature review. Forest Policy and Economics, 120, 102288*

Up to this point in time, several literature-review articles have been published on specific questions regarding innovation in forestry and forest-based industries (Hansen et al., 2006; Niskanen et al., 2007; Hansen, 2010; Weiss, 2011; Weiss, 2013; Hansen et al., 2014; Nybakk et al., 2015; Lindroos et al., 2017; Guerrero and Hansen, 2018; Korhonen et al., 2018), but no recent, systematic and comprehensive literature review for the whole forest sector has yet been done. Thus, it seemed an appropriate time to provide an overview of the literature in the field, to describe the journal publications in terms of their content and institutional backgrounds and to analyse trends and possible gaps.

The literature review used in this article comprises innovation studies in the forest sector, including forestry and forest-based (wood-based) industries. A broad understanding of innovation was employed in order to embrace all the relevant studies and to show the variety of research. A wide range of innovation types was also incorporated, including technological, business, institutional, social and policy innovations, however, only if these were production or business-related (e.g., forest management, industrial production or use). A focus was placed on the innovation process rather than the innovations themselves. The aim of this review is thus not to describe or analyse innovation fields in technical terms but to understand the innovation processes. The authors, therefore, did not review all the research on the full range of innovations in forestry and the forest-based industries but focused on research that has the process of innovation as its research focus – so-called 'innovation studies'.

This paper conducted an up-to-date, systematic global literature review of innovation research in forestry and the forest-based industries where all the principles of a systematic literature review were applied: replicability, clear criteria for inclusion and exclusion of research articles as well as the strict protocolling of all the steps that were carried out (Gough et al., 2017; Cooper et al., 2008). Searches were done in the Scopus and Web of Science databases going back as far as those databases allowed and up to 19 March 2019. An initial set of 1700 articles were filtered through four steps of exclusion to reduce this number to 230 which were then used for both quantitative and qualitative analyses. The quantitative analysis provided institutional, scientific and thematic overview information, including the year of publication, publication source, country of the research organisation, target country of the study, innovation types, scientific area, theories and methods, thematic and topical focuses of the various papers. The qualitative analysis focused on the applied research approaches and resultant main insights gained.

The quantitative overview provided interesting information, such as the number of publications involved in analyses of innovation processes and that these only started to appear in the 1980s but have become

more frequent since the year 2000, with a boom in the numbers observable in last three years. Research is done mostly in developed countries, where one can observe the dominance of the USA, Finland, Canada, Austria and Sweden. The leading research organisations in terms of the number of leading roles taken in publications are Oregon State University with 16 and the University of Natural Resources and Life Sciences, Vienna (BOKU) with 10 articles. Regarding the journals where forestry research is published, most articles are found in *Forest Policy and Economics* (43 articles) with the *Forest Products Journal* being the next most prolific publisher (12 articles). The majority of articles deal with forest-based industries (93), a somewhat smaller share with forestry (87) while others focus on bio-energy (23), agroforestry (14) and the bio-economy (13). Most of the articles analyse process (or technological) innovations. Institutional innovations are analysed in 35 articles, however, a new trend or emerging topic is observable with the advent of social innovation research with 7 articles in the last few years.

In terms of the theoretical and methodological approaches employed, the articles were divided into system-level (143) and firm/individual level approaches (87). In system-level articles, the majority (65 articles) take a broader perspective by focusing chiefly on factors in, drivers of, challenges to and conditions for the diffusion and adoption of innovations. Those studies primarily have certain innovations as the focus, e.g. timber construction, bio-energy, NWFPs, environmentally friendly technologies or carbon forestry. The innovation system as an approach is explicitly mentioned in 36 articles which usually take a sectoral/technological IS perspective but where national, regional or sustainable IS are also mentioned. Furthermore, these 36 articles include analysis of the roles of actors and policies in innovation processes and within IS. Policy studies are less prevalent (18 articles), and few apply explicit interdisciplinary models such as socio-ecological systems (4 articles) or try to measure or evaluate the effects of innovations (4 articles). The 87 firm-level/individual-level articles primarily study the innovation behaviour or strategies of firms (71 articles), including aspects such as knowledge creation, collaboration and cooperation, organisational cultures and the role of managers or workers. The adoption of innovations at a personal level usually involves entrepreneurs or farmers but can also apply to users, is studied in 16 articles. In terms of the methodological approaches used, more than half of the articles (123) apply various qualitative methods, while 65 apply quantitative- and 42 mixed-methods.

The paper starts with a qualitative overview of the articles by providing a chronological development of the topic in the research. Five phases are observed: (i) the 1981–2000 period, when the topic emerges and a foundation was being preparing, this is characterised by many articles analysing technological innovations, studying either the innovativeness of firms or innovation processes in a complex societal context, often including political-institutional, social-cultural and economic conditions (17 articles in the period); (ii) the 2001–2005 period, establishing innovation research in the forest sector was observed; (iii) the 2006–2010 period, where there is an observable expansion in innovation research in the forest sector and is marked by the special issue of innovation and entrepreneurship in *Forest Policy and Economics* in 2006 with 10 published articles on the topic; (iv) the 2011–2015 period, which can be referred to as a consolidation period with a similar number of publications as the previous period; and (v) the 2016–2019 period where one can observe a strengthening, refining and differentiating of research conducted with further growth in the number of innovation related publications in the sector (78 articles) that also saw a broadening of topics and further development or refinement of research approaches.

Insights from the qualitatively analysed content were summarised into four major themes, the first being at the micro-level: i) the adoption of innovations and ii) innovativeness and innovation activities of firms;

and on the system-level, iii) the systemic functions and deficiencies, and iv) the role of policies. Besides the described analysed themes, it was recognised that certain clusters of articles around specific innovation topics existed: agroforestry, bio-energy, multifunctional forestry, non-wood/non-timber forest products, wood construction, the bio-economy and social innovation with the details of these articles being summarised in this paper.

What was learned from this review is that innovation research has established itself as an important and distinguished field in forestry with publication numbers still growing. One can observe that some concepts or aspects seem less central today (e.g., adoption, diffusion, the innovation system) and we see new approaches emerging and extending this area of research (e.g., user-centred, open, inclusive or social innovations). Even though different innovation types have been analysed in the various articles considered, one can see that there was a strong focus on technological innovations over the years. The most popular models are innovation diffusion (Rogers, 1995), where the focus was primarily put on firms, and innovation systems (IS) (Edquist, 1997), which focuses on technological or sectoral innovation systems or a combination of systemic approaches. The IS approach has proven useful in holistic analyses of innovation processes at both the company and system level, allowing conclusions and recommendations to be derived for industry, research and governments where it is also relevant for systemic policy evaluation. What is also observable is that these studies pay little attention to local natural resources, which suggests that for the comprehensive analysis of forest ISs that includes sustainability aspects, a quintuple helix model or a similar extended approach that includes ecological, environmental and natural resource elements be applied in future. Furthermore, great potential still exists to expand research on entrepreneurship, which is closely related to innovation and innovativeness in the literature, as well as human capacities which have also only been studied to a limited extent. Very few articles in the considered sample specifically tackle questions of gender and future innovation research that includes or is centred on the topic of gender in innovation research has vast potential. This research could provide further insights into nuanced behaviour, roles and material access to resources in relation to innovation and can address inequalities while advancing innovativeness and creativeness by using a gender focus. The roles of institutional frameworks, policies and governments are quite well covered in the sample and many studies derive policy recommendations. One other aspect of note when considering the sample is that the use of advanced approaches is rare with few studies applying newer approaches: the quadruple/quintuple helices, concepts of open innovation, inclusive innovation, service-dominant logic or the role of human values, meaning that looking from this perspective, innovation research in the sector is still rather conservative.

Also observable is that the majority of studies apply qualitative case study approaches which are best suited for gaining a good understanding of innovation processes in firms or innovation systems. However, the number of single case study articles was notable, a factor which reduces the potential to gain the analytical insights that arise from comparative studies. Furthermore, very few studies focused on country comparisons and multi-sector studies, meaning this research would also benefit from the increased use of quantitative models as it is now primarily based on various qualitative models. Another direction for new methods development could be the various participatory forms of investigation. For a deep understanding of innovation processes potential can also be seen in the use of interpretative approaches (discourse, narrative or frame analysis).

In terms of the topics covered in innovation research, focus on the traditional wood value chains and related technical improvements has expanded to various goods and services from the forest, however, new industrial applications, such as those presented in the chemical or pharmaceutical industry, are still

lacking. The search for non-technological innovations in doing business seems both promising and necessary for the globally competitive development of the sector, especially given the new bio-economy context which is providing new momentum for innovation studies. The recent studies on social innovation are examples of the broad range and types of value forests have for our society, just as how non-timber uses of forests have value for both business and innovation. Potential is also seen in cross-sectoral comparisons and a better understanding of inter-sectoral relations along with greater attention being given to users and the general public in innovation research.

Without any intention of disqualifying the established models and approaches, this review paper ultimately advocates for a more progressive use of new innovation approaches, a broader set of methods and new research aims. This is done in conjunction with a call for more funding in this field and a request for more comparative studies across sectors and countries to give researchers sufficient resources and freedom to apply the more innovative research approaches.

Contributions to the state-of-the-art

This paper provides the most recent comprehensive overview of the research done on innovation processes in forestry and forest-based industries over the last four decades. Thus, it contributes to the science by providing an up-to-date picture of research trends and gaps concerning the applied research approaches, method and topical areas.

6.2.2 Article 2 - Non-timber forest products in transition economies: Innovation cases in selected SEE countries

Živojinović I., Nedeljković J., Stojanovski V., Japelj A., Nonić D., Weiss G., Ludvig A. 2017. Non-timber forest products in transition economies: Innovation cases in selected SEE countries. Forest Policy and Economics, 81: 18-29

Forestry is a so-called traditional or mature sector which is not typically characterised with high innovation activities (Weiss et al., 2011). However, an increasing number of scholarly articles (as shown in the Article 1) is emphasising the importance of the forestry sector in creating economic growth by introducing various types of innovations which are especially relevant and important for rural areas. Some of these innovative activities are related to the use of non-timber forest products (NTFP)⁶, which, even though traditionally and culturally recognised activities, are attracting renewed interests and have come to be seen as increasingly economically worthwhile in the past few decades (Maso et al., 2011). Forest owners, as well as various small and medium-sized enterprises (SMEs), are recognising the potential of NTFP to fill niche markets and diversify forest production (Šalká et al., 2006) while also contributing to the promotion and development of rural areas (Niskanen et al., 2007; O'Brien Mee, 2009). To develop innovation around NTFP requires the interaction of different actors and stakeholders as well as policies stemming from different sectors, thus innovation success depends on their embeddedness in existing innovation systems (be they national, regional or sectoral) (Rametsteiner et al., 2005; Weiss et al., 2011).

⁶ In this article we used broader term non-timber forest products (NTFP), which in case of this article meant covering some cases where wood as a material was used ("Wooden knots as climbing wall holds"), however they are not one of the mainstream products from timber/wood industry. In the rest of the articles, and thesis framework itself we refer to non-wood forest products (NWFP).

This paper focused on three post-socialist countries in south-eastern Europe, namely Serbia, Slovenia and North Macedonia,⁷ in which three selected NTFP businesses' innovation processes were analysed. The article aimed to understand the innovation processes by looking at the fostering and hindering factors at work both internally (enterprise) and externally (institutional). In doing so, the goal was to answer five specific research questions:

- 1) What are the framework conditions for innovation in the selected countries?
- 2) What was the role of the actors in the analysed innovation processes?
- 3) What was the role of the institutions in the analysed innovation processes?
- 4) What kind of interactions existed in the analysed innovation cases?
- 5) What were the main supporting mechanisms (information, coordination and incentives)?

To fulfil above-mentioned goal an innovation system (IS) approach (Edquist, 1997) was employed which views innovation as an institutional process where both the entrepreneur and a system of actors and institutions are jointly responsible for the innovation's development (Edquist, 2001; Lundvall et al. 2002; Moulaert and Sekia 2003). The main elements of an innovation system are the actors as well as the institutions and their interactions (Rametsteiner and Weiss, 2006b). In studying innovation, the following innovation systems on different levels can be relevant: NISs (National Innovation Systems), SISs (Sectoral Innovation Systems), and RISs (Regional Innovation Systems) (Malerba, 2006). According to Weiss and Rametsteiner (2005), in forestry innovations are often not the result of established national, sectoral or regional innovation systems but appear in as an *ad hoc* IS or one-project IS. This is especially the case with innovations that are new to the sector or are related to only a few sectors and, hence, they exist between sectoral innovation systems. Such examples are NTFP (more on the IS approach is provided in chapter 4). In adopting this standpoint, this paper looked at specific NTFP innovations through the lenses of two IS approaches: the general innovation and entrepreneurship support policies related to NIS and the forestry SIS.

The countries selected for analysis in this paper were undergoing significant political and economic reforms at the beginning of 1990s after which they entered into a transition process leading to widespread reforms in all their economic sectors, including forestry (Glück, 2011; Sarvašová et al., 2014; Nonić et al., 2014; Weiss et al., 2012). These reforms were related to changes in legislation, land tenure, private property rights (Nichiforel et al., 2020, Dobsinska et al., 2020) and the rise of private businesses (Bouriaud et al., 2013; Weiland, 2010). Some of these private businesses started to operate in the field of NTFP after the cessation of state-owned enterprises activities with such products after the 1990s. This was an opportunity for private enterprise to generate new jobs and income and enter the market in their own right.

This challenging transition period in all three countries affected both the development of innovation systems and the NWFP sub-sector which have been, incidentally, simultaneously developed over the years. The shared history of selected countries (all being in the former Yugoslavia and involved in the NWFP business) coupled with their now differing relationships to the EU provided fruitful ground to compare and analyse the development of selected innovative NWFP businesses and their embeddedness into existing innovation systems. This paper aimed at demonstrating how innovations arose and developed in the NWFP sub-sector in the selected countries and thus provide feedback to the existing understanding of innovation systems and point to the gaps in the institutional system and other areas that could be improved.

⁷ In the article referred as FYR Macedonia

When analysing the entrepreneurial level innovation in the cases within the national and forestry innovation systems in the three different countries a comparative case study approach was applied. Data was collected by a mix of methods in three phases. The analytical focus was then split into two parts, namely analysis of the innovation systems and analysis of the innovation processes of the selected enterprises.

As has been previously mentioned, these countries were selected based on their joint history, their activity involving NTWPs and their diverging development paths in the post-communist era. Innovation cases within the countries were selected based on the results of the first phase of data collection undertaken by the StarTree project⁸ where data was gathered on actors and policies relevant for NTFP innovations to understand national innovation systems in the different partner countries and case study regions. This was done by conducting questionnaires (12 in total) containing 11 questions to gather basic data on actors, policies at different levels (national down to local), and examples of innovative NTWP businesses in the three countries. These questionnaires were conducted by project partners (the authors of this paper), who then selected the most prominent case examples for further analysis. The cases selected for analysis in StarTree and then in this paper were the following: i) “Teaspoon-shaped bags” (Adonis/Serbia), 2) “Wooden knots as climbing wall holds” (U-Jaa/Slovenia) and 3) “Selling wild mushrooms on the domestic market” (InterMac/North Macedonia).

In the second phase, data was collected for specific case studies by conducting face-to-face, semi-structured interviews with people responsible for the particular innovations (i.e. owners of the businesses). For each case, one interview was conducted (3 in total) and these focused on the innovation process of selected businesses, starting from idea generation to the main activities as well as the supporting and hindering factors impacting the business’ development and existence (related to policies, information, funding streams, cooperation aspect, conflicts etc.). In addition, interviewees were asked to assess the general conditions in the region and country in regards to NTFPs. To gain a better understanding of the framework conditions for NTFPs, in the third phase (specifically developed for this paper) 2 additional interviews were conducted in each country with experts from the organisations responsible for innovation support for forestry and NTFPs. In this respect, judgmental sampling was applied as the most suitable method because of the focus on the organisations (governmental bodies, regional development agencies, and research and development organisations) that have an impact on the NTFP framework conditions and the fact that the selected interviewees were involved in this topic over the analysed period. This was important as the research was specifically interested in determining differences in the NTFP sub-sector before and after the disintegration of Yugoslavia. The questions were related to the issues of institutional set-up, national/regional financial support and other support mechanisms (information, cooperation and monetary or non-monetary incentives) for NTFP businesses and relevant actors in this field. This was done to be able to describe the changes in the support systems and their interrelationships as they adjust to changes in the political system.

In addition to the above-described data collection, an analysis of policy documents collected in the first phase was also undertaken. Qualitative content analysis was done for both documents and interview transcripts, following a conceptual framework of the innovation system approach (as explained above).

⁸ North Macedonia was not officially part of the project, but a co-author was working on a PhD with a related topic and he conducted all the phases of data collection related to the work package that BOKU was leading (explained in chapter 2.1), the paper was thus able to use his data.

An analysis of the framework conditions for innovations involving NTFPs in the selected countries showed that in all three countries NTFPs are undervalued by forest authorities and other organisations when compared to wood-based products. One reason for this is the absence of information and systemic data on NTFPs meaning it is difficult to grasp all the benefits possible from the utilisation of these products. When Yugoslavia was still intact, state-owned enterprises were the main actors in the NTFP business with only a relatively few individual sellers of these products also being active, but certainly not any private enterprises. Cooperation regarding NTFPs between the state-owned enterprises of the three analysed countries existed in the past, as evidenced by the fact that Slovenian enterprises were one of the most important players in the marketing of Serbian NTFPs in foreign markets. These collaborations ended with the breakup of Yugoslavia when activities related to NTFPs went into hiatus in the period from 1991 to 1997. At the end of this period, all business involving NTFPs was conducted by private businesses, usually small and medium enterprises, in all three countries.

Currently, a complex policy framework regulates the NTFP sub-sector in each country, chiefly coming from forestry and nature protection sectors. Policies regulating innovative activities are overarching and come from various sectors, none of which are directly related to NTFPs and related sectors while organisations at the national level have largely indirect roles in NTFP sub-sectors. The threefold role of institutions in the support of innovation processes was not fully confirmed in the analysed cases, however, differences were noted in the fulfilment of these roles in specific countries, e.g. In North Macedonia, predominantly financial incentives are provided, while in Slovenia the information support role is a dominating factor. It is evident that many of these policies were designed in the mid-2000s, meaning that the analysed cases were operating for a long time without any specific institutional support. This lack of policies specifically focusing on NTFPs has been confirmed in studies on other EU Member States and also in studies of non-EU countries (Ludvig et al., 2016a, Nedanovska, 2012; Nedeljković, 2015; Nonić et al., 2013) where the sector is often indirectly targeted by policies designed for rural development, entrepreneurship and business development or with the environment or nature conservation in mind. This rather symptomatically reflects the situation of a general lack of comprehensive innovation policies within forestry sectors across Europe (Rametsteiner et al., 2005; Weiss et al., 2011) and which is even more evident for wild forest products as they are not even recognised by the forest sector (Ludvig et al., 2016a). In all the analysed cases, the innovations were largely carried out solely by private companies, which also proves to be typical for the field of NTFPs around Europe (Ludvig et al., 2016a,b) but not always so pronounced as in the cases considered here.

An important aspect of company innovativeness in all three cases was shown to be the prior knowledge of entrepreneurs, particularly in terms of their knowledge of markets, their functioning and customer demands. This knowledge originated from their previous involvement in the NTFP business in previously state-owned companies (in the Serbian and North Macedonian cases) or from their personal involvement in the activities that use NTFPs (in Slovenian case). Thus, the research clarified that these innovations succeeded largely due to enthusiasm, self-education efforts and a continuous trial-and-error approach. The high level of interest of the entrepreneurs and their desire for profit and autonomy were the main driving factors. As in other studies (Aidis, 2005; Cull et al., 2006), these cases also showed that SMEs in transition economies have difficulty in obtaining external finances, thus much of their work is financed from their own resources and private bank loans. External financial support was obtained in the Slovenian and Serbian cases, both of which received one time grants from national support programmes. However, the amount provided was not significant for the success of the business. Information support was also missing in all the cases and entrepreneurs needed to rely on their own experience and knowledge to meet many of the challenges they faced. Cooperation was identified as

important in all three cases and was deemed to include cooperation with collectors, forest owners or concessionaire companies, other companies and universities. The existence of poor external support in all the analysed cases could be explained by the early stage of development of the innovation support system in all three countries but also by the specificity of the NTFP business field. Support organisations were seemingly less pro-active in providing information and/or finances and thus not successful in reaching their target customers. These findings are in line with the findings of Rametsteiner et al. (2005) and Tieguhong et al. (2012), who state that institutional level actors usually underestimate the relevance of information as an essential factor for innovation and that the absence of targeted financial assistance can be a big obstacle for small businesses. Conversely, the research also discovered that some support measures were unused by the case study companies for various reasons, e.g. the companies were reluctant or not well trained to take necessary actions, they saw the bureaucratic procedures as too difficult or their enthusiasm waned after failing in their first attempt to obtain support. The specificity of NTFPs is also a factor sustaining low support because the role of NTFPs and related innovations is still very marginal and secondary in the studied countries considered. NTFPs are often seen as by-products and of a cross-sectoral nature meaning no or few policies related to these products (exceptions are some individual products, which differ from country to country). Thus, one could conclude that the local external innovation system is barely supporting the innovations of small-scale NTFP companies in the countries analysed.

Contributions to the state-of-the-art

This paper is one of the first detailed and comparative analysis of NTFP innovation cases in the Western Balkan context. The analysis of factors influencing innovations at the national and enterprise level proved to be appropriate to reveal a multi-layered picture of innovation systems involving NTFPs in these three countries and how these innovation systems impact the specific cases. This paper showed that support to small NTFP businesses is dependent on the national institutional framework in place. Due to the poorly developed innovation systems for rural businesses in general, as well as the fact that the field of NTFPs are neglected by the established agricultural and forestry sectors, one can conclude that companies operating in this area struggle to obtain meaningful external support. Developing specific, product-by-product or more locally related policies, as well as organisations responsible for NTFPs would certainly improve the situation in the analysed countries. To upscale innovations in the NTFP sub-sector, institutional innovations would be needed that provide effective structures for innovation support in the field, including the provision of specific information, financing and coordination support. This article also points to the need for better two-way communication between companies and the relevant organisations regulating NTFPs as well as recognition of bottom-up initiatives within the various institutional systems. Further studies would be needed to better understand the situation regarding specific NTFPs and their potential in contributing to innovations in the forestry sector.

6.2.3 Article 3 - Social Innovation to Sustain Rural Communities: Overcoming Institutional Challenges in Serbia

Živojinović I., Ludvig, A., Hogn K. 2019. Social Innovation to Sustain Rural Communities: Overcoming Institutional Challenges in Serbia. Sustainability, 11, 7248

As a result of the number of societal and environmental challenges, and with the weakening of state capacity to effectively deal with these issues, civil society has taken on a new role by seeking to address these challenges using innovative citizen-actors and forms of mobilisation and thus giving rise to so-called social innovations (Nicholls et al., 2015, Pol and Ville, 2009). Social innovations are intended to offer solutions to the above-mentioned challenges by creating new arrangements, new actor-relationships, interactions and new decision-making processes (Nicholls et al., 2015, Nijnik et al, 2018). This paper employs the definition of SI used by the SIMRA project, which states that social innovations are “the reconfiguring of social practices, in response to societal challenges, which seeks to enhance outcomes on societal well-being and necessarily includes the engagement of civil society actors” (Polman et al., 2017, p.4). Developing social innovations becomes especially challenging in situations where the necessary institutional framework to guide and support the proper functioning of such activities within a given context is absent, weak or deficient and thus creating an institutional void (Khanna and Palepu, 1997, Webb et al., 2013). This paper was undertaken using the assumption that institutional voids impede the contributions of social innovations to sustain and develop rural communities in Serbia. To prove the validity of this stance the paper answered two research questions: i) what are the particular institutional voids that hinder the emergence and development of social innovations, and ii) which supportive factors help to overcome the identified institutional voids? By answering these questions, this paper contributes to the research field of social innovation in rural areas of transition countries.

Starting from the notion that innovations occur under the influence of existing institutional environments and that their success or failure is largely determined by these environments (Webb et al., 2019) this paper specifically explored this notion based on the empirical evidence of nine case studies in Serbia. Thus, this paper builds on institutional theory, recognising that human behaviour is shaped jointly by the constraints, incentives and resources provided by formal and informal rules (institutions), which can be more or less compatible with each other (North, 1990). More specifically, this paper examines the institutional void perspective which proceeds from the position that there are insufficient or no formal and informal institutions to facilitate efficient and effective market transactions and operations (Khanna et al., 2005; Mair and Marti, 2009; McCarthy and Puffer, 2016; Webb et al., 2019). This brings new aspects to the study of social innovations as most similar studies are undertaken in a Western context (McCarthy and Puffer, 2016) whereas this study of the situation of Serbia provides insights drawn from a transition country context characterised with institutional voids. Transition or developing economies where poverty, unemployment and diverse social problems are relatively pronounced and produce markedly different environments in terms of the context and framework in which SIs must develop than SI environments in developed country contexts (Agostimni et al., 2016, Turker and Vural, 2017).

This paper provides in-depth analyses of nine social innovations and the related institutional voids. For this purpose, a qualitative research design was applied to yield thick descriptions of the processes of social innovation in a multiple case study research design. All the case studies selected for this research are located in Serbia, which was chosen for this research because it is currently in a transition phase and going through the EU accession process, which provides a rich empirical site to examine the institutional

context and changes for SIs. In addition to the above, a SI boom has occurred in recent years giving rise to more SI initiatives, which are an unexplored area in that context. The selection of social innovation cases for analysis was done via purposive sampling (based on initial desktop research and screening, and expert's interviews and a snowball technique). The final selection of the nine case studies used was based on the following criteria: each fulfilled the definition criteria, was active in rural areas and featured different organisational types and sizes. Furthermore, a decision was made to use cases with a broad geographical distribution across Serbia to identify specific challenges occurring in different local contexts.

Data for the analysis was collected utilising in-depth interviews, content analysis of organisations' websites and other materials along with a literature review. Triangulation of the collected data was done to cross-check its validity and reliability. Primary data was obtained by nine qualitative in-depth interviews (conducted from September 2018 to February 2019) with the key representative of each social innovation case study, i.e. with those people who initiated and further developed each examined innovation. For this purpose, an interview guide with nine open questions was developed and these interviews were conducted face to face in the Serbian language with all the interviews being recorded and transcribed in NCH software. The purpose of the interviews was to gain extensive knowledge of the cases, the respective context of each and detail the various individual perspectives. To gain a richer understanding of the contextual factors, secondary data was collected by content analysis of various organisations' websites and materials as well as a literature review of publications dealing with social innovations and entrepreneurship in Serbia. Analysis of the primary data and interview transcripts was done by inductive coding with support from Atlas.ti software. Through an iterative process, initial codes were grouped into more focused and substantive categories of supportive and hindering factors before being subsequently related to concepts of formal and informal institutional voids.

The analysis of nine cases of social innovations in rural areas in Serbia provides a very rich and detailed picture of how various factors can support or hinder the development and sustainability of such initiatives. All the considered cases were initiated by civil society organisations and started operating after the year 2000, i.e. following the political change and at the start of the transition process in Serbia. The selected cases reflect different contextual and institutional conditions for developing social innovations, such as variations in infrastructure availability and in developments between the northern and the southern part of Serbia which involves the varying socio-economic power of the regions as the northern, western and central parts of Serbia enjoy more stable economic conditions and higher levels of involvement from the various actors. These social innovations have different organisational structures, most are registered as associations, while one is a company in a public-private partnership with local municipality while another is a social cooperative. The majority of the analysed cases began with the formation of social enterprises involved in production-oriented activities, primarily in the field of organic agriculture or non-wood forest products and where their initial goals were to establish financial and long-term sustainability and reduce dependence on donors' funds. In addition to these market-oriented activities, the examined social innovations began working on empowering village communities and working with various vulnerable groups such as people with disabilities, unemployed youth, the Roma population as well as female victims of violence or human trafficking. They address the various challenges that their communities or societal groups faced, such as social injustice, gender inequality, challenges of rural development as well as wellbeing and health issues. Each of these organisations has different partnership models with their users and producers which thus actively involves them in the work of social innovation. Furthermore, the SIs empower their users and collaborators by actively working on improving their skills and educating them. The most significant

source of impetus in establishing and running the social innovation cases has been strong international donor support coupled with considerable activity on the part of national non-governmental organisations and foundations as well as the domestic banking sector which has strongly supported developments in this field.

By looking at each innovation process and getting an in-depth view from persons directly involved in developing analysed social innovations, the project was able to identify the supporting and hindering factors impacting the initiatives. This allowed further elaboration on the existing institutional voids and highlighted areas that could be improved in Serbia's current social innovation institutional context.

As in other transition economies, social innovation and social entrepreneurship are relatively new phenomena in Serbia (Lebedinski, 2014, Vladislavljevic, 2019, Andjelic and Rakin 2019). It is perhaps unsurprising then that institutional voids for such activities exist, as evidenced by the research identifying the lack of regulatory frameworks or strategies on social innovations and entrepreneurship. This means that currently, social innovation organisations have to navigate a fraught course between existing regulations and/or tailor their business models to fit existing rules while accepting the various adverse effects on their businesses that arise from the current innovation environment. One institutional measure that partly fills this gap was the introduction in 2015 of a "social cooperative" category in the Law on Cooperatives. One of the selected cases is the first social cooperative in a rural area established assuming this role. The need for better-tailored policies, either in the form of legislation or a specific national-level strategy for social innovations, was expressed by all the interviewees. Addressing this void has proven to be challenging in Serbia, as is evidenced by the already 10-year long process of developing the Law on Social Entrepreneurship in which the ministry has proposed three drafts, none of which met the expectations of the concerned social enterprises and non-governmental organisations active in this field. As of the time of writing, the fourth draft of the law (created by the Coalition for Development of a Solidarity Economy and the German Corporation for International Cooperation) had been submitted to the ministry in charge and is now under discussion at the political level (KoRSe, 2019) which will further extend the period of regulatory inadequacy.

Formal voids are further reflected in the lack of state financial support mechanisms specifically assisting social innovations and enterprises, mainly because their activities are treated as any other profit-oriented business. Active financial support provided by foreign donors, the domestic banking sector and private domestic foundations has thus far been filling this void. One of the cases specifically addressed this issue of the lack of financial sources to support social innovations or enterprises, and have created its own fund operating as a "business angel" in support of integrated, sustainable agriculture.

Poor enforcement which facilitates opportunistic behaviour is also seen as a void. This is sometimes accompanied by a lack of transparency and participation in procedures, such as public budgeting and spending, policy formulation and policy implementation at both the national and local level. Furthermore, voids are related to national and local policy-making and implementation if their procedures are not always congruent, leading to gaps, missing rules, or even contradictory rules being applied. A general lack of relevant information on social innovations has been also been widely reported by our respondents which leads to the situation where many of the social innovators are completely reliant on their personal contacts and knowledge. This is connected to the lack of education and educational support which results in labour markets having to draw on an unskilled and ill-prepared workforce. These gaps are being addressed by non-governmental organisations who provide training,

advisory services and mentoring activities as well as externally funded government bodies (Social Inclusion and Poverty Reduction Unit (SIPRU)) which works at times with these initiatives.

The absence of institutionalised intermediary bodies (i.e organisations which should be dedicated to the coordination and support of social innovation initiatives) was noted as a void in the current institutional system. This lack is made even worse because of the poor institutionalised cooperation between the involved state organisations as well as between the state and various other private-sector actors, a problem which partly stems from the strong sectoral fragmentation of public administration.

Turning the research's attention to the informal institutional voids provided an even more nuanced picture, especially at the community level where various informal institutional voids were identified. A traditional and (still) dominant patriarchal system is one of the informal institutional voids that result in a weak position for women, especially in rural areas, an issue evidenced in all of the examined cases. This void is being addressed by various programmes (including the rules and goals of funding donors) that aim to include and empower women as well as other vulnerable groups and minorities. As previously stated, this is an issue which occurs across all sectors and is one of the areas targeted for improvement in the EU accession process. Thus far, it has been addressed by national-level regulations, such as the new National Strategy for Gender Equality 2016-2020 and an action plan for 2016-2018, however, a European Union Report (EC, 2019) noted that the issue of gender equality still needs to be further remedied and an efficient institutional set-up with adequate resources needs to be established to ensure progress in this area.

Other informal institutional voids are related to traditional resource use where it is difficult for rural people to change existing practices used in agricultural production and to engage the local community in such activities. Societal needs for organic products, for example, pushed some of the initiatives to change and transform the existing practices and rules in their regions. Furthermore, the manipulative use of the power of public administrations, both at the national and municipal levels, was found to be an informal void. Some interviewees also pointed to the problem of corruption which is a manifestation of the misuse of this power. This is one more of the general issues occurring across many economic sectors in Serbia and which remains an area of concern for the EU (EC, 2019). All of this combines to create a serious lack of trust between communities and social innovators that limits individuals' willingness to engage in relational and investment activities. Another very relevant void is manifested in the growing general apathy of people, often seen as a result of many years of socio-economic crisis in Serbia but also due to value systems which favour political nepotism.

In the conclusion then, this article stresses that numerous institutional voids exist in Serbia which impact the development of social innovations and enterprises. These are reflected in insufficient support activities and understanding of social innovation as a concept by both national and local authorities, inadequate or non-existent regulatory and financial mechanisms, a lack of coordinating bodies as well as dysfunctional communication channels and educational offers. These formal institutional voids are furthermore accompanied by informal voids such as norms rooted in traditional societal beliefs which continue to constrain the productive use of resources and foster neglect and discrimination against certain groups within society.

What can be learned from the analysed case studies in this paper is that social innovation operate successfully but under very unfavourable conditions given the existing regulatory system and societal context. All the analysed social innovations are highly dependent on external financing by donors, thus

they operate under rather tenuous circumstances and struggle to sustain their operations, which highlights the dire need for more stable and innovative financing mechanisms. Despite the many challenges present in the Serbian context, the existence of high levels of interest and activity by national non-governmental organisations is very important and promising for the proper functioning of the analysed social innovation initiatives. In partnership with such organisations, social innovators work to advocate a broader understanding of the societal value of social innovation and entrepreneurship and to ensure that both adequate national legislation and measures are passed which in the long run should better support social innovations. All the case studies analysed here showed that they succeed in offering new options and approaches which serve to motivate and involve rural populations and build trust among community members. Thus they provide a comprehensive view of the institutional challenges faced by social innovations in rural areas in Serbia.

Contributions to the state-of-the-art

This paper contributes to revealing a more nuanced picture of the institutional context of developing social innovations in rural areas in a transitioning economy. By applying an institutional void perspective, the research highlights the various formal and informal institutional voids present, defining them with empirical evidence collected from nine case studies from rural areas in Serbia. Thus, this paper brings the existing challenges related to social innovation development in rural areas to the forefront and lays a foundation that will serve to stimulate not only future research but also policymakers, development agencies and other interested actors to strengthen and better target their support for social innovations as a means to sustainably develop rural areas and not just those in Serbia. Studying such issues in more detail is a fertile area for future research with high societal relevance, especially given other areas and avenues for improvement in this field are yet to be extensively researched.

6.2.4 Article 4 - Non-Timber innovations: How to innovate in side-activities of forestry - Case study Styria, Austria

Weiss G., Ludvig A., Živojinović I., Asamer-Handler M., Huber P. 2017. Non-Timber innovations: How to innovate in side-activities of forestry - Case study Styria, Austria. Austrian Journal of Forest Science, 134. Jahrgang (2017), Sonderheft 1: 231 – 250

Article 4 was written using the framework of the StarTree project, as was the case with Article 2. Thus these two papers have the same background, which elaborates on the state of the non-timber forest products (NTFPs) in forestry and related sectors. It recognises that NTFPs and the related business opportunities have low visibility and recognition, although their potential seems to be greater than is often thought (Vacik and Wolfslehner, 2009). The basic reasons why NTFPs are often neglected are often related to two issues: limited marketability which is sometimes connected to an often existing public good character of such products (Mantau et al., 2001; Mavsar et al., 2008), and limited attention of established sectoral innovation systems, which provide only limited support to, or even act as barriers against, the development of NTFPs (Rametsteiner et al., 2005; Weiss et al., 2011). Article 4 focuses on Austria, where innovations in NTFPs have often been developed without specific support from a single policy field or, in other words, “between” established innovation systems (Kubeczko et al., 2006). Instead of sectoral systems, it is regional innovation systems or regional development policies that play important roles.

Starting with the observation that there is limited innovation system support, this paper aims to empirically analyse what this unfortunate institutional environment means for innovations in the field of NTFPs. Thus it answers the following research questions: How do innovations occur in a situation where there is very limited institutional innovation support, and how could non-timber innovations be fostered?

This Article applied an innovation system approach (as described in Article 1 and chapter 4) and focuses on the region of Styria (Austria) as an empirical case study (Yin, 2009). Styria was selected as a region because it was one of the case study regions within the StarTree project and the one on which the authors, as a partner country research team, worked the most in terms of stockholder engagement and data collection for various work packages.

The methods used in this paper included content analyses of policy documents, questionnaires and semi-structured interviews. Thirteen documents were analysed from different sectors related to NTFPs (namely forestry, hunting, regional development, rural development, agriculture, nature conservation/tourism and innovation). These documents focused on relevant policies that are important supports for innovation processes in the field of NTFPs in Styria. The documents were qualitatively analysed in order to determine their relevance regarding NTFP innovations, including their respective aims, measures and activities. In 2014, a questionnaire was conducted with five (out of nineteen invited) relevant public and private sector organisations who explicitly considered the theme relevant to them. The questionnaire covered a range of topics related to the conditions and situation in the field of NTFPs in both Styria and Austria (support policies, existing measures applied, financial support mechanisms, research and development, education, training and information activities). Furthermore, between 2014 and 2015 semi-structured face-to-face interviews were conducted with central innovation system actors and with innovators in the specific innovation case studies that were analysed. These interviews had the aim to understand in-depth innovation processes in the selected innovation examples from the region. These embedded enterprise-level case studies included the following products: game meat, Christmas trees, mountain pine essential oils, chestnuts, mushrooms, herbs and forest fruits. These case studies contained a variety of elements regarding the activities and aspects of their operations, such as support by policy programmes, marketing organisations and/or labels, for example, the LEADER+ programme, Nature Park Specialities, the Styrian Christmas tree association, Urlaub am Bauernhof (farm stay holidays) and Genussregion Österreich (The Delight Region of Austria). In these case examples, the research specifically focused on the role of actors concerning information, financing and coordination in the innovation processes.

The analysis showed that in Styrian (and Austrian) context, forestry, agricultural and rural development policies are most relevant for NTFPs even though such products are not these policies' specific focus. The relevance of these policies is reflected in their general innovation-orientation and openness across product types and activities as well as in their regional or even local level approach to implementation. The policies' relevance primarily stems from regional level initiatives within larger level frameworks (e.g., agricultural associations of the Chamber of Agriculture) or locally or regionally implemented (national or EU) policies (e.g., LEADER regions), which have a more targeted focus.

Actors involved with NTFPs are drawn from different sectors and entities, the most prominent are forestry training schools, agricultural interest groups and LEADER regions' organisations. However, most of them do not have a specific NTFPs focus. This is reflected not only in policies but also in education curricula and research programmes that barely deal with NTFPs, the only exception being the Christmas

trees and chestnuts where there are specific activities of interested organisations. The reported case studies of the LEADER region Zirbenland and the Nature Park Specialities are also among the rare exceptional examples which directly deal with NTFPs. If one proceeds according to types of organisations, most actors active with NTFPs in Styria belong to interest groups, innovation support organisations and research, education and training organisations. These are primarily regional level organisations, leading to the observation that NTFPs are often of specific regional relevance.

The analyses conducted here furthermore emphasises the ambivalent role of forest landowners' organisations regarding NTFPs as these organisations primarily represent larger forest holdings (i.e. properties over 200 ha). Even though many landowners have diversified what they offer, e.g. tourism or recreational services, they remain hesitant to go engage in NTFP-related businesses as they see potential conflicts with other users. Exceptions to this are found in hunting and game activities which are strictly regulated traditional forest activities that are strictly regulated between land-owners and hunters.

Furthermore, this paper revealed some of the existing institutional barriers for NTFPs. One of the indirect barriers is the fact that NTFPs are a side-activity of all the involved sectors which leads to selective blindness on the part of the institutional system towards these products. This results in a lack of statistics, specific research, education, training programmes and focussed support structures for this group of products. Knowing that there is general lack of effective innovation support in the forestry sector (Rametsteiner et al. 2005), this neglect of NTFPs within the forestry sector adds to the so-called "double blindness" of the institutional system. The cross-sectoral character of NTFPs seems to also be the reason for many direct barriers arising from competition between the involved sectors (forestry, agriculture and nature conservation).

From all of the above, one can say that there is no "one" sectoral innovation system supporting NTFPs but support comes from certain programmes run by several sectoral innovation systems, including forestry (Christmas trees), agriculture (LEADER, Farmstay Holidays, chestnuts and the Delight Region of Austria) and nature conservation (Nature Park Specialities). Since NTFPs are something of a by-product for the aforementioned sectors, there has been no specific knowledge, instruments or promotional activities developed. This means that it is very challenging for interested innovators to receive meaningful support. In most cases supports comes once a certain level of institutionalisation has been achieved, such as that seen in what were initially small, bottom-up initiatives, like the Christmas tree association, chestnuts initiative or the LEADER region "Zirbenland".

Analysis of the range of examples in Styria shows that despite the lack of specific sectoral innovation systems, the institutional system still has certain structures that can offer support. These structures need to be more open and flexible to better recognise and support emerging demands from practice. The Nature Park Specialities and Zirbenland LEADER cases are prime examples where the institutional system was able to give substantial and systemic support to local creativity and capacities. Both product development involving Nature Park Specialities and the regional strategy development in the Zirbenland LEADER region combined a structured and expert-led process with the active involvement of local actors' needs in view. In doing so, this serves as the ideal regional innovation system as described in the literature (Asheim, 1998, Cooke, 1998), which employs "top-down support for bottom-up innovations". Thus an important policy implication is that sectoral support programmes should be flexible and open to adapt to local products or activities or other specific local needs.

The contribution of this paper can be seen in its detailed analysis of the regional innovation systems for NTFPs in the Austrian province of Styria, which brings greater understanding of the supporting institutional factors that influence innovative NTFP initiatives and businesses. Application of this innovation system approach proved to be significant, especially in revealing the roles of various actors and policies in the innovation process. Cases presented in this paper meaningfully contribute to the collection of empirical examples that could be further used for more detailed and specific analysis.

6.2.5 Article 5 - Mapping European and forest-related policies supporting social innovation for rural settings

Ludvig A., Weiss G., Sarkki S., Nijnik M., Živojinović I. 2018. Mapping European and forest-related policies supporting social innovation for rural settings. Forest Policy and Economics, 97: 146–152 <https://doi.org/10.1016/j.forpol.2018.09.015>

Article 5 is one of the outputs from the SIMRA project in which the working group the present author was involved with was in charge of analysing policies for social innovations in marginalised rural areas. Considerable socio-political aspirations regarding social innovation required an examination of the relationship between public policies and the social innovation process. Some strands of literature see social innovation as an alternative to policies and as a more bottom-up and flexible way to meet existing social needs. However, this research's understanding of social innovations is that they are usually grassroots and bottom-up constellations in rural areas that have neither the functions nor the resources to replace regular social services or rural development policies but can supplement some of them. Rather, a need was seen for policies to support the emergence of SI in rural areas and forestry. Accordingly, this article concentrated on the analysis of the policies that have potential to support social innovations in rural areas with a specific focus on the analysis of forest policies.

A qualitative deductive approach was used with the application of content analysis for selected policy documents and qualitative interviews. The primary sources of data were the policy documents from different policy domains (social, rural development, regional development, forest, environmental, innovation policies). Since the term social innovation is broad, new and not immediately or explicitly visible in most of the policy documents, our analysis selected not only documents that directly address the term social innovation but also those that indirectly address issues relevant to enabling social innovation. In total 36 policy documents were analysed and this sample was searched through in a step-by-step approach. Twenty policy programmes, documents and instruments operational at the regional, national or the European level were collected in collaboration with SIMRA project partners and stakeholders, all of whom contributed with their local expertise and knowledge to the data collection. Furthermore, sixteen more documents were collected by conducting online searches. In addition to the document analysis, 6 qualitative semi-structured face-to-face expert interviews with international policy experts and scientists were also conducted. For this purpose, an interview guide was developed with questions related to the understanding of what social innovation is, the content of current regulations, the implementation of these regulations, the enabling and constraining factors for social innovation, the role of the organisation in the policy field and future of social innovations. The interviews took approximately 1 hour with all of them being recorded and subsequently transcribed. The purpose of the interviews was to verify the data obtained from the document search and to increase both the reliability

and validity of the research. Additionally, the interviews were also used to prepare the deductive criteria for the qualitative content analysis of policy documents.

Starting from the pre-defined theoretical definition of social innovation (Polman et al., 2017) (see Article 3), a deductive approach was used to identify three key themes for the analysis of policies and policy mapping. These three themes related to the main aspects that social innovation target, namely: vulnerable groups, regional and rural development and the engagement of civil society. Following along the lines of these three key themes, the results we determined and served to identify three types of policies that touch upon and have at least some potential to support social innovations:

A) Policies that target vulnerable groups in society – these focus on the youth, migrants, the elderly, unemployed, single mothers, those socially excluded or people with disabilities. These policies target the social demands and challenges of these vulnerable groups in terms of their inclusion and social support. At the EU level, the most relevant example in terms of a directly dedicated policy is the programme of the European Social Fund Initiative entitled the “EU Programme for Employment and Social Innovation”. Other examples of policies relevant for forestry are Green Care (EU wide), Green Care Forest (AT), Social Farming (EU wide), forest pedagogy and environmental education (EU wide).

B) Policies that target societal challenges in integrated regional and rural development – these policies embrace all the integrated approaches, such as integrated financial policy instruments or networking and up-scaling policy initiatives for social innovation. Through the integration of social, economic and environmental dimensions such policies should lead to regional and rural development. At the EU level, these policies are Regional Development Policies, Rural Development Programmes (RDP), funding initiatives within the EU Structural Investment Funds, the EU SME instrument (which is open to social enterprises) the EU “Social Business Initiative” and the “Social Innovation Europe Portal” (SIE-initiative). In forestry, policies belonging to this group support networking and business benefits for forest owners, local empowerment and economic development. They are related to institutional innovations such as the formation of labels and brands among collectives of forest owners: regional or nature marketing labels while also being related to the formation of regional development initiatives and associations (such as the Nature Parks Specialities in Austria and various chestnut associations in Italy, etc.)

C) Policies that target societal participation, institutional change and inclusion of civil society actors – these policies target the facilitation of processes of institutional development and promote changes in the relationships between stakeholders and also between stakeholders and public institutions. Social innovations can occur as a direct target of these policies but can be also related to new forms of inclusion of stakeholders in policy processes. At the EU level, the most relevant policies are The LEADER/CLLD local development method, Agenda 21 as well as EIPs (European Innovation Partnerships) and their operational groups. In forestry, relevant policies usually stimulate cooperation and trust-building around common goals with forestry actor networks. Examples in this respect are volunteering (e.g. volunteer reforestation projects in Austrian Mountain regions or voluntary cooperation for joint goals such as establishing and maintaining mountain bike trails in Switzerland), communal engagement in woodland management with social, cultural and economic benefits (e.g. Woodland Skills Centre, Coppice Wood College in Wales).

In general, this research understands that public policies have considerable potential to foster innovation through regulations, financial support as well as the provision of information and training. The public

sector can thus play a major role in supporting social innovation and providing solutions to various societal challenges through public funding and contracting initiatives.

However, when looking at the examples from forestry and the forest-related sectors, efforts to mobilise investment and resource needs may be more difficult in rural areas than in urban social innovations, as has already been shown in the literature (Asheim et al., 2016; Isaksen and Trippel, 2017). Social innovations are by definition risky ventures prone to failure (Asheim et al., 2016), thus, they need the greatest possible degree of openness in terms of support for all the phases of the innovation process (Isaksen and Trippel, 2017; Trippel et al., 2015). These attributes of social innovation clash with the traditional logic of public policymaking and at least partially explains why limited openness of public policies to SIS persist. However, what could be seen in this research is that parts of current forest policy objectives include an emphasis on the extension of forest uses beyond the traditional areas and the overarching singular goal of timber production. This gives impetus to social forestry and agro/farm forestry. This allowed the authors of this article to identify some relevant policies and mechanisms in forestry that are relevant for social innovations (examples are provided above in bullet point form). One can see that forest policies can support social innovation to some extent and in ways that include the facilitation of societal engagement as well as mutual communication between innovators and a range of other stakeholders. Policies can further support social innovations through investments into knowledge exchange and capacity-building in rural areas. Furthermore, many of the services and goods that are related to social innovations in forestry are of a collective nature and their benefits cannot be appropriated as surplus using direct market and business logic. Some of the examples mentioned in this paper show that often these innovations depend on volunteer work and gains are reinvested into the communities involved rather than taken as profit.

From the challenges identified that policies have in promoting social innovations, one can identify the following in particular: the persisting “top-down” logic of public subsidies or other supporting initiatives, strict budgetary accountability, planning and financial control (wary of the risk-taking nature of social innovations), sectoral divisions and a lack of cross-sectoral coordination and policy integration. Furthermore, many public administrators are uncomfortable with societal participation and outside intervention into their activities and preferences. Weak state infrastructure, weak governance structures and weakly imposed rule of law all influence social innovations in negative ways (see Article 3). As previously mentioned, the concept of social innovation is still under development and not directly addressed in many sectoral policies and the findings here suggest that innovation action is more difficult in rural regions because they are among the least well developed. This then translates to the fact that more investment and resource mobilisation are needed to support social innovations in rural areas.

Contributions to the state-of-the-art

Aiming to understand the relevance of public policies for social innovation in rural areas and specifically in forestry, this article has introduced a threefold typology of public policies that distinguishes between policies according to their targets. This division is not entirely clear and there will always be overlaps which mirror the diversity and societal dynamics inherent to the concept of social innovation. This typology is an important contribution to the existing knowledge on social innovations in rural areas at the EU level. This paper also provides new insights into the forest innovation literature where social innovation research is still in its initial stage at the moment. Further analyses are needed for a more in-depth understanding of each of the relevant policies as well as their impacts in specific cases.

6.2.6 Article 6 - Social Innovation, societal change and the role of policies

Lukesch, R., Ludvig, A., Slee, B., Weiss, G., Živojinović, I. 2020. *Social Innovation, societal change and the role of policies. Sustainability, 12(18), 7407*

Article 6 is also one of the outputs from the SIMRA project and which employs the same definition of social innovation as in previously described articles (Articles 3 and 5). At the beginning of this project, it was evident that SI and its drivers have been studied in rural areas far less than in urban environments and there was a resultant need to fill the gap regarding the design and implementation of SI as a response to existing complex problems in rural communities. The SIMRA project produced a wealth of empirical material and created the possibility to further explore the policy implications of social innovation in rural areas, which this paper did and supplemented the SIMRA results with additional empirical findings.

Proceeding from the assumption that social innovation has both a formative influence on policy and social change as a response to it (Ludvig et al., 2020), this article answers two research questions: i) What are the social and institutional conditions and policy initiatives that foster or hinder social innovation and ii), how can policymakers encourage, enable, and promote social innovation, and utilise social innovation to achieve better results in developing rural areas?

The methodological approach of this paper consists of two steps: i) based on theoretical and empirical knowledge, a conceptual model is developed by means of which practical examples can be analysed and ii) this model is used for an analysis of three detailed case studies of social innovation in rural areas and thereby validated. Based on the findings produced within this project, which were related to its analysis of the role of policies regarding social innovation and produced policy recommendations, this paper condenses the drawn conclusions into a heuristic model of three interrelated factors, which are referred to as the “triad of actors”.

In order to test the applicability of the developed model, three social innovation initiatives drawn from different European political-institutional and economic settings were analysed. The cases were from (i) Austria, an EU Member State with a well-developed social security and welfare system in which the state is acknowledged as the primary actor, (ii) the UK, a country more markedly linked with the neo-liberal bias towards free markets and more reliant on a charitable and third sector tradition where the government is a more peripheral actor, and finally (iii) Serbia, a country which has gone through a relatively recent disruptive transformation that has an economy still in transition and where the population profoundly mistrust public institutions.

A brief description of the cases and methods of data collection as described in the article (on page 3) is provided here:

- a. The Apprentice Worlds initiative represents a social innovation promoted by a LEADER Local Action Group in a disadvantaged rural area in Austria. LEADER is a European Union structural policy instrument for supporting rural development. The initiative aims to prepare rural youth just about to leave the education system to enter the local economy which is desperately seeking junior staff and skilled workers. This case study was conducted as a part of the Austrian research project SILEA (Social Innovation in LEADER 2014–2020: LAG Zeitkultur Oststeirisches Kernland 2020). The SILEA research team analysed available documents and carried out interviews with eight interlocutors: four current or former project managers, the LAG manager, one participating entrepreneur, one

representative from the regional Chamber of Commerce, and one from the State government. Finally, a focus group was organised involving representatives from other social innovation initiatives. The comprehensive case study (Lukesch et al., 2019) followed a format applied to all the eight in-depth case studies of SILEA which was itself inspired by the innovation biography methodology (Butzin and Widmaier, 2016).

- b. Braemar Community Hydro was promoted by a Community Development Trust in Scotland. This small-scale hydro-power plant is a community-owned enterprise and community benefit society. This case has been studied as a secondary case study in the frame of SIMRA (Slee, 2019), although it was not included in the SIMRA cross-case analysis (Ravazzoli et al., 2020). For this research, a focus group was arranged to allow discussions with the chair of the community enterprise, those responsible for the financial and technical development of the hydro-power plant and a project officer as well as interviews with 7 persons who were either core or other network actors involved in the project. These activities followed the methodology developed for the detailed analysis of social innovations undertaken in the SIMRA project (Secco et al, 2017; Secco et al, 2018b).
- c. The Agricultural Development Fund Fenomena (DAFF) was established by the Citizens Association Fenomena. It operates as a business angel in support of integrated, sustainable agriculture in Serbia. This case study was examined as a primary source for this article. Three interviews were conducted, one with the project manager of the Fenomena Association, one with the head of a government unit supporting the initiative and one with a representative of the coalition for the development of the solidarity economy, an informal network of organisations that support the development of solidarity entrepreneurship. Part of the data from these interviews was used in another publication focusing on the analysis of institutional challenges confronting social innovations in Serbia (Živojinović et al., 2019).

The heuristic model developed to analyse the policies and social innovation is called the “triad of actors” and draws on neo-institutionalist approaches, social systems theory, transition theory and other sources that have influenced the SIMRA interdisciplinary research project. These theoretical premises are explained in brief in the article. Based on the work done in SIMRA by the authors of this article, a decision was made to focus on three important groups of actors that have central roles and interrelationships in the social innovation process. The article argues that their individual strengths and effective cooperation between those three groups of actors appears to be a major determinant for the success or failure of social innovations. What this means, in essence, is that the resilience and dynamism of cooperation systems where social innovators and policymakers come together to co-create something new benefit from this converging “triad of actors”. The model itself consists of a number of elements:

(i) a trusted core of key actors - the most visible part of social innovation initiatives are their individual promoters. Apart from their capabilities and motivational strengths, much depends on the trust they have in each other and the degree to which they are trusted by the wider network of actors.

(ii) an intermediary support structure - referring to the binary interactions between the “top-down” and the “bottom-up”, there needs to be a “third figure”, a “hinge”, which stabilises but at the same time dynamises these interactions: this role is played by intermediary support structures embedded in the ambient institutional fabric. A specific characteristic of intermediary bodies lies in their linking and translating functions between local initiatives and polity. They are a conduit for information flowing in both directions based on their knowledge of problems as well as pertinent structures, rules, and values operating on both sides.

(iii) public actors providing the shadow of hierarchy – these appear to be propitious for the emergence and growth of social innovation initiatives. This means that relevant public actors, that at least tolerate if they do not actively encouraging social innovation initiatives, are important drivers of success. The shadow of hierarchy is two-edged as it involves a mixture of legislative inducements and sanctions as well as encouragement and control. In one way or another, the presence and active inclusion of public partners within or in close partnership with the social innovation initiative conveys the benediction of society as a whole.

What the analysis of these three cases indicates, in terms of the shadow of hierarchy, is that there is diverse capacity in public policy to support social innovation. In both the Austrian and the Serbian cases, new forms of support were established to nurture small rural businesses. In Serbia, the national government passively encouraged the activities of the DAFF through a foreign donor-funded governmental entity (SIPRU). The current legislative framework is not overly supportive but also not crushingly constraining for such businesses. In the Austrian case, structural policies have had much better effects on the social innovation initiatives than sectoral governance arrangements where the main supportive factor is the availability of funding streams from various European (LEADER, INTERREG) and state-based support schemes. In Scotland, the situation is different again as apart from the institutional policy background, which strongly encourages community-based enterprise, with the municipality in a rather unsupportive role, case development was much better served by specific sectoral support schemes and structures than by territorially defined policies, such as LEADER.

The important role of intermediary structures can be observed in all three cases. The types of these intermediary organisations are quite different in the three case studies. In Serbia, this role is played by the somewhat distant SIPRU unit, which is a donor-sponsored government entity. In contrast, Austria's local action group acts as a formalised partnership and has the explicit mandate to instigate area-based innovative actions using a multi-sectoral, participative, and inclusive approach. Finally, in Scotland, this role falls to the Development Trusts Association which purposefully connects top-down and bottom-up in a "down-up" structure which benefits from generally conducive political–institutional environment in which local initiatives can expect reasonable policy support.

In all three cases, one can observe the crucial role of civic action as a key driver, as we call it trusted core of key actors, which are not only active in generating the social innovation, but also in all the consecutive phases, through carrying it through difficult times, helping it to grow and eventually scaling up and out.

Comparing the three cases one could observe that the 'triad of actors' may be more or less balanced, with some elements stronger than others. The research determined that the growth and sustainability of social innovations are arguably dependent on reliable intermediary support structures and the presence of social capital and trust are important resources. Less trust (for whatever reasons) and weaker social capital within civil society and between third sector actors and public agencies negatively influence social innovation. The relationship between public policy and social innovation is shaped by two distinct driving forces. The first comes from top-down when supportive policies are created, including the promotion of social innovation as a means to deliver desired outcomes. The second driving force occurs when social innovation initiatives emerge as a response to hindering, denialist or missing policies and frameworks and become so successful that the State finally endorses them and eventually designs policies to support new adopters of the initiatives' approaches. Trust in institutions and a societal climate in which individual self-expression, civic action and community empowerment are considered as intrinsic values are paramount for social innovation to thrive. Social innovation will achieve the most

when the triadic relationships between the State, intermediary organisations and local actors work together synergistically

Contributions to the state-of-the-art

The heuristic model used here for analysing policies and social innovation provides orientation and facilitates an understanding of complex realities so often characteristic of social innovations. The 'triad of actors' reduces real-world complexity to three manageable groups, namely the relevant actors, their respective strengths, and their mutual connections. This model proves to be useful not just for describing the relevant actors and their relationships but also as an analytical model to assess how well the political system supports social innovations and how that political support may be improved. The research team found this first validation of the heuristic model as promising, although the need for further testing and refinement is evident and its operationalisation into an integrated assessment grid serving policymakers and advisers is recommended, especially given that it can also be employed for social innovations in urban areas.

6.2.7 Article 7 - Experiencing forest products – an innovation trend by rural entrepreneurs

Živojinović I., Weiss G., Wilding M., Wong J.L.G., Ludvig A. 2020. Experiencing forest products – an innovation trend by rural entrepreneurs. *Land Use Policy*, 94, 104506

Increasing urban demand for products and services associated with nature in rural areas has resulted in the emergence of experiential offers based on non-wood forest products (NWFP). Article 7 explores these new market opportunities for NWFPs by an in-depth analysis of four innovative activities operating in Austria and the United Kingdom.

Approaches to the study of innovations have changed over the last few decades from the early linear approaches (Porter, 1985) to the more modern systemic models of innovations (Edquist, 2001). Article 2, for example, looked at innovations from the innovation system perspective, which looks beyond the marketplace and formal institutions to the range of public and private actors that have a role in the innovation process, such as authorities, research institutes, training organisations, and civil society actors (Edquist, 2001, Rametsteiner, 2005). Article 7 then went even further by employing an experience economy approach which rethinks producer-customer relationships and emphasises the importance of the co-creation of value in innovation processes (Pine and Gilmore, 1999). The experience economy approach shifts the focus from selling products or offering services to offering experiences which combine, to use a theatrical metaphor, the use of goods as props and services as a stage, in order to engage customers in a way that create memorable experiences (Pine and Gilmore, 1998). These experiences are inherently personal (Pine and Gilmore, 2014) and are co-created between the businesses and customers (Snyder et al., 2016). The experience approach consists of four realms created by user participation (active or passive) and connection to the event (absorption or immersion). These realms are labelled as entertainment, educational, escapist and esthetic, the so-called 4 Es (Pine and Gilmore, 1999).

In Article 7, the authors hypothesised that offering experiences created around NWFPs, are distinct offerings linked to local culture and tradition. Thus, they can contribute to the social, environmental and economic sustainability of the rural areas in which they are offered. To address this hypothesis, Article 7 answers how the analysed experiences added value to NWFPs, how these innovations occurred and

which factors influence their success.

In this article, an in-depth analysis of four cases of innovative NWFP-based experiential offers is undertaken. These cases are selected from the StarTree project case database (collected by the partner countries) and are selected according to a few specific criteria. These criteria were that the cases represent different types of NWFPs so as to feature experience economy-related characteristics (the combination of products and services into a distinct offering), that they originated from different institutional settings and that all were micro-enterprises. Thus, two cases in Austria (Christmas tree adventure and Cooking from the meadow course) were selected and two other in the United Kingdom (Wild pickings and Willow weaving courses). Semi-structured interviews were conducted with case study representatives in September 2014 and were focused on the innovative aspects of the offerings and innovation process from which these offers arose. Interviews were qualitatively analysed according to a combination of the innovation system perspective and the four dimensions of user involvement as described in the experience economy. Also of note in this respect is that country and case study related data collected in the StarTree project was used as secondary data for this paper.

Each analysed case present a combination of product and experiential offer and formed a specific innovation type which provided new insights into the innovative business potential that exists in rural areas. This combination of goods and services make up innovative experiential products and create unique offers, thus fundamentally changing the character of the good used. The NWFPs employed in these case studies are not sold for their utility but as a part of the backdrop for an experience demanded by users. The core aspect of innovation then becomes the intangible aspects of the offer and means the conscious use of the cultural and traditional legacies connected to its creation. This emphasises the embedded value of tradition, local knowledge, practices and customs in NWFPs. The analysed cases highlighted the important role of the co-creation process between provider and customer around the specific NWFPs and activities, an occurrence which goes beyond a simple accretion of traditional or personalised stories into a product. The NWFPs and their related activities are not new *per se*, but the way they are offered in a new pedagogic and social context is.

In all four analysed cases, the presence of all four types of experiential realms (entertainment, educational, esthetic and escapisms) was found. Esthetic and escapism experiences are harder to market individually and they are normally an indirect part of broader offerings, meaning educational and entertainment experiences are the usual focus for direct marketing. All four innovations were micro-scale and developed by very enthusiastic and motivated owners, which turns out to be one of the key factors contributing to the business' success. As explained by the case representatives, they all recognised the potential in providing experiences to people in addition to providing a product, and for each of their businesses, this represented a pathway to sustainability. Their businesses work across various societal groups and generations and their offers are always adapted to the specific needs and requests of individual customers. This creates a close connection between the business owners and their customers and further contributes to the creation of memorable experiences and a sense of belonging. Creating authenticity is exactly what the experience economy advocates and such authenticity is created through the customisation of offers to make them individual and personal to each customer. The home-made character, traditional production methods and cultural imprints all combine to produce a personal attachment to the created memories which are difficult to forget.

What also characterises these four innovations is that they operate chiefly in areas with open public access (except the Christmas tree plantation which is on private land). The level of excludability in such

businesses depends on the nature of the good upon which the experience is based as well as tenure and rights to access specific land. Thus, the creation of their specific experiential offers is often achieved by using public goods. Here again, customisation plays a key role as it generates private value from public goods while keeping the goods themselves public, a system that functions well as long as carrying capacities are not exceeded.

In terms of their innovation processes, all business owners emphasised that cooperation with various types of institutional stakeholders in the region was important. These regional actors supported the innovations through promotions, by including them in regional offers for example or providing a market for the businesses at schools or among other user groups. Support for the analysed innovations also came from a range of local sources for specific purposes rather than through formal innovation or business support programmes and networks. Although in this respect it must be noted that specific schemes for supporting NWFP based businesses are lacking in both Austria and the UK. All these examples, along with others drawn from literature (Weiss et al., 2019), prove that innovations in NWFPs occur at the regional level and in *ad-hoc* cross-sectoral networks while being minimally supported by existing innovation systems. The analysed cases also proved that even a small amount of support can have a significant positive impact on their success. As such, strengthening regionally focused and cross-sectoral support tools so they are flexible and tailor-made to bottom-up initiatives would greatly help the development of these kinds of innovations.

In a conclusion, from the analysed cases it was possible to see that their success lay in the entrepreneurial spirit, enthusiasm and creativity of the owners more than in the institutional support. These experiential offers were developed as an adaptation of the local natural conditions to produce something demanded by customers and it is this connection, the co-creation of value between producers and customers, that is the most significant factor for those businesses' success. This indicates that similar innovations could be developed in quite varying economic, social and environmental settings as the specific innovative aspects are related to the redefined utility of traditional products which are placed in new contexts and offered in a new way. Hence, offering experiences can be seen as a new format for marketing NWFPs that creates a counter-trend to the decreasing competitiveness of NWFP commodities. Thus, the presented examples should not be interpreted as niche activities but as examples of what could be a larger trend with future potential. Given the personalised nature of the offers and the variations in the traditional settings in which they are provided, larger beneficial effects are likely to be created with the advent of numerous similarly styled offers based around different products rather than by attempts to replicate the same activities everywhere. As such, these experiential offers are necessarily embedded in a specific place, tradition and culture where the customers must constantly be assigned a prominent role as co-creators of the value-added.

Contributions to the state-of-the-art

This paper shows that applying the experience economy approach seems appropriate to highlight the values of NWFPs and yield new insights into these special business models in forestry. The analysed cases illustrate that these distinct NWFPs provided marketable products linked to local culture and tradition that are simultaneously very carefully and thoughtfully fitted to specific customer needs. These cases succeed by riding the wave of new interest in personal interaction with NWFPs and this reveals new opportunities and ways of using a variety of assets available in forests. The innovations represent creative approaches taken in traditional sectors such as forestry do have potential both now and for the future. Developing similarly styled businesses could contribute to the profitability of forest-related

activates through the diversification of existing business practice, an especially important opportunity for small forest owners. User-oriented innovations, which are designed based on value co-created by customers and producers, are shown to be fertile ground for future innovation strategies. This paper explored this potential based on only four existing cases in two European countries but these cases are neither unique nor limited to these specific countries rural areas and NWFPs. Thus, they are in principle relevant to many countries throughout Europe where traditional forestry and rural development face numerous challenges and increased unprofitability of traditional products. A more detailed analysis of societal demands and drivers affecting the supply and demand side is still needed, as is further analysis of users perspectives regarding such businesses and their multiple benefits, both of which could provide valuable insights.

6.2.8 Article 8 - New Values of Non-Wood Forest Products

Weiss, G., Emery, R.M., Corradini, G., Živojinović I. 2020. New Values of Non-Wood Forest Products. Forests, 11, 165 doi:10.3390/f11020165

As can be seen from previous articles (articles 2, 4 and 7), NWFPs have often been considered as side, niche or secondary products which are often neglected by their sectors, such as is the case with forestry. In contemporary forest management systems in industrial countries, market-oriented timber production is often prioritised while the production of NWFPs faces decline as they struggle to be price competitive with similar products coming from countries with cheaper labour costs and intensive production in their agricultural systems (Wiersum et al., 2018). However, NWFPs have retained some importance when there was an industrial demand of a national nature, e.g. cork production in Portugal or truffle production in some Mediterranean countries (Sieferle, 2001; Radkau, 2012). These products still play an informal or secondary role to supplement household income or for personal use (Emery and Pierce, 2005, Emery et al., 2006). A trend noted and described in the literature (Wong and Wiersum, 2019; Pettenella et al., 2019) is that NWFPs in recent times are enjoying something of a revival due to various social trends that are creating new demands for wild and natural products, traditional skills and production methods, experiential or custom-made natural products as well as healthy and sustainable lifestyle choices (as also elaborated in Article 7).

Managing such values would be a significant departure from the prevailing practices of the professional forestry sector, especially in the circular economy and bioeconomy contexts. Looked from this perspective, Article 8 saw these new NWFP-related trends as innovations occurring in the forest bioeconomy and thus this article used value co-creation and service-dominant logic (SDL) (Vargo and Lusch, 2004) to study NWFPs in different country contexts in order to reveal their full value and characteristics.

In contrast to goods-dominant logic, which focuses on the exchange of products (both goods and services), SDL sees the exchange of services as the common denominator in the analysis of markets (Toivonen and Kowalkowski, 2019). From the SDL perspective described in chapter 4 of this framework, the value of the products or services is manifested through their use, meaning that value becomes personal and experiential and is not an inherent property of the goods and services. This value is collaboratively co-created with the beneficiary, who becomes one of the agents in value creation (Vargo and Lusch, 2016). Thus value is socially co-constructed through several direct and indirect interactions between various actors (Edvardsson et al., 2011) and is defined in specific social contexts that are constituted by complex, reciprocal links between unique sets of actors (Chandler and Vargo, 2011). In

addition to a firm and its customers, a range of private and public actors are a part of the wider actor networks that contribute to value creation processes (Vargo and Lusch, 2011). Thus one can see the value co-creation approach of SDL as a useful addition in the analysis of innovations in the forestry sector (which the authors of this paper conducted in other studies), and especially in the field of NWFPs where there is a need to more fully emphasise their value and characteristics.

For this paper, a conceptual model for the analysis of NWFPs from an SDL perspective was developed and applied to three case studies in different country and social contexts. The case studies focused on the analysis of (i) maple (*Acer saccharum* sp.) syrup production and use in the USA to illustrate the diversity of values and the actor networks that may develop around a single NWFP, (ii) the use of various wild plant species in the context of Nature Park Specialities in Austria, focusing here on the creation of a label for integrated landscape management and marketing, and (iii) the use of chestnuts (*Castanea sativa* sp.) in Italy, which is a traditional product used for new territorial marketing. The cases were selected based on the authors' expert knowledge of business practices and innovations in foraging for and harvesting wild NWFPs in Europe and North America (Weiss, 2013, Emery, 2002, Emery et al., 2006, Weiss et al., 2017a (Article 4), Zivojinovic et al. 2017 (Article 2), Zivojinovic et al. 2020 (Article 7), Pettenella et al., 2019) and their suitability to be studied using SDL and value co-creation.

Data for the case studies in Austria and Italy was collected within the framework set by the StarTree project which conducted in-depth case studies and action research on NWFPs. The in-depth analysis of the Italian chestnut case was based on five semi-structured interviews with innovators and representatives from producers associations as well as literature and document reviews. The Austrian Nature Park case was also one of the StarTree action research cases, thus the data used for the in-depth analysis of this case in this paper was gathered from a range of methods and sources: responses from a producers' survey, two initial scoping workshops and business development processes in three different Nature Parks (Wong et al., 2016). The US case study involving maple syrup production and use drew upon two decades of research on maple syrup by the co-author of this paper.

The conceptual model for the analysis of NWFPs from an SDL perspective places the primary focus on the service created for the customer rather than the goods that are produced and marketed. The focus of analysis then shifts to the creation of value through interactions between individuals and institutions in specific contexts and on various scales. Seen through the SDL lens, gathering NWFPs is a knowledge-intensive practice by which networks of human and non-human actors co-create value from forests. The basic network of actors includes (a) forests, forest plants and fungi; (b) forest-owning families; (c) forest managers (who may or may not be the owners); (d) foragers; and (e) the foragers' personal, professional, social and business networks. Additional actors include individuals who may be thought of as consumers and any individuals in a market chain (intermediaries) between the forager and the consumers (producer associations, equipment or service suppliers, wholesalers, and retail outlets). SDL this brings into focus the value derived from the interactions between foragers and the plants and fungi, as well as between foragers and other actors who have either a direct or indirect connection because of the foraging activities. In the conceptual model used here, reference is made to these various actors and their interactions as the micro-scale of analysis. The mesoscale includes important institutional elements such as governance structures, advisory services and professional organisations, cultural and professional norms and extends to social actors and movements. The macro-scale includes the ecological, institutional, social, and economic environments that condition populations and distribution of foraged plants and fungi, determine the terms of access to them as well as their commercial and non-commercial

use and value in society. For the description of each case and analytical scales employed please see article 8 (Part B of this thesis).

What was learned from the analysis is that SDL broadens the focus beyond value-chain analyses and systemic innovation models and in doing so advances the understanding of the multiple values of NWFPs in both commercial and non-commercial contexts. In each of the case studies, the value of the NWFPs is anchored in cultural values associated with the products offered and the consumers' motivations for buying them. Furthermore, SDL includes institutional, social, and cultural dynamics that are recognised as playing essential roles in the process of value creation and innovation and these roles are relatively pragmatically analysed in systemic innovation models, which were also applied in this work. SDL approach demonstrates that conventional classifications of business-related innovations are insufficient to capture and extrapolate the sources of NWFPs' values, even when broadened to include institutional and social innovations. What could also be seen from this analysis (and the one in article 7) is that the distinction between product and service innovations becomes irrelevant in the case of experiential products where the good and the service are inextricably interlinked.

The driving force in these cases is the cultural dynamics surrounding them rather than company innovation, e.g. when sugaring (production of maple syrup) is experienced as cultural practice instead of commodity production. Moreover, fundamental social changes play a crucial role in the renewed interest for NWFPs when the wild or natural origin can be certified, as is the case for the Nature Park products, or such products territorial origin is promoted, as in the case of the chestnuts from the Italian region of Trentino. Nevertheless, business innovations are interrelated with social-economic changes as they are mutually dependent, as evidenced by the production and sales of chestnuts being linked to the existence of the association active in this field in Italy.

Furthermore, this paper has shown the complex commercial and non-commercial relationships that develop between consumers and the forest products that are steeped in traditions and other cultural contexts which then produces value for the consumers. The complexity of these values is relevant for businesses, even if many of these values are intrinsically non-commercial. When people are willing to pay for the non-commodity characteristics which these traditional, regional products or experiential offers entail, then these values create business opportunities.

The analysed cases from this article point to the fact that service providers, such as extension services, producers' associations and consultants can play key roles among the multiple actors involved in the complex value creation process around NWFPs. Their functions could be manifold: (i) to link producers with other actors in the value chain and mesoscale institutional processes, (ii) to facilitate innovation through networking, (iii) offer financial and legal support (iv) through to utilising advanced information, knowledge capacities and various tools that can support business owners.

As already noted in previous articles, there is a need for cross-sectoral thinking and to establish a connection across societal groups (urban/rural) in order to stimulate NWFP innovations. Traditional forestry organisations may be less prepared to facilitate such cross-sectoral and cross-societal links when compared to regional development-oriented organisations where multi-sector actors are already incorporated. Local organisations or producers' associations can provide important institutional capacities as they are skilled at understanding and connecting the specific needs of producers and consumers. Institutional structures should create a supportive environment for NWFP innovation and business development while simultaneously providing sufficient capacity and coherence, and be open

and flexible towards emerging ideas from local actors and bottom-up initiatives. Their support should be directed to unusual ideas, cross-sectoral interactions and do so in the early phases of innovation. This is because innovation needs a stable and reliable environment, especially concerning issues such as property rights, administrative structures and funding instruments. Good institutional capacities are particularly essential for upscaling and diffusing innovations at the level necessary to provide meaningful economic benefits when it comes to rural development.

Contributions to the state-of-the-art

This article contributes to the analytical aspects of NWFP innovation analysis by broadening its focus to the value co-creation process. Based on empirical evidence of three NWFP uses, this research furthermore describes innovation processes around NWFPs which contain intangible values rooted in tradition and culture. The application of SDL to analyse the selected case studies in three different country contexts proved to be valuable for revealing new value in NWFPs by emphasising the importance of value co-creation between producers and customers as well as the complex interrelations of the various actors in the innovation process. Compared to previously applied innovation system analysis, SDL allows the identification of deep actor relationships and brought customers (their needs, requests, intentions) to the forefront of the analysis. Furthermore, SDL has implications for policy-making and for the design of support instruments as it calls for stronger stakeholder participation and co-creation mechanisms in the development and implementation of policy measures at all administrative levels.

6.2.9 Article 9 - Social Innovation as a Prospect for the Forest Bioeconomy: Selected Examples from Europe

Ludvig, A., Hujala, T., Živojinović I. 2019. Social Innovation as a Prospect for the Forest Bioeconomy: Selected Examples from Europe. Forests, 10, 878 doi:10.3390/f10100878

From the study on mapping policies which support social innovations in forestry (Article 5), research in this area moved forward in this article and looked at the potential role of social innovations in the forest bioeconomy by analysing the European Bioeconomy Strategy and how it integrates social innovation concepts. This article answers following questions: (i) how is social innovation taking place in a forest bioeconomy and what are its transformative potentials and (ii) what are the chances and prospects for private forest owners therein? The intention here was to address collective action and communal benefits through both private and public-private collaborative efforts that go hand in hand with forest owners' interests. As is the case with the broader bioeconomy, the forest bioeconomy is comprised of multiple facets (Hurmekoski et al., 2013; Wolfslehener et al., 2016) that should open up opportunities for forest owners. Thus far, these opportunities have not yet been examined from a social innovation perspective and this is the gap that this article seeks to fill.

For this purpose, two principal founding policy strategy documents that have sustainable development as their overall aim were examined: the EU social innovation initiative and the EU Bioeconomy Strategy. Both have been developed within the last decade and launched at around the same time and both have become increasingly prominent concepts embraced by political leaders and administrations. The forest sector and the general use of forest resources can contribute to this desired sustainable development of the bioeconomy and a sustainable and inclusive biosociety. Starting from these notions, qualitative content analysis (Mayring, 2007) of these two policy documents was conducted, while secondary data was collected by undertaking a literature review. This data was used to support the employed conceptual

approach and in the analysis to evaluate the relevance of coverage of key aspects of social innovation in the forest bioeconomy. Furthermore, secondary data was also obtained via 10 expert interviews which were conducted as a part of the data collection process in the SIMRA project. This data was used to verify the data obtained from the document search, to increase the reliability and validity of the research and to prepare the deductive criteria for the subsequent qualitative content analysis and evaluation. The secondary data supported the analysis and helped answer the research question. To illustrate the potential contributions of forestry to the bioeconomy, the social innovations that the experts reflected on during the interviews were used along with the cases that authors of this article discovered through their work in the SIMRA project and previous projects focusing on innovation (as documented in the public databases of the SIMRA project and innovation case database of BOKU).

To answer the research questions, a framework that first identified the main features of social innovations was adopted in order to relate how these features fit the goals of a forest bioeconomy. Looking at different definitions of social innovations and the one developed in the SIMRA project (see Article 3), disentangling the processes that led to the innovation from its outcome was deemed necessary. Subsequently, an examination was made of the perceived possibilities of (i) the social innovation during its creation (with the involvement of collective civil society actors) and/or(ii) how the social innovation's outcome (the output and its societal impacts) can contribute to a forest bioeconomy. Furthermore, there was a perceived need to distinguish between the three main types of relevant social innovations for a forest bioeconomy: (a) social innovations covering forest owners' objectives in combination with fulfilling social benefits and needs, (b) social innovations covering forest policy objectives that are consistent with regional/rural development, and (c) social innovations covering collective civil society involvement, community forestry, and interactions in the forestry actors' network.

This research commenced with a document analysis of the five main objectives stated in the updated EU Bioeconomy Strategy and then contrasting these objectives to the role of social innovation which was conceptualised as new solutions to societal challenges, with enhanced participation from civil society actors, while seeking enhanced societal well-being outcomes (EU, 2014). The authors of this article ranked individually the results along a continuum of strong to weak, after which the final rankings were fixed. The social innovation aspects are most strongly addressed in objective #5 of the EU Bioeconomy Strategy, namely creating jobs, and more weakly in all the other objectives which focus on the natural resource aspects of the bioeconomy. Then, the forest bioeconomy was linked as a main supplier to each objective. Here, manifold ways were found where supply functions from the forest sector could support all five objectives of the updated EU Bioeconomy Strategy.

Furthermore, the three key aspects of social innovation in forestry (see above) were ranked in relation to the five main objectives of EU Bioeconomy Strategy using the same continuum from strong to weak to provide a more distinct picture. The first of these aspects was do the "social benefits and needs" in social innovation address needs of various societal and vulnerable groups and is covered to a medium extent in ensuring food security (objective#1) but covered strongly in creating jobs (objective #5). This aspect is weakly covered in the other objectives which focus on the natural resources side of the bioeconomy. "Sustainable and rural development" is the second aspect and is strongly addressed in objective #5) but has only medium relevance in the others. The third aspect, "participation and collective action" are covered weakly in the first four objectives because the EU Bioeconomy Strategy concentrates primarily on the production side of natural resources and only includes people in objective #5. As such, this aspect is ranked as medium across all objectives. What this translates to is that objective #5,

“creating jobs and maintaining European competitiveness”, seems to be the main link between social innovation and a forest bioeconomy.

The authors’ expectations and indeed, the broader perceptions taken from literature and interviews, suggests that the connection between the bioeconomy objectives and social innovation should have turned out somewhat stronger, given the general features of social innovation, such as its ability to combat rural depopulation and provide (educational, cultural, and economic) opportunities for the sustainable use of resources, would contribute to the main goals set by objective #2 of the updated EU Bioeconomy Strategy). The authors’, however, noted that this would still only be one condition and not a main feature of the strategy. What other studies also point to, and which corresponds to the findings of this article, is that bioeconomy strategies (both EU and also the Finnish National Bioeconomy strategy (Mustalahti, 2018)) do not include citizens in meaningful capacity and are not responsive. The transition to a bioeconomy needs the citizens as one of the main pillars of socially sustainable development (Mustalahti, 2018; Hausknot et al., 2017; Dupont-Inglis and Borg, 2018).

The EU Bioeconomy Strategy is resource-focused and the contributions of forestry are viewed largely in terms of turnover, added value, and the numbers of jobs created. The strategy also outlines the value of ecosystems and their services but none of these parts relates the features to social sustainability, which should deal with the question of how to guarantee well-being for future generations. Individuals and society are mentioned solely in the supporting text of objective #5 in terms of workforce and the potential for job creation at local levels. Without creating opportunities for small forest owners to also achieve and use outcomes of multi-purpose forest utilisation, the full range and potential of the forest bioeconomy do not appear to have been addressed in the strategy.

Providing case examples in this article from different countries in Europe has shown how the collective action and social engagement of forest owners and other stakeholders have given rise to creative solutions that resulted in new and improved services and goods. These innovations are remarkably diverse with some having a non-profit background and some involving volunteer work while others derive a regular income as in a fashion akin to more traditional businesses. The majority of these examples of social innovation are service-based with strong societal and social aspects with a number of them involving a broad range of actors and stakeholders aside from the producers and initiators, however, they all have strong socially inclusive features and targets. These examples are characterised by their intangible features (often offered as services) going hand-in-hand with production but that is also related to “softer” outcomes, such as ensuring social stability or strengthening identity via collective action and income generation in remote rural areas. This distinguishes them from the technical and production-oriented perspective taken by many entrepreneurs and which is so dominant in the EU Bioeconomy Strategy. The common link between the strategy’s bioeconomy perspective and that of the social innovations’ is that both strive for sustainable development. Hence, they can be mutually supportive when social innovation serves to keep people in rural areas, avoids land abandonment and provides economic, educational, and cultural opportunities that can then stimulate bioeconomy principles in struggling rural settings. Social innovation also connects to the forest bioeconomy when new institutional arrangements are created and there is the inclusion of the local communities, when the innovation is not merely business-centric and profit-driven and when multiple actors are involved in the creation of the innovation and are then also positively affected by its outcome.

One could conclude that social innovation activities, such as those that create new opportunities and are fulfilling niches in forestry, are not explicitly dealt within the EU’s bioeconomy strategies as they are

simply not in the focus of bioeconomy policymakers. The potential positive impacts and effects of social innovation mesh well with the bioeconomy strategy which covers all possible sectors and systems that rely on biological resources and aims to link the strategy to UN Sustainable Development Goals. From a social innovation perspective, the limitations of the EU Bioeconomy Strategy lie in its prevalent focus on production, which does not directly include the services, i.e. related to forests and the forest sector. These services are potentially very important as they provide material (wood and non-wood), bioenergy, and a host of other regulating and cultural ecosystem services alongside innumerable intangible services. This variety of services should be acknowledged by forest bioeconomy policymakers to lead to the diversification of products and services offered. To do this, one important requirement is the widening of actors networks as well as increased understanding and consideration of the variety of social needs and benefits that can be met and derived from forests.

Contributions to the state-of-the-art

This paper conceptually looked at the potential of and ways social innovation can contribute to the forest bioeconomy. It focused on the commonalities of the EU Bioeconomy Strategy and the EU Social Innovation Initiative policy goals as a reference framework for systematically identifying specific forest bioeconomy activities fitting into both realms. The provision of the example of these activities has clearly shown how the forest bioeconomy plays and will continue to play, a unique role in addressing yet unmet needs with the constant development of new types of services. This research challenges positions that regard economic and social issues as strictly separated as it identified them as two combined, complementary sources of income for Europe's forest owners. With its findings, this article provides initial insight into the issues analysed and provides a springboard for future detailed studies. Last but by no means least, this article also highlights those areas in need of further improvement to better develop a truly sustainable forest bioeconomy concept.

7 Discussion

This thesis lays the foundations in the endeavour to conceptualise the roles of various actors and institutions in innovation processes concerning NWFP and social innovations in forestry. To accomplish this, the present research employed a systematic analysis of the scholarly literature and an analysis of empirical case studies drawn from both developed and transition economies. More broadly, this thesis also provides new insights on the potential that the above-mentioned innovations can bring to forestry and rural areas, filling the gap created by the profound lack of research regarding innovation systems for NWFP innovations and social innovations in forestry (Article 1⁹).

Both the conceptual and methodological considerations applied in this research were developed within two projects, StarTree and SIMRA, which had a significant impact on the research focus and direction of this thesis. In both projects, the selection of countries and cases analysed was settled upon through consultation of the project partners (Valero et al., 2017; Weiss et al., 2019). Common rules and methods for data collection, procedures and deadlines were mutually agreed. Within the boundaries set by the projects, researchers were able to design and develop their own research focuses. Starting from the initial position of working within work packages dealing with innovation systems that focused on actors and institutions in innovation processes, the nine articles of this thesis conceptually followed the approaches set in the projects from which they sprung but have been expanded with new perspectives by the author of this thesis. In terms of empirical findings, the author of the thesis expanded the scope of cases to countries with transition economies, specifically two Balkan countries. Thus, a case from North Macedonia involving the study of NWFPs (Article 2), and cases from Serbia focused on social innovations (Articles 3 and 6) were included. The reasons for these additions are manifold: (i) to cover specific topical issues by looking at innovation systems in SEE countries with potentially different development patterns while also exploring social innovations in transition economies; (ii) to explore new research fields (e.g. the role of social innovations in the context of the forest-based bioeconomy) which simultaneously complements the innovation system approach by looking at the potential of value co-creation by the involved actors; and finally, (iii) for practical research reasons, to prove the ability to conduct all research steps as the PhD candidate, from defining the research questions, settling upon a research design and all the way through to the analysis and interpretation of the results.

In chapter 6, the individual findings of each published article along with their contributions to the state-of-the-art were presented. This chapter will detail the broader import of those findings and discuss them in the context of the research questions presented in this thesis' framework (7.1). Furthermore, this chapter also reflects on the theoretical approaches, concepts (7.2) and methods (7.3) used in the thesis.

7.1 Discussion on the empirical findings

In this section, the main findings of the thesis are presented in relation to the research interest (sub-chapter 1.1.) and the posed research question (sub-chapter 1.2). This chapter is divided into three sub-chapters: (i) the first sub-chapter discusses how scientific research and approaches have evolved in connection with innovations processes in (NWFPs and social) innovations (answering research question 1), (ii) the second sub-chapter discusses the main findings in terms of the institutions and actors and

⁹ In this chapter, references which relate to the thesis articles will be written as Article 1-9, so the readers can readily see the contributions from the thesis. Full references are provided at the beginning of the thesis framework as well as in the reference list.

related factors which can support or hinder innovation processes (answering research questions 2, 3 and 4), and (iii) the third sub-chapter shows the new opportunities and potential that such innovations can bring to the forestry sector and more broadly to rural areas (answering research question 5).

7.1.1 Contribution of the thesis to the scientific literature on NWFP and social innovations in forestry

The first research question of this research was addressed primarily in Article 1. It provides the most recent and comprehensive overview of the research done on innovation processes in forestry and forest-based industries over the last four decades. This paper provided clarity with regard to research trends and gaps in terms of the applied research approaches, methods and topical areas that it focused on. Thus, this sub-chapter reflects principally on the insights gained from Article 1 and other literature, meaning that cross-article reflection drawing on the other 8 articles is less pronounced.

Looking at the chronological development of the research on forest sector innovation, one can observe five periods. The first period covers 1981–2000 when forest-based innovation emerged as a research topic and was characterised by articles analysing technological innovations, studying either the innovativeness of firms or innovation processes in a complex societal context. The analyses conducted by the 17 articles written in this period often included political-institutional, social-cultural and economic conditions. In the years 2001–2005 innovation research in the forest sector was more formally established and became a distinct research field, with 25 relevant articles. From 2006 to 2010, forest-sector innovation research expanded significantly and is marked by a special issue of the *Forest Policy and Economics* journal in 2006 which published an edition with 10 articles on forestry innovation and entrepreneurship. For comparative purposes, there were in total 50 topic-relevant articles published in this period. The fourth period from 2011–2015 is a so-called consolidation period with a similar number of publications as the previous period. Finally, the most recent period runs from 2016 to 2019, the last year for which data is analysed, and where one can observe research becoming more nuanced and refined. Furthermore, the period saw strong growth in the number of publications on innovation in the sector, 78 articles in just three years, as well as a broadening of topics and the further development and refinement of research approaches. In this last period, the clusters of articles on NWFPs and social innovation is noticeable and is also related to two specific European research projects (on which this thesis is also based) (Article 1).

One can see that in recent years innovations of various kinds (including social and institutional) have become increasingly recognised in scientific research (Article 1). They have been identified as valuable for rural development and economies (Richter et al., 2020) and different sectors contributing to this (concerning forestry see Weiss, 2019). However, from the analysed case studies in this thesis and Article 1 one can see that studies focusing on social and institutional innovations in forestry research are less prominent and numerous when compared to studies focused on product or process-related innovations. Thus far, the topical orientation of forestry research generally has been quite narrowly focused on the traditional wood value chains and related technical improvements (Article 1; similar findings by Lovrić et al., 2020b). Although as noted above with regard to the five mentioned periods, a significant and growing share of innovation studies on various goods and services, including NWFPs, has been observed in recent decades.

Different types of innovations and aspects of the innovation process related to NWFPs have been studied in both developed and developing countries (Article 1) by numerous authors. Some of the more notable

studies in this regard have focused on aspects involving innovative aspects of NWFP cultivation (Zhang et al., 2014; Guerin-Laguette et al., 2014), entrepreneurship aspects (Bannor et al., 2021; te Velde et al., 2016; Ludvig et al., 2016b; Brinks and Ibert, 2015), innovative socio-cultural and economic relevance of NWFPs (Zhu et al., 2020; Zocchi, et al., 2020; Liu and Xu, 2019; Schunko and Vogel, 2018) and the role of small and medium-sized enterprises in innovative NWFP businesses (Mashahadi et al., 2016; Nedeljković, 2015). This thesis further contributes to the body of knowledge on innovation research in NWFPs by focusing on the institutional and actor-related aspects in NWFP innovations in specific contexts, as in transition economies. This is a path less well trodden as similar previous studies were focused on institutional support for innovations in NWFPs in developed countries (Nybakk, 2009; Nybakk et al., 2009, Ludvig et al., 2016a; Ferreira and Sousa, 2018; Schunko and Vogel, 2018; Weiss, 2019).

Research on social innovations has thus far been focused primarily on rural areas with the main goal of advancing the understanding of the meaning and relevance of social innovations for rural development (Jungsberg et al., 2020; Bock, 2012; Neumeier, 2012; Bosworth et al., 2016). Studies focusing specifically on social innovations in forestry have only started to be published in the last three years (Lawrence et al., 2020; Ludvig et al., 2020; Rogelja et al., 2018; Ludvig et al., 2018b; Nijnik et al., 2019; Polman et al., 2017; Articles 5, 6 and 9). All these studies serve to highlight examples of the broad range of values the forest has for our society and how non-timber uses of forests relate to innovation (Article 1).

During this research, the reasons why research on NWFP and social innovations have been less prominent in forestry became increasingly obvious. One of the reasons relates to their newness. For a long time, timber was literally seen as virtually the only product of value that could be extracted from forests and most innovations in forestry accordingly occurred in relation to silviculture, forestry technologies and processes and usually addressed aspects of wood production, transport and processing. Other forest products and services were regarded as side- or by-products of minor importance. Innovations related to NWFPs, which covers a diverse range of new products and extends to the marketing, services and experiences connected with the use of such products, have recently become recognised as opportunities to diversify the business models of forest owners as well as of many SMEs active in rural areas, especially those directly engaged in forestry, which was consequently followed by research on these innovations (Article 2; Article 4; Article 8). Similarly, the value of social innovations has been recognised by forest owners, local communities or individuals only in the last ten years, where this recognition includes the possibility to become more active in a variety of socially relevant businesses and innovations (Article 3; Article 5; and Ludvig et al., 2019b). In forestry, but also in other related sectors, there is insufficient statistical data and information to show the true relevance and value of the variety of NWFPs and services and social innovations (Article 2; Article 3). Despite the increasing amount of research being done, NWFPs are still relatively unknown (Article 1) and their potential is usually underestimated (Croitoru, 2007; Vacik et al., 2014; Lovrić et al., 2020a). A similar situation is found concerning social innovations in forestry, which have only recently become an area of research (Article 1; Article 5). Thus, this thesis contributes to the rather young body of literature on innovation in NWFP and social innovations in forestry by providing insights into the actor- and institution-related factors that impact on such innovation processes while also adding to understanding the potential of such innovations.

7.1.2 Institutional and actor-related factors influencing social and NWFP innovations in forestry

When studying NWFP and social innovation processes in various cases and country contexts a number of institutional and actor-related factors and specificities were observed which influenced these processes' development. In many cases, these factors limit the potential development and use of innovations, however, some positive influences were also noted. This sub-chapter provides an overview of these different factors (answering research question 4), describes them together with the role of actors involved in the innovation processes (answering research question 3) and in relation to the policies and other institutional factors that influence innovations for better or worse (answering research question 2).

Articles 2, 4, 7 and 8 observed that often a public good character of NWFPs is one of the factors that influence their innovation potential. It limits their marketability and the possibilities to transform them into a resource on which to base profitable businesses. Compounding this situation further, social innovation services are similarly often hard to market which reduces their economic viability (Article 3). Thus, these types of innovations are quite often dependent on public or other external funding as it is extremely difficult to become economically independent, at least in the short to medium term (Article 3; Article 5). As Laschewski and Penker (2009) explain, this public good character of products or services triggers revalorization processes which seek to link negotiation regarding property to their intangible values. There is seemingly a growing need, especially among urban populations, for natural or wild products and the desire to experience nature (Kilchling et al., 2009), the search for the rural idyll and a growing appreciation of the aesthetic values of the countryside (Aznar and Perrier-Cornet, 2004). From one perspective, this can be seen as a trend that pressures traditional land uses, such as forestry, but from another perspective, it also creates new opportunities to generate business activity and wealth in rural areas (Leßmeister et al., 2018; Saifullah et al., 2018; Slee, 2005).

Furthermore, a relatively weak institutional framework across many of the analysed cases could be observed (Article 2; Article 3). What most cases have in common is that specific necessary public and private support structures are largely missing. Regarding the public sector structures, deficits were found in the limited supply of information about support measures for innovations, a lack of innovation-related research, and a lack of educational and training services which could stimulate innovations (Article 2; Article 3). These deficits are often accompanied by quite broadly designed but poorly targeted policy measures (e.g. in terms of the provision of specific information and funding possibilities for innovation-specific networks). NWFP innovations and social innovations are currently only indirectly targeted by policies and thus quite often overlooked in terms of being offered support (Article 2; Article 3; Article 4; Article 7; Article 8). On the private side weak support from sectoral interest groups was plainly observable, for example, from forest-owner interest groups as NWFPs often do not provide direct benefits to landowners but to other parties in the value-chain (Article 2; Article 4). The existence of weak institutional frameworks for NWFP and social innovations in forestry is not surprising as similar weaknesses have also been found in innovation system studies more broadly researching the forestry sector in different European countries (Weiss, 2019; Jarský, 2015; Rametsteiner et al., 2005). These innovation system studies highlight the weak representation of forestry topics in national innovation system as well as barely any interaction between forestry actors and national innovation actors. Furthermore, within the forestry sector, there are usually no comprehensive innovation policies formulated and there is weak interaction with respective actor-networks outside the sector (Weiss, 2019). Having said that, in some innovative forestry activities, such as bio-energy or timber construction,

one can see fruitful patterns of interaction as a result of the economic importance of the forestry sector in certain regions (Lazarevic et al., 2020; Weiss et al., 2017b; Lindgren and Emmitt, 2017). The above-described situation is typified by the region of North Karelia (Finland) and Aquitaine (Spain), where forestry innovation systems are characterised by higher involvement of various actors, better-suited policies and cross-sectoral development programmes (Weiss et al., 2017b). This as well goes along with more support existing for technological and product market-oriented innovations (Lazarevic et al., 2020; Weiss, 2019).

The analysis of policies for NWFP innovations and social innovations in forestry (related to research question 2 of the thesis) also shows that sectoral policies regulate a particular thematic field and measures arising from them are usually only broadly defined (Articles 5; Article 6). In this regard, an analysis of the policy documents revealed that policy support measures for innovations come directly from forestry sector only rarely (Articles 2; Article 5), and if at all, then only when these products gain significant economic importance, e.g. for mushroom cultivation in Mediterranean countries or Christmas tree production in Austria (Article 8). More often such support is based on other sectoral policies, such as agricultural policies, or structural policies that are cross-sectoral and oriented towards cohesion objectives such as local and regional development, employment and income distribution, and the provision of basic infrastructures and services (Article 6). Similar findings can be found in research by Moore and Westley (2001) and Rogelja et al. (2018). The applicable policies for the above are often related to EU programmes such as the EaSI component of the ESF+, the ongoing EU Smart Villages initiative, the CAP and the rebooted LEADER/CLLD, all of which offer suitable platforms to support social innovations (Article 5; Article 6; Nordberg et al., 2020; Lukesch et al., 2019; Dargan and Shucksmith, 2018). Thus, there is a need to ensure that the key policy ideas from the EU are effectively implemented in national, regional and local policies. In a similar vein, Vickers and Lyon (2014) stressed that the State and its agencies play a key role in creating institutional contexts and (quasi-) markets through regulation, commissioning and policy. Article 6 concludes that the most successful social innovations seem to be those supported by both sectoral and broader structural dimensions.

What is explained in the previous paragraph is the general picture formed by the analysed cases in different articles when it comes to the hindering and supporting factors for NWFP innovations and social innovations. However, looking at all the articles employed by this thesis, it is possible to observe some differences in the institutional frameworks across various European regions and specific countries that were analysed. In an Italian case (Article 8), and cases in other countries that were analysed in the StarTree project (Weiss et al., 2019), it can be seen that Mediterranean countries pay special attention to NWFPs, especially those that have strong traditional ties and long histories and are backed by well-developed actor networks and support structures (as is the case with chestnuts and mushrooms). This is proven also by the economic significance of these products (Article 8).

Western and Central European countries (such as the United Kingdom, Austria and Slovenia) have relatively strong institutional frameworks for rural or regional development through which NWFP innovations and social innovations are supported (Article 2; Article 4; Article 6). However, direct policy support from the forestry sector is less notable even in these countries, a factor compensated for by a range of other sectoral and structural policies that substitute or complement the weak forest sector support (Article 4; Article 5). This is in line with the cross-sectoral nature of many of these innovations. In all these countries, i.e. Italy, Austria, the United Kingdom and Slovenia, European policies and programmes play a strong role (Articles 2; Article 4; Article 7; Article 8). In Austria, for example, support from the forestry sector is given purely for forestry “cases” of innovation, such as Christmas tree

production and the marketing of game meat, both being very traditional forestry activities (Article 4). Regional development support is provided primarily for cross-sectoral innovations, such as the LEADER programme in Austria which supports the Nature park specialities as part of its tourism offer (Article 4; Article 8), or in the United Kingdom, where willow weaving courses are provided as a part of educational courses and for tourism purposes (Article 7). In a number of cases, non-sectoral support was of benefit for some cross-sectoral innovations, such as the support given by an Italian municipality for chestnut production (Article 8), or local public support for Welsh forest foraging courses (Article 7).

A further group of countries where a different situation was observed are the former socialist countries in south-eastern Europe, namely Serbia and North Macedonia, both being characterised by weak institutional frameworks for NWFP innovations and social innovations (Article 2; Article 3). In these countries, Article 2 highlighted the diverging developments for NWFPs in these former Yugoslav States, including in Slovenia taking a decidedly different trajectory when compared to Serbia and North Macedonia. The EU integration process appeared to stimulate significant support mechanisms for various rural business development in Slovenia (as explained in the paragraph above), much more so than in Serbia and North Macedonia. Some of these results for North Macedonia and Serbia are also reflected in an analysis of the influence of policy instruments on NWFP commercialisation in these two countries in an article by Nedeljković et al. (2013). Using the results of an analysis of social innovations in rural areas of Serbia, Article 3 shows that such innovations largely develop due to development projects facilitated by foreign programmes and funding schemes, while national state support remains very limited. Dependence on external, usually foreign, funding is thus identified as an unsustainable option for the future development of such initiatives (Rakin, 2017).

What should also be noted is that weak public support in most of the above-mentioned cases neither indicates a total absence of such support nor that the national frameworks are always hindering factors. However, they are not well-targeted for certain products and services while also being difficult to access for potential beneficiaries (Article 3; Article 5; Article 6). This occurs at times because of the bureaucratic burdens imposed which are often hard for small companies or forest owners to manage because they lack the managerial capacities needed (Article 2; Article 3). In some of the cases, even a small amount of well-targeted funding was found to be very beneficial for the development of innovations (Article 5), which is to some extent contrary to the usual perception that a lack of funding generally hinders innovations. From the typical functions of innovation systems, which are to provide information, funding and networking support, it became apparent in some cases that information and networking opportunities were more important than financing, despite the latter usually being cited as the most critical to success (Article 4; Article 5). Similar findings are proved in an article by Koutsouris and Zarokosta (2020). They identify networking between heterogeneous actors as a major strategy for innovation co-generation (*ibid.* p. 183). Other studies found that establishing both formal and informal relationships with public actors opens access to information, knowledge and other resources while also influencing learning processes crucial for the success or failure of social innovations (Chalmers, 2012; Eriksen and Selboe, 2012; Moore and Westley, 2011; Vickers and Lyon, 2014). Chalmers (2012) states that social innovators who fail to identify and gain access to the networks reduce their exposure to valuable sources of knowledge that feed into the social innovation process and can facilitate their success. The majority of the analysed cases in this thesis prove that a combination of different policy instruments seems to be most beneficial (Article 2; Article 4; Article 6). This is why LEADER, for example, is often mentioned as the most targeted and successful mechanism by combining advice and funding (Article 4; Article 5). The role of LEADER in stimulating innovations is also being described by other authors (Nordberg et al., 2020; Lukesch et al., 2019; Dargan and Shucksmith, 2018). There is a similar

situation with regional-level agencies that work to connect local activities to develop a supportive institutional environment on a larger scale which are called “regionally networked innovation systems” in the literature (see Asheim, 1998). With regards to the innovators’ previously mentioned lack of managerial capacities, these regional-level agencies provide the needed support to also enable innovators to acquire funds or information. In Article 4 it is thus noted that the best model to support innovation seems to be “top-down support for bottom-up innovations”, indicating the need for institutional frameworks which are open and flexible enough to adapt to local needs when offering effective support.

Such support is especially important for social innovations, which have proven to be riskier undertakings with more uncertain outcomes and thus requires openness in terms of budgeting throughout the whole innovation process. Article 5 concludes that these inherent attributes of innovations clash with the traditional logic of public policymaking, which is characterised by an aversion to failure and political processes that use failure to score points rather than learn lessons, as identified by Chapman (2002), Mulgan and Albury (2003) and Sørensen, and Torfing (2013). In Article 6, some of the principal values, such as trust in institutions and a societal climate in which individual self-expression, civic action, and community empowerment is supported, were identified as those that drive the successful development and adaptation of innovations. Going further along this vein, Jungsberg et al. (2020) identify functional networks, upskilling in a supportive environment and community members banding together as crucial for social innovations by analysing example cases drawn from rural areas in the Nordic countries.

Many of the cases analysed in this thesis, both concerning NWFP innovations (Article 2; Article 4; Article 8) and social innovations (Article 3), show that they most frequently involve rather small and localised businesses or initiatives. They are all characterised by the strong leadership of very motivated and enthusiastic innovators who have a strong will to be independent and autonomous. This has been noted in other studies as well (see e.g. Belletti et al., 2007; Ludvig et al., 2016a, b). In some of the present research’s cases that meant that innovations were developed using only the innovators’ private financial sources and with rather limited institutional support (Article 2). While in other cases, innovations were established using the investment of large amounts of voluntary work with limited remuneration for all concerned (Article 3).

Other actors in innovation systems often play important intermediary roles as supporters, positioned between the “top-down” and the “bottom-up” in the overall institutional setting (Article 6). Article 6 described that such support may span the gap from the acquisition and transfer of funding, to other forms of knowledge transfer and support such as coaching, mentoring, networking and lobbying. These intermediary support structures may be initiated from the “bottom-up” as umbrella or lobbying organisations or from the “top-down” by state support structures in certain sectors, a phenomenon also noted by other authors who identify the potential roles of intermediary actors (Koutsouris and Zarokosta, 2020; Lang and Fink, 2019), especially in weaker institutional environments (Ricart et al., 2004). Article 6 additionally shows that the public actors’ roles are relevant and among the most important drivers of success, although in this regard, if not actively encouraging social innovation initiatives they must at least tolerate them. The presence and active inclusion of public actors within or close to social innovations often bring with them the approval of society as a whole, as is also borne out in the work of Rogelja (2020). A study by Marini Govigli et al. (2019) shows the value of encouragement by local policy actors even in the absence of substantial institutional support. This certainly also applies to the NWFP related cases analysed in the articles used in this thesis (Article 2; Article 3; Article 4).

The role of consumers in innovation processes is heavily emphasised in Articles 7 and 8. They show that the success of the innovations considered was directly related to the active involvement of consumers, in provided services and the experiential offerings, as co-creators of value. The cases analysed in these articles show that the role of consumers must be given a more prominent place in innovation processes so they can act as needed co-creators of added values to the innovative outputs. The principle of co-creation is based on collaboration, deliberation and mutual learning and, as such, it has provides the greatest potential for success (Desmarchelier et al., 2018; Voorberg et al., 2014; Voorberg et al., 2015).

7.1.3 New opportunities for NWFP and social innovations in forestry and forest-related sectors

This sub-chapter addresses research question 5 which is focused on the new opportunities and roles that NWFP innovations and social innovations could have in forestry and forest-related sectors.

Consumer or user-oriented innovation approaches seem promising as innovation strategies, something that becomes particularly evident when it comes to the provision of various experiences in or related to forest businesses, as noted in Article 8. These new opportunities are related to the social changes that have been observed in rural areas, as addressed by Bock (2016), except that NWFP innovations and social innovations respond to the individual needs of innovators, or local demands, they often develop in line with new societal (frequently urban) demands, observed in recent years as higher demand for local, traditional or wild products and the desire to get back to nature, to learn about it and to enjoy it. With this context, it is possible to identify new possibilities for the future of forest businesses, where new products or services can be marketed in different ways so that they correspond to the growing and changing demands of the next generation of consumers. As an output of the StarTree project, some trends in this regards were identified (Amici et al. 2020¹⁰) and these highlight consumer interest in: (i) the naturalness and non-industrial production of NWFPs, (ii) the retro image of NWFPs or services by relating them to values associated with traditional, home-made and hand-made characteristics, and finally, (iii) the experiential characteristics of many innovations related to NWFPs, including their educational and entertainment aspects.

Nevertheless, the forestry sector remains rather conservative and thus reluctant to support either NWFP innovations or social innovations despite the evidence and exemplary cases, including those in the articles used in this thesis, showing the potential of such endeavours. A contributing factor in this may be that current forestry practices need to be widened to fully realise this potential. The bioeconomy paradigm, which currently holds sway as the dominate direction of future development in forestry (Winkel et al., 2019) is predominantly focused on products and technological innovations (Watanabe et al., 2018, 2019) and, as shown in Article 9, the EU Bioeconomy Strategy does not directly address services related to forests and the forest sector even though they provide material (wood and non-wood), bioenergy, and a full range of other regulating ecosystem services as well as intangible cultural and spiritual services. Thus forestry, even when adopting a bioeconomy perspective, should consider the opportunities that can be derived from social, service and institutional innovations in the sector. Similar directions for the NWFP sector have been identified by authors such as Wiersum et al. (2018) as well as in all articles used in this thesis. Indeed, there is a growing body of literature that highlights the benefits to be derived from diversification in the forestry sector practices in terms of encompassing the ever-growing variety of new opportunities for innovations and innovative approaches beyond timber

¹⁰ Author of the thesis is involved in this publication

production. However, embracing something new creates the need to widen forestry actors' networks, taking cross-sectoral approaches, implementing explicitly innovation-oriented policies, being open to new products and services as well as having a modern perspective of forest-related social needs and societal benefits in and for society at large.

In terms of the potential of innovations to address broader societal issues, the results of Article 7 indicate this is limited if innovations sporadically occur, thus advocating the need to innovate with various product and services on a larger scale and replicating existing innovations where possible given local environmental, cultural and economic limitations. To some extent, this is both confirmed and further elaborated upon by Gonzalez and Healey (2005) who found that individual socially innovative actions may not produce any major governance transformations themselves but that meaningful change comes with the interaction and the accumulation of experiences from different socially innovative actions combined with societal shifts in values and the generative power of the internal learning capacity of dominant governance actors.

7.2 Discussion of the theoretical approaches and concepts

In conceptual terms, this thesis is based on innovation system analysis (Edquist, 2001) and complemented with applications of other theoretical perspectives, such as institutional voids (Khanna and Palepu, 1997; Khanna et al., 2005), a governance perspective (Mayntz, 1998; Ostrom, 1990) and a focus on the role of policies in innovation processes (Crabbe and Leroy, 2008; Fischer et al., 2006). The use of other approaches, such as "service-dominant logic" (Vargo and Lusch, 2004, 2008) and the concept of "experience economy" (Pine and Gilmore, 1998), as well as an investigation of the innovation topic in the context of the bioeconomy approach, has allowed an expanded focus on innovations studies to cover new values and potentials related to NWFP innovations or social innovations in forestry (see chapter 4 for more details on the theoretical backgrounds).

This thesis (in Articles 2, 4 and 7) shows that the innovation system approach is useful as it allows for a holistic analysis of innovation processes at the company and system (both national and regional) levels while simultaneously being suitable for identifying the strengths and weaknesses in a given innovation system (Carayannis et al., 2012). It is common to ex-ante delineate the system boundaries and its components, study complex structures as well as non-linear, iterative processes that are typical in innovation cases. Compared to some other approaches that are highly influential in innovation research, such as "technological innovation systems" (Markard and Truffer, 2008) and "socio-technical systems" (Geels, 2004), both of which are more concerned with technologies and socio-technical phenomena that are in a state of emergence and/or transformation, the innovation system approach is suitable for conducting analyses when a system is relatively well-established and stable (Coenen and Díaz López, 2009). The innovation system approach is suitable for deriving conclusions and recommendations for practice, research and governments. Furthermore, this approach to analysing innovation processes was empirically useful here for studying the actors (players of the game) and their specific roles in innovation processes, identifying which institutions influence innovation process (the rules of the game) and the interactions that occur between them. It was purposeful for getting an overall picture of the main institutional and actor-related factors influencing NWFP and social innovations in forestry. However, the innovation system approach is not without its limits and it must be conceded that it did not provide much detailed information about some specific aspects related to actors and institutions.

Thus, in some of the articles, additional concepts are used to explore more in-depth specific elements of particular innovation systems. In Article 3 for example, the institutional voids perspective allowed a better understanding of the institutional gaps that hinder innovation in specific contexts. The article looked in greater detail at the formal and informal voids occurring in the more unstable cases of an institutional set-up for social innovations, such as the one in Serbia. This analysis was useful for getting more nuanced and layered pictures of interconnected factors influencing innovations. A specific contribution was seen in this approach's ability to identifying a number of informal factors and gaps which were not examined in other articles with a focus more on formal institutions. Thus, Article 3 serves as a springboard for further analysis on these changing rules which are especially relevant for smaller and marginalised rural communities that need social innovations if they are to thrive in the future. In some other studies, the framework of system failures was used to more broadly examine the failures in national innovation systems (Varblane et al. 2007). This framework could also be used for more detailed studies in the future that provide a better understanding of the state of national innovations system in weak economies.

Articles 5 and 9 looked in more detail at the role of formal institutions, namely the relevant laws and formally enacted policy programmes, strategies and regulations. As Carayannis et al. (2012) stressed, linking public policy measures to the innovation system approach proved to be beneficial for understanding existing policy measures, their inefficiencies and aspects which could be improved. Article 6 looked at the role of policies and the direction of their influence on social innovation, which helped develop an understanding of the supporting and hindering policy measures that influence innovation development and diffusion. In the same article, actor constellations were considered in three social innovation cases by employing a governance perspective. Focusing on policy and governance aspects allowed the heuristic "triad model" to be tried and tested after its development in the SIMRA project (presented in Article 6). This model was useful for analysing the role of policies and political frameworks for social innovation initiatives where this first validation of this heuristic model can be viewed as promising. However, the model is still in need of further refinement by testing it in different contexts (i.e. urban areas) and its operationalisation into an integrated assessment grid serving policymakers and advisers.

These few concepts were aimed at complementing the innovation system approach and bringing a broader knowledge base into play to study innovation processes in forestry. However, the potential of other theoretical approaches is also apparent, for example, those that will help to identify even more details concerning the interests and power relations of specific actors in innovation processes, or details of policy instrument implementation and evaluation, e.g. approaches such as actor-centred institutionalism (Mayntz and Scharpf 1995, Scharpf 1997) or sociological institutionalism (Healey 1998; Peters, 1999).

What becomes obvious from the systematic literature review conducted for the present research (Article 1, Weiss et al., 2020a) is that studies which apply innovation system analysis pay little attention to the capacities of local natural resources since economic theory assumes that largely substitutable production factors exist, meaning that one variable factor can be substituted for others. This is something that should be critically looked at because such studies may cover aspects of the trade-offs between different land uses and the use of natural resources for various purposes only to a limited extent. Looking more broadly at the variety of natural resource uses could provide further insights to sustainability aspects of specific innovations from a long-term perspective, especially when these innovations are scaled up. One of the reasons for not going deeper into this issue in this thesis is that

the cases analysed were too specific and narrowly bound to their contexts to be of use in this capacity. Even though some of these aspects were presented in Article 7 and arguments made that the studied businesses, such as those providing experiential offers connected to NWFPs, are not necessarily to be upscaled and replicated in many places to have a greater impact. What is argued is that a positive impact for rural economies can be generated by the sum of numerous businesses around different products and less by the replication of the same activity in many places. Embracing this approach would also help ensure that the utilisation of specific products would not exceed local ecological carrying capacities.

In the literature analysed for Article 1, it was noted that newer innovation research approaches have been employed in forestry innovation studies to some extent but generally, innovation research in the sector remains rather conservative. The newer approaches are applications of quadruple/quintuple helices models (Grundel and Dahlstrom, 2016), the concepts of open innovation (Jugend et al., 2020; Schwerdtner et al., 2015; Henttonen and Lehtimäki, 2017; Vieira et al., 2018), inclusive innovation (Cavicchi et al., 2017; Refsgaard et al., 2017), the service-dominant logic (Mattila et al., 2013; Mattila and Roos, 2014), disruptive business models (Watanabe et al., 2018) and co-evolutionary complexes (Watanabe et al., 2019). In this thesis, the experience economy (Article 7) and service-dominant logic (Article 8) were applied which, up to now, has rarely been done in a forestry innovation research context (Mattila and Roos, 2014; Mattila et al., 2013; Helles and Vedel, 2006).

With the application of the concept of the experience economy, Article 7 illustrated the potential of using creative approaches in traditional sectors, such as forestry. The article does not provide an in-depth analysis of specific experiential aspects in innovation cases but rather exemplifies the ideas and business focus that could have innovative applications in rural contexts. One can see this form of marketing of NWFPs using their experiential potential to be a basic driver in the resurgence of interest in NWFPs in Europe as such potential contributes greatly to the diversification of viable services that can be provided by rural entrepreneurs. Besides contributing to the users' satisfaction and business owners' success, such experience-based enterprises contribute to their local communities' visibility and recognition, thus playing a role in preserving the cultural and traditional values of the regions in which they are located. The bond between business owners offering such experiences with consumers and society, as well as with traditional, regional and cultural values are inseparably linked and their combination adds immeasurably of their chances and degree of success.

The insights gathered from Article 7 can be expanded upon by focusing on the role of consumers as co-creators of the value added by innovative products and such a focus was taken in Article 8. Together, these two articles illustrate that moving from a goods-dominant to a service-dominant logic broadens the horizon when it comes to identifying the multiple roles of forest products in commercial and non-commercial contexts. As proved by others (e.g. Hoover et al., 2001), business strategies based on value offerings considerably expand the creative scope of companies, thus providing them with various new options irrespective of the general situation in a specific sector, industry or even location.

The innovation system approaches, as already mentioned, sees innovation processes as complex interrelations of numerous types of actors drawn from multiple areas and entities as well as the formal and informal institutions impacting innovative efforts. This is, however, relatively pragmatic and atheoretical when analysing actor relations or the role of institutions. Application of the service-dominant logic approach allows the inclusion of institutional, social, and cultural dynamics that are recognised as essential in the process of value creation. Value is created in the interactions between producers, consumers, and other actors in specific institutional settings (Voorberg et al., 2015). Focusing

on the value perspective is seen as particularly important for traditional sectors as a way to break the cycle of mutual imitation and grow in the modern, competitive context (Toivonen and Kowalkowski, 2019). This approach, in the examples analysed, revealed that conventional classifications of business-related innovations are insufficient to capture the full spectrum of values related to NWFP innovations and to identify the institutional and social innovations appearing in connection with the use of such products. Similarly, what both Articles 7 and 8 show is that the distinction between product and service innovations becomes obsolete in the case of experiential products, where the good and the service are symbiotically presented as an innovative product that customers are willing to pay for. The potential of using such approaches, especially for family forest owners, is illustrated by its viable application in a range of examples provided by Hansen et al. (2019) and Ludvig et al (2019b).

7.3 Discussion of methods

The empirical findings of this thesis, which are based on a systematic analysis of scholarly literature and an analysis of empirical case studies from both developed and transition economies provide a basis for reflection on the roles of various actors and institutions involved in NWFP and social innovations. Since research on innovations in these specific fields of forestry was largely lacking, the nine articles used in this thesis are based on the application of qualitative approaches in order to gain detailed descriptions and a better understanding of the processes of innovation in a multiple case study research design.

A case study approach tends to rest on qualitative research methods and provide very relevant and interesting insights on a small number of cases where there was insufficient knowledge beforehand. However, innovation research into both NWFP and social innovations in forestry would benefit from a broader and more detailed analysis of more cases in each of the selected countries. Overall, the empirical findings of this thesis indicate specific patterns in the processes of developing innovations, however, the author of the thesis has to acknowledge that limitations exist in terms of the possibilities for generalisation, which can depend on the specific cases themselves, the regions where they are located and the various country contexts. A more detailed analysis of specific country contexts, e.g. looking at the entirety of national innovation systems down to regional and sectoral systems while simultaneously employing higher numbers of diverse cases within countries is needed. Doing so promises to provide a more robust understanding and nuanced picture of the factors which lead to the success or failure of innovative efforts. In addition to all of the above, quantitative assessments and comparative analyses across sectors and countries are needed to contrast, complement, confirm or invalidate conclusions drawn from research involving individual or small numbers of case studies at a more general level of abstraction.

The selection of cases for this thesis must also be mentioned and reflected upon. Selections were initially made by the well-informed interview partners and contacts in the project countries being researched by the StarTree and SIMRA projects. Most of the cases presented in this thesis are, to some extent, examples of successes in their specific contexts and thus proved to be viable candidates for studying innovation processes. This naturally biased the research sample to some extent by lading it with innovations that were largely successful for at least a certain period. However, this provided the research effort with a rich body of information and lessons learned from the specificities of each case but heightened the need to learn much more about the what, why and where of innovations that failed. This, of course, is easily said but more problematic to achieve as short-lived, failed innovations are difficult to identify given that the interview partners, contacts and, unsurprisingly, the innovators themselves were reluctant to talk about failures.

Regarding data collection, different methods were applied and the obtained data proved to be very comprehensive to understand the issues to be analysed. Focus group and workshop data were useful for understanding the context and background information of the analysed cases, while the semi-structured interviews and policy documents provided the details of actors, actor interactions and the institutional aspects of interest to the research. In short, the different methods allowed the triangulation of obtained data and to sufficiently check the validity of our research.

Some of the challenges faced during the data collection process were related to the work undertaken in the big consortia of the two European projects. It was in some cases challenging to prepare projects partners for data collection as not all of them had experience in qualitative data collection. This necessitated developing quite detailed instructions and explanations on both data collection and reporting procedures as well as providing examples, illustrations and then follow-up training sessions. Despite such detailed work differences could still be noted regarding the quality of the information reported at the end. In some cases, it was possible to go back to project partners and clarify issues, in other cases a search for alternative data sources, such as reports and websites, had to be undertaken to supply the missing data. The reasons for this ranged from the inexperience of researchers in qualitative data collection through to the time pressure and workload assigned to the partners by the projects' various work packages. Furthermore, language barriers were supposed to be overcome by reporting collected data in the form of data protocols which were designed to be the first step-interpretations of the collected data. Transcribing full interviews in the various national languages and then translating these into English would have been prohibitively expensive and very time-consuming. Thus, the data protocols were deemed to be adequate for the big consortia involved. However, much deeper explanations and meanings are possible to be extracted from full interview transcripts, such as those done in Austrian and Serbian cases.

In terms of weaknesses, both focus groups and workshops were administered by project partners, thus limiting who had a direct role in selecting the participants and ensuring the data collection procedures were followed on the spot. However, measures were taken to maximise the quality and comparability of the data collected by the project partners. These measures included quite detailed preparations and guidance in advance involving those colleagues which were then invited as the co-authors of the reports and articles and had best insight in the data they collected. In terms of policy documents collected for content analysis, no major challenges arose, however, for future projects there is a foreseeable need for an even broader analysis of policies, including social, labour and trade policies, as many of these policies may influence innovation processes, especially when it comes to social innovations.

In terms of data analysis, the qualitative content analysis was useful and appropriate for the research. Since each article dealt with a small number of case studies there were no problems with the manual coding of the interview transcripts, however, it has to be emphasised that the use of specialised software, such as that employed for Article 3, is both more efficient and effective. The software helped to provide even more nuanced and detailed interpretations. For this reason, project partners responsible for data collection were invited to serve as co-authors on a number of the articles. This, in turn, facilitated a better understanding of the details in the specific context of "their cases" and helped to establish reliability by correctly interpreting the reported results. Last but not least, the systematic analysis of literature (Article 1) has proven to be a robust method of analysis by actively involving two researchers to cross-check each step of the analyses. For a PhD student working largely alone, this can be challenging due to the limited time and capacities that are available.

8 Conclusions and Outlook

Global policy objectives, such as the Sustainable Development Goals of the UN Agenda 2030 and the priorities of the European Green Deal, strongly promote innovation in different sectors and at different levels. The EU has expressed a desire to expand its focus from purely economic and technological innovations to encompass social innovations as well. This desire is already manifesting itself in a range of EU programmes and initiatives such as the CAP, Smart Villages, LEADER/CLLD and the EaSI Programme. These developments are also having an impact on the forestry sector which has begun expanding its portfolio of innovative activities. This thesis looks in detail at some examples of NWFP and social innovations in forestry, focusing specifically at the institutional- and actor-related factors that influence the development of such innovations. In doing so, this thesis contributes to the knowledge base regarding the potential for further diversification of forestry sector practices and the institutional factors that influence their development. Additionally, the present research also highlights new opportunities for innovations, especially for products, services and experiences which are of special importance for smaller producers, forest owners and for the development of rural areas in general.

The results of the case studies examined in this thesis show that innovations related to NWFP and social innovations are in most cases run by forest owners, micro, small and medium enterprises, or rural communities who recognise the potential in NWFP innovations as opportunities to fill niche markets and diversifying their production or the potential of social innovations to fulfil the specific needs and challenges of their respective rural communities. A specific success factor for these endeavours was seen in the connection between the innovators and consumers in the co-creation of value. This is aligned with new customer demands where a redefined utility of traditional NWFPs in new contexts and new ways has led to previously unforeseen opportunities for innovation. Similarly, the value of social innovations is now seen through their potential to create inclusive institutions and empower local communities rather than in the economic value of the products or services they offer. In all the analysed innovation cases examined for this thesis, significant success factors were identified in the entrepreneurial spirit, persistence, enthusiasm and creativity of innovations' proprietors who were eager to pursue their innovations irrespective of the institutional support that was in place when developing them. However, studies covering the entrepreneurial characteristic of innovators already figured prominently in the literature at the commencement of this research (Niskanen et al., 2007; Nybakk, 2009; Nybakk et al., 2009). Thus, a decision was made to go down a road less travelled and focus on researching factors, such as those institutional and actor-related, which could shed light on if and how entrepreneurs are supported or hindered by the system in which they operate.

The analysis of these institutional and actor-related factors shows the need for a widening of the forestry actors' networks to embrace cross-sectoral approaches, a need for explicitly innovation-oriented policies with an openness for new products and services as well as a need to more deeply consider forest-related social needs and societal benefits. Furthermore, bridging the gap between societal groups, such as rural and urban populations, is seen as another step that would create further potential in generating new market opportunities. Successful innovation support should ideally comprise of both service providers and intermediary actors who can contribute to the development of mechanisms that fulfil innovation's needs. What is seen from the present analyses is that traditional forestry organisations are less prepared to provide such cross-sectoral and cross-cultural links when compared to regional development-oriented organisations where multi-sector actors are necessarily involved. Innovations will achieve the most when the triadic relationships between the State, intermediary organisations and local actors as well as innovators are working together synergistically. Furthermore, policies need to provide a bundle of

mechanisms that will support entrepreneurship, civic action and public intervention, such mechanisms will need to include legislation on cooperatives, public-private partnerships and suitable governance arrangements in general. All of this points to the need to break down barriers created by different organisations to enable joint action. Financial sources need to be more diversified and flexible, open to support inherently risky projects and innovations in their development phase. For example, the provision of funds earmarked for social innovations in sectoral and structural policies can create opportunities for previously unimagined solutions and benefits conceptualised by individuals not bound by the prevalent socio-political paradigm. General trust in institutions and a societal climate in which individual self-expression, civic action and community empowerment are considered as intrinsic values are paramount for any innovation to thrive. The analysis of innovation cases in different countries pointed out that different histories, institutions, variations in social capital as well as trust between civil society and the State create very different enabling environments for innovations. Policies designed to support NWFP and social innovation must be sensitive and adaptable to allow for these differences.

Growing public awareness of novel solutions, as illustrated by NWFP innovations, and the advent of new organisational forms in response to policy gaps and market failures, as illustrated by social innovations, can lead to the better utilisation of the opportunities that already exist for the forestry sector and rural development. Ideally, this will eventually lead to larger, positive societal changes. All the analysed examples of innovations in this thesis have the potential to contribute to their local communities' visibility and recognition while also playing a key role in preserving the cultural and traditional values of their regions. The articles used in this thesis describe the complex commercial and non-commercial relationships of people to forest products and services, based in traditions and other cultural contexts that are of value to people. The complexity and diversity of these values are relevant for rural businesses, even if many of these values are intrinsically non-commercial. The question arises whether there is an actual societal and business trend towards placing increased importance on NWFP and social innovations or if this perception has been created simply by a new analytical perspective that highlights these qualities and relationships. It is the belief put forward in this research that both are true. The cases analysed suggest that an orientation towards broader common goals or establishing new products, services or experiences will contribute to jobs and income in rural regions and maintain both natural and cultural environments. These benefits are increasingly important aspects stemming from such innovations and should help provide impetus to their widespread establishment and sustainability.

8.1 Implications for policy and practice

The results of this thesis point to the changes needed in both policymaking and practice in order to stimulate NWFP or social innovations. This research calls for increased stakeholder participation and co-creation mechanisms in the development and implementation of policy measures that address innovators at all administrative levels. For stable and conducive institutional frameworks, sufficient capacities and policy coherence are needed, especially with regard to property rights, administrative structures, and funding instruments. Good organisational capacities are important for upscaling and for the diffusion of innovations at the magnitude necessary to produce meaningful positive economic impacts for rural areas. As stated in the chapter above, support programmes at both the national and regional level need to be open and flexible to adapt to the emerging ideas of local actors. Bottom-up initiatives would benefit the most from a focus on unusual ideas and cross-sectoral interactions. In an early phase of innovation, employing a risk- and innovation-friendly approach, as well as support instruments and support structures that provide information, networking and financial means using tailor-made support measures are needed.

To achieve such a policy environment requires high-level (e.g. EU-level) policy actors' support used in conjunction with actively engaged and supportive national and local governments, which are the entities in the best position to provide enabling institutional environments for innovations of various types. Better coordination and communication between various actors and the inclusion of local communities and innovators in the decision-making process are also seen to be beneficial for creating supportive innovation environments by stimulating learning between various actors.

In terms of practice and actors who can pursue and then become actively engaged in innovative endeavours, there is a need that they recognise the broad conceptions of innovations and understand the potential that exists in "unusual" business opportunities. One way to achieve this is to ensure that innovators, NGOs, local, regional and even national governments effectively share their knowledge of best practice and the lesson learned from failure. Creating a network of innovators can help local actors to overcome existing institutional gaps by joint activities and advocating their interests, allowing them to focus on pursuing opportunities and thus contribute to their chances of success. Besides their capacities to engage in innovation, the deliberative, learning and adaptive capacities of innovators also need to be strengthened. In the forestry sector, one can see the potential for forest owners, be that individuals or associations of forest owners, to increase the profitability of forestry by diversification of the offered products and services or acting in collaborations with rural entrepreneurs and actors from other sectors. Finding synergies between related sectors such as forestry, agriculture, and tourism can only serve to contribute to the sustainable development of rural areas.

Other practice actors that are seen as helpful in innovation processes are so-called service providers or intermediary actors. These can be various actors, such as extension services, producers' associations, consultants, and NGOs. They can play key roles among the multiple actors involved in value creation. They often create links between producers and other actors in the value chain and innovation system and thus facilitate innovation through networking of various public and private stakeholders. In some cases, they may also provide financial or legal support. In contrast to potential innovators, such as forest owners, intermediary actors usually have more capacities, suited to utilise advanced information or decision support tools that can support innovators with information that would otherwise not be available to them.

8.2 Future research topics

The results of this thesis necessarily have limitations and these point to avenues for future work. As discussed in this framework text, the innovation system approach tends to underplay the role of interests and power relations between various actors. These should be addressed more comprehensively in future research. Some of these aspects will be covered by the thesis author in a forthcoming publication on the potential of social innovations to transform rural areas based on the analysis of actors' power relations and policy instruments in a Serbian case. For this upcoming research, policy documents and 33 interviews were conducted with various actors drawn from different administrative levels, including from public, private and third sector organisations. Further research is also needed to better understand the roles of the socio-economic framework conditions and the distribution of property rights that impact innovative activities. Properly addressing these aspects also promises to contribute to a better understanding of the causes behind the success and failure of innovation efforts and to help adapt and transfer the lesson learned from the successes across regions or sectors.

Detailed analyses of societal drivers affecting the supply and demand sides of innovations are also needed, as highlighted in Articles 7 and 8. In-depth analytical studies on the role of potential drivers (e.g. demographic changes, changes in lifestyles, changes in purchasing power) creating new demands and services or experience-oriented innovations would help in better-targeted support for innovations and innovators. Consumer or user-oriented innovation approaches thus seem promising as a future direction of innovation research, which has also been pointed out by other researchers as well (Helles and Vedel, 2006; Hujala et al., 2019). This would mean expanding the portfolio of actors to be analysed. A well-being approach may also help to shed light on the value of the multiple benefits to users and consumers arising from participation in innovation process. Research activities by a group from the SIMRA consortium are already planned on this subject with a focus on the roles of public actors in social innovation initiatives in marginalised rural areas where the aim is to investigate public actors' roles and their influence on social innovations. Another planned and already partly initiated research effort addresses re-constitutive social innovation cycles by analysing cases of women-led initiatives in rural areas. The goal here is to investigate how such innovations can empower women in rural areas by actively engaging them and enhancing both their employment opportunities and entrepreneurial skills.

The nine articles used in this thesis analyse innovation processes in the context of certain companies and provide analysis of the state of the processes at the time of research. Future analysis could look at the diffusion of these innovations to see whether they not only survived but managed to thrive and spread. This could deepen our knowledge as to the scope and potential influence of such innovations to the broader environment and practices (Vargo et al., 2020). To do this, the recently developed theoretical framework developed by Vargo et al. (2020) that rethinks the process of diffusion in innovation using a service-centred, ecosystems, and institutional lens could be used as it covers many of the aspects missed when using the innovation system approach.

Broadening the research focus to include the exploration of the larger context, including environmental aspects, is also seen as a promising avenue of future research. A comprehensive analysis of the role of innovation systems in forest-related innovation cases could include environmental aspects where the use of approaches such as the quintuple helix model of innovation (e.g. Grundel and Dahlstrom, 2016) or other extended approaches that include effects on ecological and environmental resource elements seem promising.

In terms of research design, a potential future research direction should also be to conduct longitudinal analyses, investigating whether the factors identified in this research as influential in specific cases change, in terms of effects, over time (in different phases of the innovation process and the diffusion stage) and to search for the drivers of such changes, as was also suggested by Vargo et al. (2020). Such analyses would also depict how certain innovations but also innovation systems evolve, providing e.g. interesting insight concerning developments in transition economies (cases from Articles 2 and 3) or if something has changed in the cases of countries, such as the United Kingdom (case in Article 6), which undergo significant and rather sudden changes of institutional environments (e.g. by leaving or joining the EU).

Future research would also benefit from more complex country comparisons and multi-sector studies, which are extremely rare in the literature. Such studies hold the promise to significantly broaden and also deepen the empirical base for understanding innovation processes, innovation patterns and factors for success and failure (this is addressed as well in research by Weiss, 2019, Edquist, 2004, 2011). For example, a recent work (that began after SIMRA's completion) has already concluded some preliminary

work on a proposal that will establish a multi-disciplinary network for improving policy support for community-led local development (CLLD) through an enhanced understanding of the role of social innovation and citizen entrepreneurship in exploring and experimenting place-based solutions to current social, economic and environmental challenges.

Our up-to-date empirical knowledge is limited to a select group of countries, namely developed countries such as Austria, Italy, Slovenia, the United Kingdom, the USA and few countries in transition like Serbia and North Macedonia. This already provides a somewhat nuanced picture of the different contextual and institutional backgrounds for developing innovations. However, integration of data from a greater number of diverse countries would allow researchers to learn from other examples and would certainly be beneficial in terms of gaining knowledge from a more meaningful sample of institutional settings and contexts.

Finally, conducting studies using higher numbers of cases and/or longitudinal analyses, as suggested previously in this text, would benefit from mixed-methods research designs. Quantitative methods are appropriate for analysing large amounts of data in longitudinal research and could be promising to identify crucial points and factors in innovation processes. Quantitative research designs would also be useful in future forest sector innovation research, for testing hypotheses and refining the body of knowledge regarding forest value chains in comparison with those of other sectors. A specific research field suitable for applying quantitative methods would be the investigation of the effects of innovation policies and support measures, an area barely investigated to date. Qualitative analysis could and should complement the results of quantitative approaches with an in-depth investigation of crucial points in innovation processes while revealing and validating how and why innovations develop over time. In this regard, interpretative approaches, such as narrative, discourse or frame analysis, can contribute to deepening scientists' understanding of innovation processes.

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Annexes

Table A1. Teaching activities of the thesis author during the period of the thesis writing

Teaching activities in the assessment period	Name of the course	semesters	role
Lecture and seminar	Innovations for sustainable forest management (732337, BOKU)	W16,W17,W18, W19,W20	lecturer, examining and supervising seminar work

Table A2. Participation in meetings, conferences, seminars of the thesis author during the period of the thesis writing

Authors	Title	Name of conference	Location	Period (mm/yy)	Presentat ion (Yes/No)
Weiss, G; Ludvig, A; Živojinović, I	Co-Kreation von Werten im Bereich der Nichtholzprodukte	AfW-Webinar "Partnerschaften zu Erholung und Freizeit im Wald"	Webinar (online)	09/2020	Yes
Živojinović, I ; Hogl, K.; Weiss, G.; Ludvig, A.	Social innovation for sustainable rural communities: overcoming institutional challenges in Serbia	XXV IUFRO World Congress 2019 "Forest Research and Cooperation for Sustainable Development"	Curitiba, Brsilien	10/2019	Yes
Ludvig, A; Weiss, G; Živojinović, I	Policy implications for social innovation in forestry	XXV IUFRO World Congress 2019 "Forest Research and Cooperation for Sustainable Development"	Curitiba, Brsilien	10/2019	Yes
Weiss, G; Ludvig, A; Živojinović, I	Governance implications for social innovation in rural areas on the example of forestry cases	ISIRC 2019 "Social Innovation: Local Solutions to Global Challenges"	Glasgow, Scotland	09/2019	Yes
Ludvig, A; Weiss, G; Živojinović, I	Policies for Social Innovation: The example of social farming	XXVIII European Society for Rural Sociology Congress "Rural Futures in a Complex World"	Trondheim, Norway	06/2019	Yes
Weiss, G; Ludvig, A; Živojinović, I	Welche Politiken unterstützen waldbezogene soziale Innovationen?	50. Forstpolitikwissenschaft streffen	Vienna, Austria	04/2019	Yes

Živojinović, I; Hogl, K.; Ludvig, A.	Institutional structures for social innovation in rural development: gaps and potentials - the case of Serbia	2nd Austrian Conference on International Resource Politics: Resources for a social-ecological transformation	Innsbruck, Austria	03/2019	Yes
Ludvig, A; Weiss, G; Sarkki, S; Nijnik, M; Živojinović, I	Mapping European and forest related policies supporting social innovation for rural settings.	2nd Austrian Conference on International Resource Politics: Resources for a social-ecological transformation	Innsbruck, Austria	03/2019	Yes
Ludvig, A; Živojinović, I; Weiss, G	Institutional set-up for social innovation in rural areas - an analysis of current frameworks and instruments in Serbia	ISRIC 2018 Conference " Bridging Social and Business Innovation"	Heidelberg, Germany	09/2018	Yes
Živojinović, I; Nedeljković, J; Stojanovski, V; Japelj, A; Nonić, D; Weiss, G; Ludvig, A	Innovating in the transition forestry: cases of non-timber forest products innovations in forestry sector in the South-East Europe	Wild Forest Products in Europe (StarTree final conference	Barcelona, Spain	09/2016	Yes
Ludvig, A; Mutke, S; Corradini, G; Huber, P; Živojinović, I	From paradox to paradigm: the non-conventional innovation in natural resin	Wild Forest Products in Europe (StarTree final conference	Barcelona, Spain	09/2016	Yes
Weiss, G; Ludvig, A; Živojinović, I; Huber P	Non-timber innovations: An innovation system analysis for side-activities of forestry	International IUFRO Symposium: Advances and Challenges in Managerial Economics and Accounting	Vienna, Austria	05/2016	Yes

Table A3. Scientific peer-reviewed papers arising from other project activities in which author of the thesis was involved during the period of the thesis writing

Article	Impact factor (year of publication)
Terkenli, T.S., Bell, S., Tošković, O., Dubljević-Tomićević, J., Panagopoulos, T., Straupe, I., Kristianova, K., Straigyte, L., O'Brien, L., Živojinović I.* . 2020 Tourist perceptions and uses of urban green infrastructure: an exploratory cross-cultural investigation. . Urban Forestry and Urban Greening, 49, 126624	4.021
Dobšinská, Z., Živojinović I.* , Nedeljković, J., Petrović, N., Jarský, V., Oliva J., Šálka, J., Sarvašová, Z., Weiss, G. 2020. Actor power in the restitution processes of forests in three European countries in transition. Forest Policy and Economics, 113: 102090.	3.139
Ficko, A., Lidestav, G., Dhubhain, A.N., Karppinen, H., Živojinović I. , Westin, K. 2019. European private forest owner typologies: A review of methods and use. Forest Policy and Economics, 99: 21-31.	3.139
Feliciano, D., Blagojevic, D., Bohling, K., Hujala, T., Lawrence, A., Lidestav, G., Ludvig, A., Turner, T., Weiss, G., Živojinović I. 2019. Learning about forest ownership and management issues in Europe while travelling: The Travellab approach. Forest Policy and Economics, 99: 32-42.	3.139
Matilainen, A., Koch, M., Živojinović I. , Lahdesmaki, M., Lidestav, G., Karppinen, H., Didot, F., Jarsky, V., Pollumae, P., Colson, V., Hricova, Z., Glavonjic, P., Scriban, R.E. 2019. Perceptions of ownership among new forest owners - A qualitative study in European context. Forest Policy and Economics, 99: 43-51.	3.139
Weiss, G., Lawrence, A., Lidestav, G., Feliciano, D., Hujala, T., Sarvasova, Z., Dobsinska, Z., Živojinović I. 2019. Research trends: Forest ownership in multiple perspectives. Forest Policy and Economics, 99: 1-8.	3.139
Weiss, G., Lawrence, A., Hujala, T., Lidestav, G., Nichiforel, L., Nybakk, E., Quiroga, S., Sarvasova, Z., Suarez, C., Živojinović I. 2019. Forest ownership changes in Europe: State of knowledge and conceptual foundations. Forest Policy and Economics, 99: 9-20.	3.139
Vujcic, M., Tomicevic-Dubljevic, J., Živojinović I. , Toskovic, O. 2019. Connection between urban green areas and visitors' physical and mental well-being. Urban Forestry and Urban Greening, 40: 299-307.	3.32
Ostoic, S.K., van den Bosch, C.C.K., Vuletic, D., Stevanov, M., Živojinović I. , Mutabdzija-Becirovic, S., Lazarevic, J., Stojanova, B., Blagojevic, D., Stojanovska, M., Nevenic, R., Malovrh, S.P. 2017. Citizens' perception of and satisfaction with urban forests and green space: Results from selected Southeast European cities. Urban Forestry and Urban Greening, 23, 93-103.	3.122
Tomicevic-Dubljevic, J., Živojinović I. , Tijanic, A. 2017. Urban Forests and the Needs of Visitors: A Case Study of Kosutnjak Park Forest, Serbia. Environmental Engineering & Management Journal, 16, 2325-2335; ISSN 1582-9596	1.186
Tomicevic-Dubljevic, J., Živojinović I. , Skocajic, D., Grbic, M. 2016. Climate Changes and Invasive Plant Species: Raising the Awareness of the Public Towards Alien Invasive Plant Species in the City of Belgrade. Fresenius Environmental Bulletin, 25(11): 4680-4684.	0.691

PART B - RESEARCH ARTICLES

ARTICLE 1

Weiss, G., Ludvig, A., **Živojinović, I.*** 2020. Four decades of innovation research in forestry and the forest-based industries – A systematic literature review. *Forest Policy and Economics*, 120, 102288. <https://doi.org/10.1016/j.forpol.2020.102288>



Four decades of innovation research in forestry and the forest-based industries – A systematic literature review

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ABSTRACT

This article conducts a systematic literature review of journal articles on innovation in forestry and forest-based industries. We include international, English language, peer-reviewed research articles included in the scientific databases Scopus and Web of Science since the 1980s. Our search for articles that specifically mention “innovation/innovativeness” and “forest/wood/timber” from a social science perspective resulted in 230 studies. Our analysis provides a quantitative overview of institutional contexts, science fields, methods, and topical orientations. On the basis of qualitative content analyses, we also describe the historical development of the research field, summarize the main insights for the central research themes on firm and system levels, and illustrate the state-of-knowledge for selected innovation fields. We conclude with research trends and gaps with regard to the applied research approaches and methods. Overall, the established concepts and approaches from innovation research are well received in forest sector innovation studies, although newer trends could be taken up more progressively. The analysed articles apply various quantitative and qualitative methods and are dominated by country and (sub-)sectoral case studies. A greater variety of methods could enrich the knowledge base and a stronger application of comparative analyses across countries and sectors could substantiate previous findings.

1. Introduction

Innovation is gaining increasing attention by policy makers and the study of innovation processes has become a refined field of scientific and practice oriented research. It has developed into a distinct research field also in forestry and in the forest-based industries. A range of innovation-related public research programs have been launched,¹ and innovation has often been one of specific research topics in interdisciplinary programs or projects. A few topical books² and special issues have been published, e.g. in the Forest Chronicle (2002) and Forest Policy and Economics (2006; 2018).³ So far, several literature reviews (Kubeczko and Rametsteiner, 2002; Spilsbury and Kaimowitz, 2002;

Hansen et al., 2006; Niskanen et al., 2007; Hansen, 2010; Weiss, 2011; Weiss, 2013; Hansen et al., 2014; Nybakke et al., 2015; Lindroos et al., 2017; Guerrero and Hansen, 2018; Korhonen et al., 2018) have been published on specific questions, but no recent, systematic and comprehensive literature review for the whole forest sector has been done. It thus seems time to give an overview of the literature in the field, to describe the journal publications in terms of their content and institutional backgrounds and to analyse trends and possible gaps.

Our literature review comprises innovation studies in the forest sector, including forestry and the forest-based (wood-based) industries. We employ a broad understanding of innovation in order to embrace all relevant studies and to show the variety of research (Garcia and

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¹ For instance, Finnish Forest Cluster Research Programme Wood Wisdom from 1998; European transnational research initiative WoodWisdom-Net initiated in 2004; European COST Actions (COST Action E30 “Economic integration of urban consumers’ demand and rural forestry production”; COST Action E51 “Integrating Innovation and Development Policies for the Forest Sector”)

² Rametsteiner et al., 2005, 2010; Weiss et al., 2011; Niskanen et al., 2007 (see reference list)

³ The Forestry Chronicle (2002), Volume 78(1), “Science and Technology and Innovation”, <https://pubs.cif-ifc.org/toc/tfc/78/1>; Forest Policy and Economics (2006), Volume 8 (7), “Innovation and entrepreneurship in the forest sector”, <https://www.sciencedirect.com/journal/forest-policy-and-economics/vol/8/issue/7>; Forest Policy and Economics (2019), “Social innovation to increase the well-being of forest-dependent communities and promote sustainability in remote rural areas”, <https://www.sciencedirect.com/journal/forest-policy-and-economics/special-issue/10H9J184QXV>

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Calantone, 2002). Most innovation research refers to Schumpeter's (1934) understanding of innovation as the introduction of a novelty and as distinct from invention. Innovation is understood as the specific process when an idea, invention or novelty is practically applied or introduced to the market or some other practical field of activity. Nelson et al. (1977) define technological innovation as "a non-trivial change in products and processes where there are not previous experiences" and Fagerberg (2004) calls innovation "the first commercialization of an idea".

The term and concept of innovation embodies two very basic qualities of the phenomenon that are closely interrelated. It may refer to the phenomenon and process in general (innovation used without article and in singular form) or the results and outcomes (a specific innovation, singular or plural). The first meaning refers to its specific qualities or characteristics and is found in concepts such as innovativeness, innovation diffusion or innovation orientation. With the second meaning, we may describe specific examples of innovations in qualitative or quantitative terms and refer to different types of innovations such as new products or production processes. Being initially more concerned about technological innovations, scholars gradually broadened their scope to include organizational innovations in their studies (e.g., Lundvall, 1992). Schumpeter (1934) named five types of innovations: new products, new methods of production, new sources of supply, the exploitation of new markets, and new ways to organize business. A similar broad understanding of innovations has found its way into practice when, for instance, OECD (2005, p.46) defined innovation by enumerating four types: "An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations". In addition to these firm-level innovation types, researchers recently also focus on institutional (Ludvig et al., 2016) and social innovations (Nijnik et al., 2018), whereby the former relates to new policy-level solutions or improved institutional arrangements and the latter refer to innovation processes with a significant role of civil society actors.

At the core, innovation studies focus on conditions, factors and effects of innovation (Damanpour, 1991), on personal/individual, organizational, inter-organizational and/or institutional/system level (Weiss, 2011; Jenssen and Nybakk, 2013). Research themes include, among others: adoption and diffusion of innovations; innovativeness and entrepreneurial attitudes of managers, entrepreneurs or users; innovativeness and innovation culture of organisations/companies; innovation management and new product development; innovation networks and innovation systems; innovation policy or governance; and outcomes and effects of innovations. The knowledge about the relevant factors for innovation and the applied models becomes increasingly complex. Besides the firm conducting the innovation, other firms along the value chain as well as other actors become recognized as having potentially important roles, such as within industry clusters, innovation networks or national, regional or sectoral innovation systems. Systemic studies go beyond the firm and users level as they include institutional environments and look at complex interactions of multiple actors, including clusters and networks, within business systems or innovation systems. They include at least the following three systems that seem of central importance for innovation processes: industry/ companies; research and education organisations; and governments (triple helix model, Etzkowitz and Leydesdorff, 2000), or, in the study of quadruple, quintuple (Carayannis and Campbell, 2010) or N-tuple helices (Leydesdorff, 2012), even further actors or societal subsystems such as further stakeholders or civil society organisations. Other broader approaches that include institutional, governance or cultural aspects are the concepts of innovation ecosystems (Valkokari, 2015; de Vasconcelos Gomes et al., 2018), open innovation (Chesbrough, 2003) or social innovation (Moulaert, 2013). Natural resources have been included in ecological or sustainability oriented approaches (Rennings, 2000; Carayannis and Campbell, 2010). The role of customers and users

are particularly included in user-driven innovation models and value-based approaches (Vargo and Lusch, 2004; Toivonen and Kowalkowski, 2019). Such advanced approaches have recently started to be recognized in forest sector research. In our article, we use the notion of systemic studies for a broader set of approaches that study innovation processes on a macro-level, i.e. beyond firms and their direct collaborations (Weiss, 2011). The term innovation systems (IS) is used for such studies that explicitly apply the "systems of innovation" approach (e.g., Lundvall, 1992; Edquist, 1997) and related models such as national, regional, sectoral or technological IS.

In discussions about innovation, people often want to understand only radically new products or technologies as true innovations, an aspect which analytically refers to the degree of novelty of innovations. This quality is included in the concept of innovation diffusion through which they penetrate the market and where novelties are adopted (and adapted) by firms in one or also other sectors (Rogers, 1995). Novelty has been denoted in different ways, for instance with the terms of radical and incremental innovations, by distinguishing discontinuous (basic) and continuous (interrelated) innovations, or by speaking of innovations that are new to the firm (as the minimum requirement), new to the market or sector, or new to the world (OECD, 2005, p57). All of these innovation types are important parts of innovation processes when viewed from a macro-economic, institutional or sectoral view (Rametsteiner et al., 2005).

In this paper we include a wide range of innovation types, including technological, business, institutional, social or policy innovations, but only if production or business-related (e.g., forest management, industrial production or use). We thus include studies on the governance of innovations, but do not include governance studies more generally, e.g. studies of the (innovative) governance of natural resources without explicit reference to innovations or innovative land-use or land management, or the study of innovative legal instruments for nature conservation if they are only concerned with the regulation of the conflict but not with innovative technical or business solutions.

We focus on the innovation process not the innovations as such. The aim of this review is thus not to describe or analyse innovation fields in technical terms but to understand the innovation processes. We therefore do not review all the research on the range of innovations in forestry and the forest-based industries but focus on research that has the process of innovation as the research focus – that is what we call innovation studies.

After the description of the applied methods, we present an institutional, scientific and thematic overview of the research, describe the historical development of the field, summary insights according to four thematic fields of research, and specific insights on selected topical fields. We conclude with a short analysis of trends and gaps in research approaches and methods.

2. Methods

Our study aims at a review of innovation research in forestry and the forest-based industries up to date and globally. For this purpose, we conducted a systematic literature review, assuming a structured approach for critically reviewing and analysing published academic research (Tranfield et al., 2003). Principles of systematic literature review were applied: replicability, clear criteria for in- and exclusion of research articles and strict protocolling of all steps that were carried out (Gough et al., 2017; Cooper et al., 2008).

In our research we followed the key stages in conducting a systematic review: scoping, planning, identification (searching), screening and eligibility (Siddaway, 2014; Booth, 2016). Scoping provides an overview of state-of-the-art on the topic and what might make a novel and important scientific contribution. This step includes also the precise definition of our research focus, which we present in the introduction section. All other review phases are presented here in the methods section. Detailed documentation is provided in the Annexes 2, 3 and 4.

In the planning stage we had to consider trade-offs between the comprehensiveness, practicability and reproducibility of our review. Since the scoping found that a comprehensive overview of innovation research in the forest sector globally and over time is missing, in this paper we decided to apply no limitations in time, global geographical regions or sub-sectors. For a practical, representative and reproducible research, we decided to systematically search a few defined search terms in standard databases only. In this step we pay attention to both sensitivity of search, finding as many articles as possible, and specificity, making sure that articles are indeed relevant. For securing a high sensitivity we decided to use two available databases and broad search terms (see Annex for search query and applied filters). For securing the specificity of our research we examined each single article in the cleaning process to belong to the scope of our research. For this purpose, we defined inclusion and exclusion criteria for the selection of articles, with regard to the concerned types of publication (peer-reviewed scientific publications), language, topical fields, research themes/questions, conceptualisation of innovation, and others (detailed criteria are presented in the Annex 3). In summary, we focus on international, English language, peer-reviewed scientific publications. Our review focuses on forestry and the forest-based industries. We as well include cross-sectoral fields such as agroforestry or bio-energy, and larger fields such as rural development and rural innovations and studies of the agriculture-food-forest-fisheries sector whenever forest, wood or timber was specifically mentioned. It should be noted that in order to follow the systematic method, any relevant peer-reviewed articles not included in the used scientific databases or not using the search terms in the title, keywords or abstracts are not included in our sample.

In the planning stage we also planned the record keeping and report system. For reporting we follow the widely accepted Preferred Reporting Items for Systematic Review and Meta-Analysis Statement (PRISMA) and present a flow diagram of the literature search and sifting process (Moher et al., 2009) (Fig. 1).

We retrieved articles from the two scientific databases: Scopus and Web of Science (WoS), going back in time as far as those databases provide, and until March 19, 2019. These databases were chosen due to their interdisciplinary reach and comparatively high data quality (Mongeon and Paul-Hus, 2016). The search query (“innovation*” OR “innovativeness”) AND (“*forest*” OR “*wood*” OR “*timber*”) was applied in both databases. In both databases we used refinement options (filters), such as limiting the sample to the social sciences, the relevant document types (i.e. research articles) and sources (i.e. forestry relevant journals). The refinement did not limit to forest sector journals only, but did exclude not connected fields such as computing sciences or geochemistry etc. Forest sector and innovation or rural and regional development related journals were kept (Annex 2). The eight articles that were published before 1980 were excluded in the identification stage, as they did not study innovation as a process from a social-science perspective and rather indirectly targeted innovations. After getting an initial set of the articles ($n = 1700$), a sifting process along defined criteria (Annex 4) was done by two separate researchers (authors of this paper).

In the screening stage we proceeded with the exclusion of articles. In the first round, 248 duplicates were removed. In the second round, after screening title, abstract and keywords, 314 articles were excluded as they do not deal with forestry. They fell into the search by having “wood” or other search terms in the names of the authors, abstracts or keywords (e.g. Hollywood, random forest algorithm (as decision tree), Bretton Woods moment).

We proceeded with the eligibility stage, along the criteria defined in the planning phase (Booth, 2016), and shifted from sensitivity to specificity of the articles (Siddaway, 2014). By analysing the content of the abstracts we excluded 713 articles as they did not deal with innovation in the forest sector, but rather mention innovation or innovativeness implicitly in the background of the article or results, but not as the

research objective. In the same step, we excluded publications which did not qualify as empirical research papers or reviews but were other types of publications such as editorials or comments.

Furthermore, we conducted a qualitative screening of the full articles, after which we excluded 195 articles. These articles did not explicitly focus on innovation as a process but study other aspects of innovations such as other economic topics, technical and/or ecological studies.

Steps of the search and exclusion are presented in Fig. 1. The final full set of articles taken as eligible for in-depth analysis contained 230 articles. These articles study the innovation process in terms of influencing factors, the governance of innovation, methods for the “design of innovations”, foresight studies, or apply other sociological approaches to study innovation as a social phenomenon. They aim to understand the emergence, development, implementation and effects of innovations.

For the synthesis of our research we decided to do both quantitative and qualitative analyses of the 230 articles. The quantitative synthesis aims to provide institutional, scientific and thematic overview information, including year of publication, publication source, country of the research organisation, target country of the study, innovation types, science area, theories and methods, thematic and topical focus of the paper and related information (see Annex 4 for detailed categories; results are presented in section 3; more detailed analyses can be found in the supplementary materials). The qualitative synthesis focus on the content of the articles in terms of applied research approaches and main insights. Based on this analysis we describe the historical development of the research field (section 4) and the main insights in central research themes and selected topical fields. The thematic fields (section 5) were defined as innovation-oriented research themes and are grouped into micro and two macro-level themes. On the micro-level we structure the results into innovation adoption by companies and users, and into firm level innovativeness and innovation behavior. On the macro-level we look at systemic analyses, and at the role of governments, institutional frameworks and policies. The specific topics (section 6) were selected when we found clusters of articles on certain sectoral innovation topics such as bio-energy, timber construction or non-wood forest products. On this basis we assess the main research trends and gaps (section 7).

3. Innovation research in the forest sector – institutional, scientific and thematic overview

Although relevant research may have been done before – without labelling it as “innovation research”, the first publications which use the terms “innovation OR innovativeness” connected with “forest”, “wood” or “timber” appear in the 1980's and more frequently after the year 2000. A publication boom is observed in the recent years with 24 articles in 2017 and 26 articles in 2018 (Fig. 2).

Research is mostly done in research organisations in developed countries in Europe and North-America (Table 1), and interestingly, certain countries (and research organisations) dominate the picture. Researchers (looking at the first authors' countries) mostly come from the United States of America (52 publications), Finland (23), Canada (20), Austria (15), and Sweden (14).

The research focus is on developed countries, since most studies are done in the countries of the researchers' affiliations. More research is done by researchers from developed countries in developing countries than vice versa because of the stronger research capacities. Most studies are on topics in single countries than comparative studies across borders.

The leading research organisations are the Oregon State University with 16 and the University of Natural Resources and Life Sciences, Vienna (BOKU) with 10 first authorships (Table 2).

The highest numbers of articles have been published in the Journal of Forest Policy and Economics (43 articles). The following is the Forest

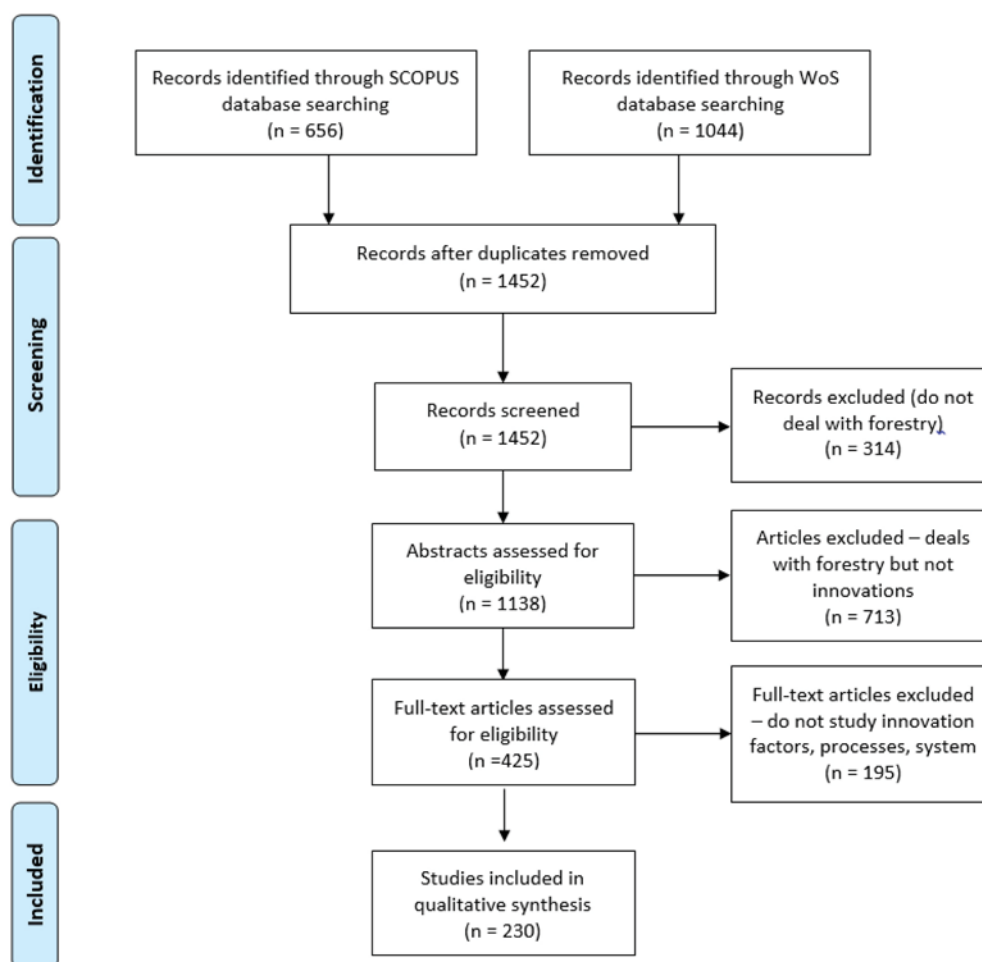


Fig. 1. Research steps, presented according to the Prisma Diagram (Moher et al., 2009).

Products Journal with 12 articles. No other journal published more than ten articles in this period since 1981. Relevant articles are published in both sectoral and non-sectoral journals (Table 3).

The majority of articles is on the forest-based industry (93), a bit smaller share on forestry (87), and others focus on bio-energy (23), agroforestry (14), and bio-economy (13) (Fig. 3). Within forestry, around half of the articles are on innovations in forestry in general, others deal with specific innovation fields related to various ecosystem goods or services. Within the forest-based industry, most articles deal with the wood industry or the forest industry as a whole.

With regard to innovation types (Table 4), most of the publications deal with process (or technological) innovations (53 articles),

sometimes combined with other types (70 in total). Many papers do not specify certain innovation types (48), or look at not specifically defined combinations (38). Institutional innovations are also a major topic (35). Product innovations (including goods and services) and organizational are less prominent. Social innovation is an emerging topic (7 articles).

Among the various social science approaches that are used, the majority can be filed under economics and business administration (172 articles in total), institutional economics being the leading approach (92 articles). Policy and sociological studies are also frequently used. 14 articles represent various interdisciplinary approaches, covering science and technology studies, historical/sociological studies or studies of socio-ecological systems (Fig. 4).

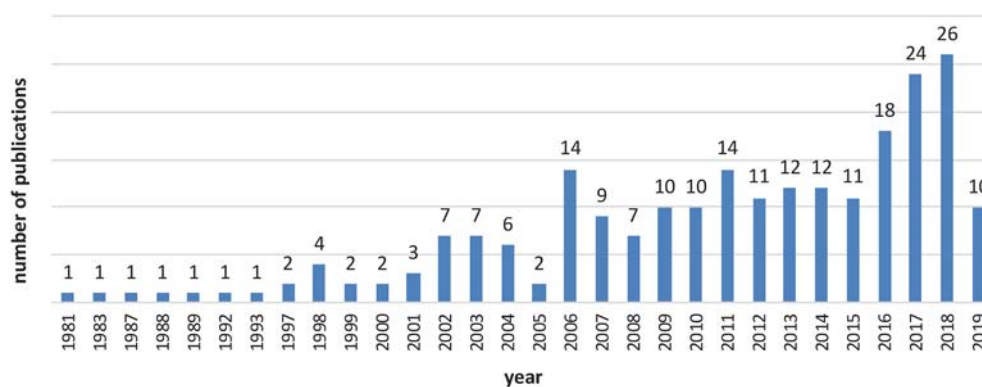


Fig. 2. Number of publications per year (until March 19, 2019) (N = 230).

Table 1

Location of first authors per continents and country classification of economic development according to UNOPS (N = 230) (full table with countries of researchers is provided in the supplementary material).^a

Continents/classification of economic development	Number of articles
Europe	114
Developed countries	114
North America	72
Developed countries	71
Developing countries	1
Asia	17
Developing countries	16
Least developed countries	1
South America	10
Developing countries	10
Africa	9
Developing countries	6
Least developed countries	3
Asia, Europe	5
Economies in transition	5
Australia/Oceania	3
Developed countries	3
Total	230

^a Classification of economic development according to UN: (i) developing countries and territories, (ii) least developed countries, (iii) countries with economies in transition, (iv) developed countries and territories (UNOPS, 2018, p. 745–751)

Table 2

Research organisation with three and more publications (representing 61 articles in total).

Research organisation	Number of articles
Oregon State University	16
University of Natural Resources and Life Sciences, Vienna	10
University of Helsinki	5
USDA Forest Service	5
Swedish University of Agricultural Sciences	5
ETH Zurich	4
Yale University	4
Savonia University of Applied Sciences	3
Simon Fraser University	3
University of Malaya	3
Total	61

Table 3

Publication sources with three and more publications (representing 127 articles in total).

Name of Journal	Number of articles
Forest Policy and Economics	43
Forest Products Journal	12
Canadian Journal of Forest Research	7
Technology in Society	7
Scandinavian Journal of Forest Research	6
Sustainability	6
Forestry Chronicle	5
Technological Forecasting and Social Change	5
Forests	5
Forest Science	4
Energy Policy	4
Journal of Sustainable Forestry	4
Journal of Forestry	4
Technology Analysis & Strategic Management	3
Wood and Fiber Science	3
Silva Fennica	3
International Wood Products Journal	3
Forest Ecology and Management	3
Total	127

For our in-depth analysis in sections 4–6, we qualitatively classified the articles in terms of used theoretical and methodological approaches. We divided the studies into system-level and firm/individual-level approaches, whereby the former include various economic, sociological and policy studies of innovation systems and processes, including network analyses, discourses or effects of innovations. The latter include studies of firm innovativeness, innovation management and adoption processes by entrepreneurs or users. Overall, system-level studies clearly dominate over firm/individual-level studies (143 vs 87 articles) (Fig. 5).

The most of the innovation studies conduct systemic analyses of innovations and/or technologies, explicitly spoken out or more implicitly. Some of them specifically name “innovation systems” (IS) as research approach (36 articles). They usually take a sectoral/technological IS perspective, but also national, regional or sustainable IS are mentioned. They include the analysis of the roles of actors and policies in innovation processes and within IS. Those questions are usually related to sectoral forestry IS on national or regional level, or to specific innovations in question, e.g. technologies, NTFP, recreation, etc. Studies may be related to the evolution, the effects or efficiency of IS and institutional or policy support measures. Besides the supportive functions, also barriers are frequently studied. Some IS studies focus on the technological capabilities, knowledge and learning of firms, networks or industry clusters, and some include the concept of entrepreneurship.

The broader systemic approaches (65 articles) focus mostly on factors in, drivers of, or challenges and conditions for the diffusion and adoption of innovations. Those studies mostly have certain innovations in the focus, e.g. timber construction, bio-energy, NTFP, environmentally friendly technologies, carbon forestry, short rotation plantations, the forest products industry or bio-economy as a whole. Prominent approaches are science-and-technology studies or the study of socio-technical systems and technological change. Such complex analyses often study longer time periods and domestication, industrialization or modernization processes in forestry, or study the transformation of innovation, technological or energy systems. Several studies apply social network analyses. A number of studies specifically look at territorial or regional governance or local innovation networks. Specific concepts include grounded innovation platforms (GRIP), payments for ecosystem services (PES), co-evolution, or an innovation value matrix.

Policy studies (18 articles) deal with the implementation or effects of research, innovation support measures, or specific programmes such as PES, community-based forest management, or the Canadian Model Forest Programme. While most studies are more analytical or descriptive, some aim at collecting stakeholder opinions or designing innovation support policies.

Four articles apply explicit interdisciplinary models such as socio-ecological systems. They look at innovation processes in connection with leadership, resilience, collective action or community forestry. Other social science studies include social network analyses, discourse analyses, development studies, perceptions, action research, historical or ethnographical studies. A few articles study social innovation or social enterprise.

Very few articles try to measure or evaluate the effects of innovations (4 articles). These evaluate innovation support policy by use of a Cobb-Douglas production function, or measure the effects of innovations with a combination of quantitative and foresight studies.

The 87 firm-level/individual-level articles mostly study innovation behavior or strategies of firms (71 articles), including aspects such as knowledge creation, collaboration and cooperation, organizational culture, or the role of managers or workers. Specific innovation models include the concept of open innovation, business model canvas, participatory technology development (PTD), empathic design and the knowledge creation model Socialization–Externalization–Combination–Internalization. 16 articles study the adoption of

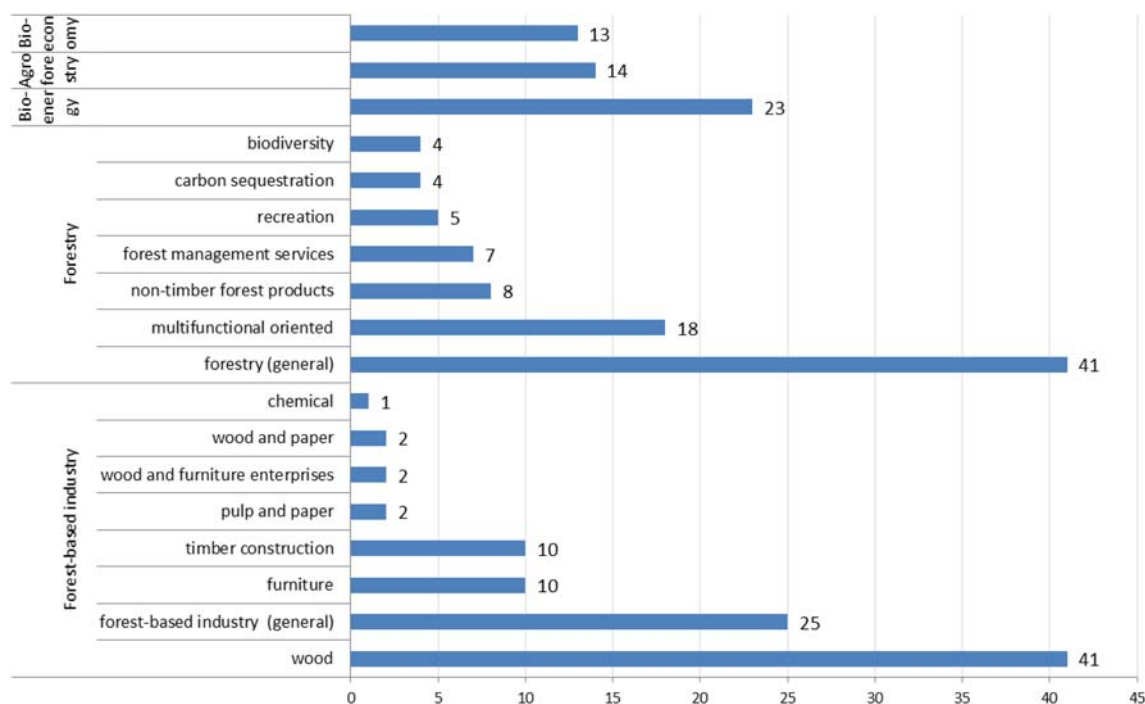


Fig. 3. Topical foci of articles (N = 230).

Table 4

Innovation types tackled in the publications (N = 230).

Innovation type	Number of articles
Institutional	35
Marketing	2
Mixed	38
Not specified	48
Organizational	15
Process	53
Process and institutional	2
Process and organizational	3
Process and product	12
Product	15
Social	7
Grand Total	230

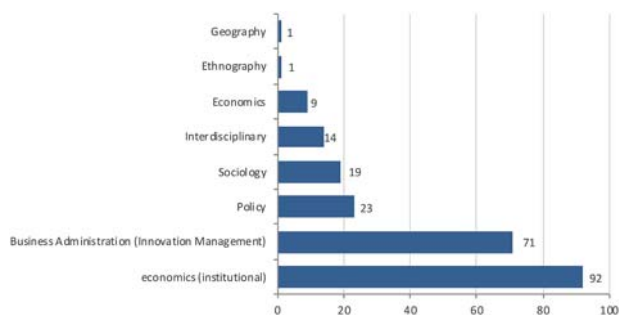


Fig. 4. Science areas (N = 230).

innovations on personal level, usually entrepreneurs or farmers, but also users. Three of those adoption articles relate to agroforestry and three articles specifically include gender aspects. The applied concepts include farmers' motivations, users' perceptions, hierarchical decision models or social practice theory.

More than half of the articles (123) apply qualitative methods, while 65 apply quantitative and 42 mixed-methods (Table 5). Qualitative, quantitative or combined case study approaches dominate the sample.

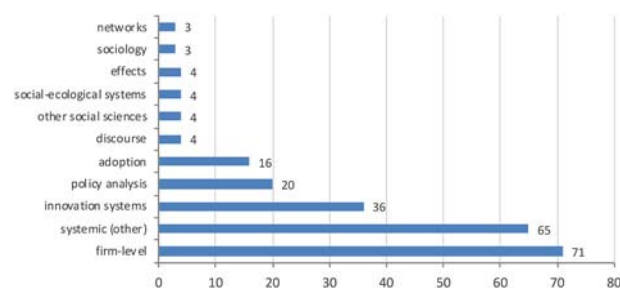


Fig. 5. Research approaches used in the publications (N = 230).

Table 5

Methods and methodological approaches applied (N = 230).

Methods and methodological approaches	Number of articles
Qualitative	123
Case study	72
Comparative case study	17
Literature review	15
Conceptual	13
Comparative analysis	4
Discourse analysis	2
Quantitative	65
Other survey based analysis	35
Case study	21
Comparative analysis	5
Comparative case study	4
Mixed-methods	42
Case study	33
Comparative case study	7
Comparative analysis	1
Conceptual	1
Total	230

Besides case studies, important qualitative methods are also conceptual studies or literature reviews. Quantitative methods foremost include survey based studies and sometimes apply secondary or statistical data analyses (details are in the supplementary materials).

4. The development of innovation research in the forest sector

After pioneering studies before the year 2000, innovation research in the forest sector has established itself and has been growing continuously since then. This section briefly presents its development in five stages.

4.1. Period 1981–2000: Preparing the field

In the beginning of innovation research in the forest sector, articles mostly focus on technological innovations, studying either the innovativeness of firms or innovation processes in a complex societal context, often including political-institutional, social-cultural and economic conditions. The study topics and approaches of those 17 articles differ between developed and developing countries, the former focusing on timber production (e.g. mechanization of harvesting, A5⁴ and A14) and wood industries, the latter on agroforestry (Nigeria, A3; Paraguay, A4) and forest management with inclusion of local communities (China, A9; India, A11) or for their benefits (modern wood stoves, A2). Studies are primarily interested in innovation diffusion, looking at firms' innovativeness or innovation processes from systemic-societal view. Other foci are bio-energy and global warming (A12), empowerment of indigenous communities (A11), labour processes in industrialization of tree harvesting (A14), and the adoption of ecosystem management in the US (A16). National or regional level macro-economic or policy perspectives dominate the studies, but some take a firm-level view (diffusion factors in US wood products industries A6, A15; role of public sector educational or assistance needs of US sawmills or forest products firms A7, A13, A17; innovation strategies of Canadian firms, A10) or deal with collaboration (agroforestry extension services with farmers, A4).

Seven studies were published in forestry/forest sector journals, the majority, however, appeared in other journals and are science and technology studies, policy, geography or development studies.

4.2. Period 2001–2005: establishing innovation research in the forest sector

After the year 2000, innovation research developed into a distinct research field, with 25 peer-reviewed articles published within a five-year period, and half (13 articles) of them in forestry journals. Most articles deal with classical forestry and forest industry topics. In the USA and Canada, the articles study various aspects of innovativeness, innovation processes and innovation governance, including democracy (A18) and leadership questions (A30). Four studies from Europe deal with bio-energy (A21, A33, A36, A41). Multiple use or community-related forestry is studied in a developing countries context (community forestry in Mexico, A26; PES in Costa Rica, A31) and also in the USA (community-based ecosystem management, A18), Canada (Model Forest Program, A32) and China (share-holding tenure, A37). Articles in developing countries furthermore deal with agroforestry (A19, A20, A22, A35) and forestry innovation systems (A24, A28).

The majority of studies takes up an institutional, policy or system perspective, but ten are on firm level (adoption of agroforestry A20, A22 and A35; adoption of improved cookstoves in Sudan A33; company conflict strategy A38; innovativeness in wood construction in the USA A27; e-business in US lumber industry A34; innovativeness in wood products industries in Finland A39, the US A40, and in a US-Chile comparison A42). The systems of innovation approach is mentioned in articles in developed (Quebec, A25) and developing countries (Costa Rica, A28). The articles in forestry/forest sector journals focus either on wood industry innovativeness (industrial countries A27, A34, A39, A40, A42), or on the governance of innovations (in fully developed

economies, foremost in the USA and Canada A18, A25, A29, A30; in developing economies A24, A28, A31, A35, A37). The renewable energy studies have all been published in non-forestry journals (A21, A33, A36, A41) which tend to publish development studies or science and technology studies. There is also a discourse analysis around the emergence of new electronic ("cyborg") technologies for minimum impact wilderness recreation (A23).

4.3. Period 2006–2010: Expanding innovation research in the forest sector

The expansion of the research means the doubling of articles compared to the previous period (50 articles), more than half (33 articles) in forest and wood related journals. The recognition of the research field is marked by the special issue on innovation and entrepreneurship in Forest Policy and Economics in 2006 (10 articles from which eight are in our sample). In this period, more articles focus on the forest-based industry (27 articles) than on the classical timber-oriented forestry (11 articles), but some additional publications are on special forestry topics, including bio-energy (A60, A57, A63, A86), biodiversity (A74, A75), NTFP (A47, A79), Alpine communal forests (A80), carbon forestry (A62) and agroforestry (A44, A61).

The 38 publications on developed countries (18 articles on USA and Canada; 18 on Europe; two on Australia and New Zealand, A48, A62) almost exclusively deal with classical forestry, the forest-based industry and bio-energy. Others deal with NTFP (A79), collective innovations in communal forest management in the Swiss Alps (A80) and with carbon forestry in New Zealand related to forest restoration for traditional cultures (A69). Seven articles are on developing countries, studying agroforestry (Philippines, A44; Africa, A61), NTFP (Bolivia-Mexico, A47), furniture industry and modernization of farming in China (A53, A58), the adoption of cookstoves in Mexico (A63), and pulp and paper industries in Brazil (A91). One article on Russia deals with forestry in an economy in transition (A73), and four articles are targeting mixed types of countries (A74, A75, A78, A92). Two articles are tackling PES for biodiversity conservation (A74, A75). In terms of specific topics, three articles refer to climate change, namely a case study on reducing greenhouse gas emissions in the Canadian wood industry (A87), an action research study on carbon farming in New Zealand (A62) and the REDD program which is referred to in Wunder's article on PES (A75). One discourse analysis of the EU concept of knowledge based bio-economy is the first around this new topic (A89). Other specific topics include entrepreneurship (A47, A51), participatory technology development (A61), rural development (A58), social or users' perception of innovation (A63), and the role of environmental and quality strategies in technical innovations (A75).

The 25 studies that employ firm-level approaches, deal with firm-level innovativeness, innovation strategies, business models or organizational characteristics and other innovation factors (21 articles), entrepreneurship and the adoption of innovation by firms (A87), land owners (A44, A58) and users (A63). The 25 macro-level studies mostly employ innovation systems approaches, science and technology, institutional, or policy studies, and some apply industry life cycle (A50) and discourse approaches (A89). Others are focused on the collaboration of firms, vertically in value chains (A47), horizontally among forest land owners (A59), and with extension services or scientists (A61, A67). Effects of innovation activities in the wood sector are dealt with in a Polish study (A76).

4.4. Period 2011–2015: Consolidation

This period with 60 articles gives a similar picture to the previous. Studies in developed countries mostly refer to timber-oriented forestry and the forest-based sector. Others deal with wood construction (A149), bio-refinery (A137, A141), bio-energy (A136, A145, A152), NTFP (A111, A113), carbon forestry (A95), conservation (A128), recreation (A114, A117) and cultural services (A105) or multiple use forestry

⁴ The articles from the analysed sample are named as A and their number. The full list of the papers is provided in the Appendix A.

(A96, A121). Those specific topics on non-traditional forest management or the forest-based industry are often published in non-forestry/non-forest sector journals. The publications in a developing countries context deal with agroforestry (A44, A61), diffusion of cookstoves (A139), the forest-based industry (6 articles) and new policy approaches against deforestation (A150) or for land restoration (A151) and are mostly published in non-forestry journals. The forest-based industry articles (30 in total) focus mostly on the USA and Scandinavian countries and have been published partly in forestry/forest sector, partly in other geographical, innovation or business and production management journals.

In this time period, eleven forestry related articles were in a European context (A93, A98, A99, A105, A111, A117, A128, A129, A135, A140, A142). Other forestry articles deal with specific topics such as carbon forestry (Australia and USA, A95), recreation (New Zealand and Italy, A114), NTFP (China, A130), and multifunctional landscapes (USA, A96). In the USA context, two articles are on innovations in logging (A103, 106), two European articles deal with forestry service markets (A129, A140). Similar to the period before, more articles tackle firm-level questions (37 papers), while 23 are situated on the macro-level.

4.5. Period 2016–2019: Strengthening, refining and differentiating

The latest period experiences further growth of innovation related publications in the sector (78 articles), a broadening of topics and a further development or refinement of research approaches. Almost half of the publications (37 articles) now appeared in forestry or wood-related journals, while other are in environmental or rural, innovation or business journals.

Within forestry (30 articles), the studies deal less with traditional timber-oriented innovations (harvesting, innovation adoption or innovation policies) but increasingly take up new activities: multifunctional forest landscapes, multiple benefits of forests or social innovation (five articles), NTFP/NWFP (five articles), carbon forestry in a developed (A225) and a developing countries context (A191), community forestry (from an innovation ecosystems perspective, A229), recreation (mountain biking, A226) and forest management services (A230). Agroforestry practices in European countries and Indonesia are the topic of four articles (A172, A173, A182, A206). Nine articles investigate bio-energy, either with the forestry or the energy production part of the value chain. The clusters of articles on NWFP and on social innovation are related to two specific European research projects with the possibility to apply refined, in-depth and comparative analyses.

Studies on innovation in the forest-based industries are still predominantly done in developed countries and cluster in North-America and northern European countries (21 out of 25 papers). Within those studies, specific approaches include the study of social capital (A192), human capital (A166) and role of employees (A193), cross-sectoral linkages (A215) and collaboration (A216). Bio-economy (ten articles) appears as a new topic in industrialized countries, often with technological/economic transformation approaches, and possibly the reason why also bio-energy comes back as a research topic.

5. Main insights from forest sector innovation studies

We summarize the main insights from the selected articles according to the four major themes defined above (Section 2): on the micro-level, we look at a) the adoption of innovations and b) innovativeness and innovation activities of firms, on the system-level, c) at systemic functions and deficiencies, and d) the role of policies.

5.1. Innovation adoption

The adoption of innovation has often been studied from a top-down oriented view, starting from the assumption of beneficial technologies

that should be adopted by land-owners or users. This has often taken place in developing countries, foremost on the example of agroforestry. Overall, studies highlight the importance of land owners' personal, social and economic situation and needs (A4, A35, A126), including gender aspects (A22, A132, A173), knowledge, perception and attitudes (A20, A147), and motivations (A44). There is also the need for building up institutional capacities and to adopt innovations and extension work to the specific situations of land owners' (A4, A19, A20, A61, A58, A126, A173). In developed countries, land owners have not been studied so extensively, but some studies have been done, e.g. in connection to advanced agroforestry (A172, A206), carbon forestry (A62, A95, A225), forest conservation (A128), short rotation forestry (A136), or the "undermanagement" of forests (A164). Those studies confirm the role of knowledge and intentions of land owners (A95, A172), traditions and culture (A164, A206) and well developed economic, knowledge and institutional frameworks (A136, A206), extension services and communication channels and the engagement of supporting peers (A128, A136, A225) for the success of new management practices and products.

More generally, openness towards learning as well as economic or ecologically oriented attitudes towards forest management may result in different responses of small-scale forest owners to the challenges of shrinking rates of return from wood production in their forests and to alternative sources of income (e.g. NTFPs and services, recreation, government subsidies) (A99). An environment that encourages informal and formal relationship building is seen as fruitful for innovative activities and learning (A161). An example for such a learning concept may be a model for the collaboration of scientists and practitioners presented in a study of sustainable forest management in Canada (A67). Similarly, a study on adaptive community forest management in Mexico shows the need of integrating local forest knowledge and traditional self-organisation with the monitoring and data communication abilities of forest management (A26). Combination of formal scientific approaches with local knowledge and empirical experimentation through action research is presented as potential for higher innovation activities (A24). Education, in its most generic sense of all of us being an informed consumer, may be the best ecosystem management tool in the natural resource manager's tool kit (A30).

Adoption and perceptions of users are less studied. Several studies on biomass improved cookstoves show that basic socio-demographic factors, or the payment schemes are not decisive for adoption, but it is rather mediated through cultural structures, including gender roles (A33, A63). In a strong patriarchal context, the educational level of the female household's members was positive for the adoption but the housewife's age and the educational level of the husband had negative effects (A33). Other context factors are related to the fuel supply situation and harvesting/collection practice (A63, A168), the resulting economic savings (A194), or the environmental awareness and beliefs of the users and peers or key players (A168, A228).

In a European context, public perception is seen as a relevant factor in forest industry innovations and raising societal awareness should be part of sector communication (A208). Recent studies on the diffusion of new uses or applications of wood such as in the construction sector determine the knowledge and perception of users, end-user or the public as one of a range of decisive factors (A174, A177, A208, A223). Industry innovation strategies and public support programmes would thus need to consider broader groups of stakeholders or the public (A174, A208, A223) and their active roles in innovation processes (A100, A153, A177, A180).

Entrepreneurship seems to be implicitly tackled in innovation studies although it might be studied without explicit reference to innovation. It has been implicitly included in many studies but as a specific concept it was only included in studies related to tourism innovations (A114) and NTFP, for instance, distinguishing gatherer types (A203) or studying entrepreneurial practices and their support needs (A162, A183).

The adoption of innovation by firms has been studied in the USA, in connection with educational needs of sawmill operators (A7), in substitution modelling for forecasting wood panel products (A15), in the field of e-business in the lumber industry (A34), and related to harvesting technologies for biomass production by logging contractors (A103, A106). In Canada, a study on greenhouse gas reduction by forest industries (A87) shows that the motivations were to some extent related to climate change but also to regulations, costs and consumer demands. Innovation adoption by firms is often studied under the label innovation diffusion or other approaches as presented in the following section.

5.2. Innovativeness and innovation activities of firms

Most of the article that deal with innovation activities of firms, reflect that the forest sector faces large scale structural changes, and see the main drivers for innovation in changing global competition patterns and changing societal demand structures, with emerging producers and markets. For the level of innovativeness in the sector, the studies present a rather modest picture. It is perceived that innovations in traditional sectors such as forestry and the forest industries has been limited, and that forest-based industries are less innovative compared to other sectors (A49, A52, A78, A90, A98, A133). Comparative studies across sectors are rare but generally support this view, e.g. comparing to automotive industry in Slovakia (A125) or a range of industry sectors in Malaysia (A181). The difference, however, is not so accentuated when comparing to similar traditional sectors (A98) and a more differentiated view shows differences with regard to sub-sectors, types of innovation or company size (A6, A42, A49, A53, A70, A90, A133). Innovations in the forest sector are largely oriented to incremental forms of innovation (A49, A52, A78, A99) and process innovations for cost reduction (A90). Firm size in terms of number of employees significantly contributes to innovativeness (A49, A98, A99). The size of forest properties is similarly mentioned as prerequisite for higher innovativeness. In Slovakia, it is found that small forest holdings prefer conventional round wood to other products, while large-sized holdings are more engaged in innovation and offering new products (A135). Type of ownership is another factor for level of innovation activity of forest holdings. State and municipal forest enterprises are more inclined to innovation than private ones (A51, A135).

Larger companies are generally seen as more innovative (A98), but larger companies focus more on process innovation while smaller ones often have a more balanced innovation portfolio with including product and business system innovations (A42, A53, A90). A different example is the case of the USA upholstered, wood household furniture industry where smaller companies were more innovative than larger ones (A70). Differences can be explained by the sector specific structural patterns and regional or national framework conditions, and comparative studies look less on a direct comparison of levels of innovativeness but rather explain the different sectoral and regional situations and respective needs for training and education or other assistance (A6, A8, A13, A17, A125). Firms delivering directly to end-users are more likely to innovate than companies at earlier stages of the value chains (A50, A98). There is an increased likelihood of innovation in firms located within close reach of major cities, but only in the case of new products or process innovations (A98). Transformative innovation is required if, on a worldwide scale, the forest sector is to realize its full potential (A78). Transition to bio-economy requires discontinuous or disruptive innovations for which capabilities may be accumulated through research collaborations (A91), through digital disruption platforms across industries (A217), or in the form of inter-industry development blocks (A137). Existing structures and mindsets in the forest industry puts it in a weak position for a transition towards a bio-economy (A141).

Strong innovation orientation and openness has been proven beneficial or even critical for forest based industries, e.g. through strength of project leaders, more structured new product development processes, clear product concepts and a stronger market and customer orientation

(A90). Such explicit approaches for innovation management are rarely applied in the sector firms as they mostly strive for process rationalization, although few studies show exceptions. Those include USA furniture firms (A90) and the primary wood products sector in Virginia (A85) that appear to have a specific focus on product development, or a very conservative but successful company strategy by a leading Canadian forest corporation (A123). Most studies confirm the important role of explicit innovation strategies and innovation oriented climate in the companies (A48, A50, A64, A66, A68, A77, A94, A97, A146, A163, A185, A186). A study on discontinuous innovations in wood processing industries in Brazil shows that innovative firms developed a combination of internal and external research-based arrangements for firm-centred innovation efforts (A91). Besides company size, also the educational level of employees (P48), work climate (A71, A72), firm culture (A127) or an active development of foreign markets, especially in economic crisis periods (A186), have been described as important. The traditional production orientation in the forest sector, an over-reliance on suppliers and too lean operation with a lack of "organizational slack" have been identified as some of the most important barriers for innovation overall (A90, A133).

The issue of labour force, human capital and work transformation was dealt in few articles (in forestry, A14, A83, A191; in wood industry A124, A166, A193), analysing the role of human capital for the innovation potential but also how the industrialization of the forest work is not always welcomed unanimously (A14). A study on the transformation of woods work in southeast America in the middle of twentieth century showed that, in comparison to other developed countries, the industrialization of pulp wood harvesting was delayed because of the available cheap work force, since the African Americans had little employment alternatives (A83). An exploratory study investigated practices for capturing employee creativity in four innovative forest sector firms in the US and Finland (A193). With the exceptions mentioned above, the role of workers has rarely been in the focus of research which seems to put much more attention on the leading role of the managers (A66). The important role of all employees is naturally included in any research that deals with organizational culture. From those studies, it is evident that good internal relationships (A192) or a positive company climate, i.e. one that encourages the development of new ideas, experimentation and risk-taking specifically, is positive for innovation (A94, A97, A133).

Most research applies the classical OECD classification of innovation types, a simpler distinction of product, process and business model innovations or only product and process innovations. In sum, any other innovations than technical processes or improved goods are only rarely studied, probably due to the fact that companies do focus strongly on those (A49, A90, A98, A133). Exceptions include a study of a new Swedish multi-story timber house-building system as a system innovation (A174), and the study of business model innovations by SMEs in the field of the bio-economy in Finland (A213).

A number of articles deal with the beneficial collaboration of businesses, including SME collaboration among competitors in open innovation (A185), the role of chemical suppliers as a source for innovation in the wood treating industry (A143), multiple stakeholder research networks for knowledge co-production by producers and users (A146), or inter-agency networks of multi-national companies in Uruguay (A204). A review of the literature on cross-sector collaboration in the forest products industry reports that cost reduction, competitiveness, and environmental sustainability are among the principal drivers for collaborations, and business culture, lack of trust, and lack of parameters to evaluate costs and savings are the key challenges (A216). Several articles study the role of clusters for supporting innovation, in both developed (A8, A115, A156, A161, A180) and developing countries (regional furniture cluster case study in Malaysia, A101, A112, A113). Openness as a decisive factor for innovation and company success often goes along with an active participation in networks or clusters (A146, A180, A185). Those studies imply that many kinds of

collaboration may be supportive for innovation and companies should be open for such interactions – although this does not preclude that any co-operations should not be chosen strategically.

With reference to the main research insights on crucial factors and observed shortcomings for innovativeness, two review papers (A90, A133) summarize a number of central conclusions and recommendations for company managers and industry representatives for their innovation policy: to ensure a positive and innovation-friendly climate in the company, to establish an innovation strategy on highest management level, to practice an active innovation management and to install systematic product development processes, and to monitor the success of the company's innovation policy. An innovation culture includes a market and customer orientation throughout the company and the company personnel needs sufficient time to invest in innovations (A90). Managers should embrace a “total product” mentality which reaches beyond the products as a commodity and includes associated services desired by the customers (A133). Particularly for small firms, co-operation with other companies up and down the value chain and with research organisations or public and private service providers is recommended (A90). Small firms may also be unable to compete based on low costs but rather through a focus on unique products and strong customer relationships.

5.3. Systemic functions and deficiencies

Systemic studies often start with an increased interest in the role of public bodies, e.g. in the creation of regional cluster programmes in Austria (A8), in supporting research and development in specialized public programmes in Canada (A10), in the creation of research/expertise centres in Canada (A46, A109), in promoting specific innovations such as the use of bamboo for rural housing in India (A100), in the roles of firms and institutions in the evolution of technological trajectories in the Brazilian pulp and paper industry (A155), in supporting or maintaining forest industry competitiveness through the right policy support (sawn wood industry in Nigeria, A215, or furniture industry in Malaysia, A219), promoting the transition towards a wood-based bio-economy in Germany (A212), or in financial mechanisms for import substitution in the Russian timber processing industry (A178).

In explicit innovation system (IS) approaches, government roles are seen broader than simply financing research (A45) and IS are analysed in their whole and with several support functions, for instance, categorized into funding/providing incentives, coordination and conflict resolution, and provision of information (A49, A142, A199). Proposing that for successful innovation implementation it is necessary that all core actors actively contribute and are well connected and all functions of the IS are fulfilled, identified gaps explain deficiencies and provide entry points for improvement (A49, A45, A52, A88, A103, A106, A107, A125, A142, A156, A180, A183, A184, A199). Studies often look at the forest sectoral IS (A25, A49, A45, A88, A122, A142, A204, A199), sometimes at a more specific one (logging IS, A103, A106; bio-refinery technological IS, A170) and sometimes – when the forest sector is an important part of the national economy – they analyse the national IS (A28, A73). The regional IS approach is also often applied (A8, A88, A107, A153, A180, A198), whereby regional and sectoral systems are in many cases factually connected and studies do recommend combined regional-sectoral approaches for innovation support policies (A52, A107, A125, A156, A180, A183, A184). Knowledge and human resources are at the basis of any innovative process (A25). Emphasized is the role of information exchange, e.g. through technology transfer and extension services (A25, A46, A103), two-way information flows among all IS actors (A49, A98, A199, A204), including exchange among forest holdings (A49), entrepreneurs (A162), harvesting contractors (A199) or among interconnected industry companies (A137, A170, A204). Many studies mention the role of the IS to provide sufficient financial sources which is a main support function of IS (or policies) (A49, A142, A180, A183, A184, A199), for instance, by providing funds (A157, A199).

When comparing the importance of different support mechanisms, it seems that financing is not the priority but rather the availability of information and the provision of actor links (A49, A52, A93, A142, A162, A180, A183, A184, A198, A103, A106).

System deficiencies are very often related to a lack of sufficient interaction among the various types of actors, e.g. among researchers and between research and practice (A25, A103), but also with public agencies (A204), between national and sectoral IS actors (A49) or cross-sectoral, along the value-chains (A49, A52, A93, A106, A149, A170, A180, A184) and between policy and markets (A93). Imbalances in the IS may be, in different countries, due to a lack of public or private actors (A180), or within the public sector such as in the Slovakian case (A199).

Besides actors and their interlinkages, studies emphasize the important role of institutional frameworks and policies (A45, A49, A84, A93, A142, A149, A184, A198, A199, A200, A212). Deficiencies are seen in a lack of explicit innovation support policies (A45, A49), an insufficient institutionalization and formalization of the IS (A142, A199), barriers across sectors (A49, A52, A93, A180, A183, A184). Institutional innovations are described as important elements for many innovation activities, in various forms, e.g. associations, clusters (A8, A101, A112, A113, A161, A180) or new forms of governance (A93, A156, A184).

Overall, sectoral IS are usually strongly oriented at the main sector products, i.e. timber and their processing value chains (A49, A52). Other goods and services and other types of innovations are often neglected (A93, A138, A162, A180, A184). This goes hand in hand with a strong focus on process innovations for rationalization and a limited attention to new products (A49, A52, A90, A133). The weaknesses of IS thus include a lack of openness across sectors and for new products and innovations, lack of explicit innovation oriented policies and a lack of systemic thinking in innovation support measures. Current innovation support is piecemeal, fractioned and often not coordinated. This issue-by-issue approach foregoes the benefits of a more coherent and comprehensive approach (A49). Successful examples are characterized by comprehensive policy approaches, cross-sectoral openness, and flexible, often regionally oriented support measures that combine various policy instruments including financing, information provision and coordination (A49, A52, A162, A180, A184). Recent studies on transformative industrial change of traditional forest-based industries towards new bio-products suggest that it is often innovative companies driving those developments with smaller roles of policies or institutional actors (A137, A170, A217).

In some articles, crisis has been identified as a driver of innovations. For example, some forest managers take new uncertainties as an opportunity not only to try different species in forest management, but also to change the way that they generate knowledge, explore options and plan forest management (A171). Crisis restoration, in terms of re-planting tree planting and reforestation in post-war areas, may become a forward-looking solution not only to produce high levels of participation and engagement, but also to foster new and innovate ways of using trees in rural farming systems (A221).

The dependency on the natural resources is considered, observed or stressed by several articles. A study of the Costa Rican forest sector explicitly states the need to include economic-ecological relationships as one necessary element of what the author calls a sustainable system of innovation (A28). A study of the wood IS of the French region Aquitaine shows how the dependence on the natural resource may predefine objectives, performance and limits or risks for the sector development and related IS (A88). In consequence, for a comprehensive analysis of forest ISs with including sustainability aspects, a quintuple helix model or similar extended approaches that include ecological, environmental or natural resource elements seem necessary (A153, A180).

5.4. The role of governments, policies and institutional innovation

A role of governments in support of innovation is seen as needed in many papers. Some see that governments have a role to play in encouraging transformative innovation, but a major constraint is that such innovation requires a long-term approach that few governments are willing to adopt (A78). A few articles study the role of policy for innovation. A comprehensive analysis of the Canadian policy landscape relevant for forest sector innovation from 1998 exemplifies the multiple policy fields and measures that may affect innovation (A10). They range from research and development, to cluster support, education and training, security of property rights and access to the forest resource, environmental policy regulations, as well as industry, social and regional development policies. Other policy oriented studies have looked at other questions, such as possibilities to support bio-technological innovations in Russia through the creation of a technical research center (A144) or the role of and support to “threshold firms” in Canada (A189). Effectiveness of specific policies was evaluated for the Canadian forest expertise centers (A46) and the later university-industry research centers (A109), in the field of timber construction in Europe (A84), for the cascade use of wood in Bavaria (A209), Russian governmental support for developing entrepreneurship in the forest sector (A119), or the effects of Russian governmental measures to stimulate technological innovations in order to substitute imports (A178). Several articles highlight the importance of regionally focused innovation support approaches, including the role of clusters and cluster policies (A8, A125, A134, A161, A180).

In fact, many articles provide policy recommendations, in particular those with systemic approaches. In an abstract way, it can be said that governments should develop support measures aimed at a healthy ISs and based on comprehensive analyses of the relevant IS (A90). Examples for such systemic analyses are provided in the IS oriented articles that provide, for instance, a comprehensive understanding of sectoral development patterns, trajectories and factors for innovation development and diffusion (A28, A73, A101, A103, A106, A120, A149, A155, A170, A174, A195, A196, A212, A215, A219, A223, A226), reveal strengths and weaknesses in the fulfilment of IS functions (A73, A107, A142, A178, A180, A196), or develop models for regional innovation support structures such as clusters (A8, A107, A112, A156, A161, A180), technology centers (A144) or similar regional support structures (A125, A153).

Institutional innovations in terms of policy changes are focus of numerous papers (A9, A18, A37, A80, A93, A99, A135, A150, A151, A154, A158, A176, A215, A229), emphasizing that such innovations often lead to new modes of governance and are dependent on the mutual learning among stakeholders. Success of institutional innovations may depend on existing sectoral power relations, where established stakeholders often aim to retain power, favoring conventional policies and market rules (A93, A129, A140). Community-based ecosystem management in the US faces a range of governance challenges and requires examining the alternative institutional models that might best be suited for a community group's needs (A18). Community forestry in Cameroon could be fostered by the use of other complementary support means (A228). The implementation of a share-holding forestry tenure system in China depends on social, economic, political and biophysical conditions (A9) and needs flexibility and resilience in forestry strategies if the goals and objectives are to be sustained over time (A37). The impact of new regulations can also have effect on technological innovation, as demonstrated with advances aimed at reducing soil damage (A176).

A few studies evaluate effects of policies on innovation and competitiveness of the sector. In Brazil, the impacts of a local initiative as a policy response with the aim to lower deforestation was evaluated by applying a quasi-experimental method (A150). For Slovakia, a quantitative evaluation of EU cohesion funds in the wood industry showed that the subsidy did not have the intended effect (A179). In the analysis

of Slovakia's forest sector innovativeness, it is shown that innovation activity has increased during the 2002–2010, being correlated with the forest policy that aims to support multifunctional forestry by implementing new services and products (A135). The effects of innovation on the market structure of the wood industry was assessed in a quantitative model on European level, showing that research and development (spending and personnel) are key factors in explaining market concentration (A131).

6. Specific innovation fields

Within this collection of literature, and besides the described analysed themes, we recognized certain clusters of articles around specific innovation fields. In this section we summarize the insights for those specific topics since they differ from the main results presented above (e.g., agroforestry, bio-energy, multifunctional forestry, NTFP) or present emerging innovation fields (e.g., wood construction, bio-economy, social innovation).

6.1. Agroforestry

Innovation in agroforestry is characterized by its developing economies and tropical environments contexts, often developed and diffused in national or international development projects. Articles in our review (15 specific articles, three of which on European applications) describe agroforestry as challenging. They observe a big gap between research results and their successful application in practice, even in development programmes or projects (A35, A147, A173). Agroforestry is promoted for its ecological advantages over agricultural crops, but compared to agricultural production systems, agroforestry needs longer time to grow and to reveal the benefits and thus even longer time for farmers to test and adopt this system (A22). Successful implementation therefore requires good understanding of farmers' long-term land-use decisions (A4, A35). Farmers take decisions in complex biophysical, socioeconomic and political environments (A126) with influence of a range of extrinsic (farmer/adopter characteristics and external environment) and intrinsic factors (knowledge, perceptions and attitudes) (A147). Furthermore, the adoption depends on the specific motivations for agroforestry such as additional income, soil improvement or wind-breaks (A44). The farmers often need to follow a low-input, low-risk logic (A126), because of cash and credit constraints (A22) or insecurity of tenure (A3). For instance, agroforestry systems need to be compatible with existing knowledge, attitudes and practices, help to meet specific needs for cash, wood or fodder, and should be easy to test on a limited basis with minimized risks (A4). Longer term investment makes agroforestry innovations particularly dependent on the availability of labour and financial means in the households and risk and uncertainty considerations (A22, A35). Male and female decisions and practices reflect differing exposure and perceptions of risk (A132). Decisions for agroforestry may be specifically restrained by the limited adult labour and the connected cash and credit constraints in female headed households (A22). All this indicates that any implementation and scaling up of agroforestry innovations requires much more than information transfer but the purposeful choice of customized modes of communication (A20), institutional/community capacity building (A19, A126), joint development of solutions or their local adaptation between researchers, advisers and users in longer-term collaboration (A4, A61, A126), or the collaboration with local innovators (A61) or expert farmers and opinion leaders (A20, A173). Three more recent articles deal with the new agroforestry innovation movement in Europe, one reconstructing the historical silvopastoral systems in Hungary (A182), and two studying the re-introduction of agroforestry practices in Belgium (in Wallonia, A172, and in Flanders, A206). The historically practiced agroforestry systems are promoted today by research and by promotion programmes as diversified farming systems with ecological benefits. For a scaling up of this agro-ecological innovation, technical,

financial, legal, organizational and social challenges have to be met (A206), and social learning approaches in multi-stakeholder networks and in on-farm innovation processes are recommended (A172).

6.2. Bio-energy

The advanced utilization of forest-based biomass for heating and other forms of energy started in the 1980's, and is one of the major innovation examples of the forest sector. Except for one study on Norwegian firewood companies (A165), the articles in our review (23 articles) describe it as a showcase for the economic-political-social (and ecological) complexities that are connected with innovation processes (A12, A21, A86, A145, A175). It may not be expected on first sight, but the use of bio-energy as a renewable source of energy is a far-reaching innovation that does not only require technological development and a certain change of user behavior but also a change of (forest) sectoral practices (A86), affects other forest values and uses (A160), and implies inter-sectoral trade-offs (e.g., with pulp and paper, A12; with other energy sources, A86) and as such causes political conflicts (A175). For the USA, competing public and political narratives for and against the use of forest fuels are described (A160) and despite numerous support measures, the conflicting forest, environmental and energy policies result in very limited adoption of heating with wood (A175, A211). In Europe, the market diffusion of forest based small- or medium-scale heating systems such as with wood chips or wood pellets has also been rather slow (A21, A41, A57, A188, A190), despite achieved technical advancements (A21, A41), an often great abundance of the raw material (such as in Central European and Nordic countries, A41, A190), and high rural development potentials also in other regions such as Spain (A145) or Italy (A188). Successful examples such as the Austrian case implied various positive conditions on different levels and active, strategic support by relevant actors (A21, A60). Slower progress such as in Sweden was also caused by many factors, including poor coordination of actors (A57). Even for Finland with a long tradition of specific policy support for bio-energy since the first energy crisis in 1973 (A36), it meant a challenging institutional change with complex interactions between sectors and across local and national levels (A86). Although the utilization of forest-based bio-energy would have a high potential for the mitigation of climate change and many local development benefits, the studies illustrate impressively the range of economic, political and social constraints in the diffusion process. A European research project on locally based innovation approaches or platforms for bio-energy, claims that for inclusive innovations for sustainable development, socially embedded innovation processes are needed (Italian case study A188, Norwegian case study A190). Even quadruple or quintuple helix models of local ISs or platforms do not guarantee balanced inclusion of all societal groups.

6.3. Bio-economy

The recent (European) policy trend towards a bio-economy has been taken up by a number of articles (13 articles), including a critical analysis of the EU policy agenda for a "knowledge-based bio-economy" that deconstructs its neoliberal framing (A89). The articles study forest-based bio-economy business models (A213, A218), innovation management (A170), responses of the industry to new policies (A209), the relevant policy networks (A195, A196) or the preconditions for and processes of system transformation (A141, A153, A170, A212). A literature review on firm-level competitiveness in the forest sector in the context of a transition towards the bio-economy reveals a lack of knowledge on competitive dynamics across sectors (A218). In summary, authors describe rather closed, conservative networks, which makes a transformation towards a sustainable oriented bio-economy and related policies quite challenging (A141, A195, A196, A209, A212). Opportunities, challenges and business models may differ considerably between SMEs and larger companies (A209, A213) when the

transformation towards a bio-economy is characterized by a high degree of uncertainty (A212), when policy contexts become more complex and when the coupling of digitalization and bio-economy is transforming the forest-based bio-economy into a digital platform industry (A217). Companies may need to seek new alliances with other sectors (A137, A170, A217) but also internal re-organisation and new managerial competencies (A170). Quadruple or quintuple helix ISs could support a transformation to a sustainable forest-based bio-economy also on regional level (A153).

6.4. Timber construction

Studies on timber construction (10 articles) mostly ask about innovativeness and factors for innovation development and diffusion. A USA study from 2002 found that the most innovative early adopter group tended to be larger firms building high-end homes (A27). In 2010, a comparative study of timber frame construction in six European countries (A84) found that the new business opportunities arose from growing environmental awareness in society and a need for affordable housing. Companies answered with prefabrication and lean production processes for improving both the quality and effectiveness of the production. The study found government policies for research and development and knowledge transfer as an important prerequisite but not the only source of innovation, since it was strongly driven by the companies themselves. More recent studies on multi-storey timber construction in Sweden (A174), Finland (A223) and across Europe (A149) come to similar but more detailed results. Important positive factors for innovation include improved regulatory frameworks (adapted building codes such as on fire safety), research, development and innovation support, own knowledge development and experience by the companies, cooperation, competition, and an improved price performance due to gained experience and higher levels of standardization and prefabrication of building products. Main challenges still include unfavourable regulatory frameworks and a lack of knowledge about and acceptance of timber as a building material in the construction sector and on the side of customers, clients and public bodies. Other challenges relate to the risk-averse nature of the construction value chain, the relative high complexity of modern wood building systems and the knowledge discontinuities due to the project-based way of working in the construction sector. In this regard, the competitive tendering practices are mentioned as a hindering factor (A223) as it restricts more continuous relationships among partner firms and impedes the necessary early collaboration among the core actors in the IS (architects, construction companies and clients). A need is seen for more competition within the wood construction sector and better cooperation between wood product suppliers and the construction sector (A149). The importance of local level development platforms and municipalities to boost timber construction is highlighted by a local case study in Western Finland (A156), with a need for information provision, land-use planning, public procurement and investments and research, development and innovation support. A Swedish case study presents "empathic design" as a promising method for new product development (A177) in the field of building with wood. Although in a country with a different economic development level, an Indian case study which studied the innovative substitution of wood by locally available bamboo for rural housing (A100) provides an interesting comparison as it finds similar challenges for innovation diffusion, including the need for public awareness. In the local context, the study recommends incremental changes and participatory approaches for raising awareness among the population and training in order to improve local acceptance among clients and firms. The papers of our review cite numerous further peer-reviewed articles on innovative solutions and innovation processes in timber construction which were not included in our literature review when they did not mention our search terms in title, keywords or abstract.

6.5. Multifunctional and community-based forestry

Eighteen papers deal specifically with multifunctional oriented forestry and various forms of community involvement, two aspects that seem to be related in many cases. Various other topics such as social innovation, forest restoration, biodiversity conservation, carbon forestry or payments for ecosystem services are also often related to multifunctionality. Community-based forestry as an institutional, collective or organizational innovation (A9, A11, A18, A37, A80, A121, A158, A229) has shown different outcomes and illustrates the need to pay considerable attention to institutional and governance issues. While the introduction of joint forest management policies in forestry in India did empower indigenous communities and reduced environmental degradation (A11), community forestry in Cameroon improved some environmental management aspects but did not significantly improve sustainable management practices overall (A229). Complex interdependencies with political, economic and social factors impact on the adoption and success of tenure reforms in China, including continuous and flexible forestry strategies in a share-holding forestry tenure system (A9, A37) or adequate compensations for households in a programme for the conversion of cropland to forests (A158). In an industrial countries' context, institutional issues related to community-based ecosystem management have been studied for the US, showing the necessity for examining the alternative institutional models that might best be suited for a community group's needs (A18).

Multifunctional forest management has been studied from various perspectives and for various situations, including programmes for community-based or private tree planting for forest restoration in Africa (A151) or South America (A221), for fighting tropical deforestation in the Amazon (A150), or for carbon forestry in New Zealand (A62). Theoretical and methodological issues of defining the essence, role and place of multifunctional forest economy were explored in a Russian context (A121). For various case studies across Europe, a need for new governance arrangements and social innovations is seen for the sustainable management of treeline areas (A202) and for new approaches in community-related forest management (A224). Various analyses of multifunctional forestry and the provision of public goods related to ecological services and rural development around the globe illustrate the complex interdependencies of historical legacies and ecological, social and institutional dimensions, e.g. in the restoration of degraded post-frontier cloud forests in Ecuador (A221), in carbon forestry to restore degraded mountain forests on indigenous land in New Zealand (A62), in the re-established traditional Sweet Chestnut and Truffle Holm-Oak forests in France (A111), in the sustained management of communal forest landscapes in the Alps (A80), in US land owner collaboratives (A59), or for implementing adaptive forest ecosystem management in the Pacific North-West of the US (A16).

Payments for ecosystem services (PES) can play a role in the support of multifunctional forestry but do not work independent from a strong and adapted institutional framework (A62, A111). PES has been presented as an innovative tool which can be used in forestry for raising new funds for biodiversity conservation, or to utilize money previously spent for other sectors or activities. This allows for creating a business niche along with other environmental policy measures (A74, A75). Such market-based mechanisms cannot succeed without effective environmental regulations and equitable governance at local, national, and international levels (A75). The opportunity (and challenge) for governments and conservation groups is to partner effectively with businesses to deliver ecosystem services through the market. Moreover, strong technical capacity and robust monitoring and enforcement mechanisms are needed to ensure the credibility of markets for ecosystem services, and the organisations that implement them (A74).

6.6. Non-wood/non-timber forest products

Non-wood/non-timber forest products (NWFP/NTFP) have a

potential in the diversification of forest production in all parts of the world. Mushroom cultivation, for instance, has recently been booming in China, but is growing in both developed and developing countries (A130). In a study on innovations and business models around locally-controlled forestry in Asia, Africa and Latin America, half of the 50 case studies related to NTFP. Those locally-based businesses have a great potential for forest-based prosperity and their success is connected on one side to the local initiative and collective ownership and on the other side on good institutional support (A201). A specific study on NTFP enterprises in Bolivia and Mexico reveals that certain key entrepreneurs are a driving force of success of whole value chains (A47). Institutional and policy support for commercialization and upscaling is needed but needs to be tailored to each value chain (A47) and may include specific, tiered producer organisations (A201). The importance of local initiative, institutional support, and the interconnection of both levels is shown also for developed countries. A Norwegian survey of landowners shows that social networking and a learning orientation influences their innovativeness and economic performance related to non-timber forest products and services (A79). NTFP innovations are typically generated from bottom-up in small, regional and often cross-sectoral "ad-hoc" networks with little policy support since the role of NTFP is strongly underestimated by institutional actors (Europe, A162; Austria, A184, A203; South-East Europe, A183). Effective diffusion, however, would need a recognition of the socio-cultural and economic relevance of wild gathering by public actors and institutional innovations such as the formation of producers' associations and policy support measures that are able to adapt to local, bottom-up situations and initiatives, foster cross-sectoral interaction and information exchange and work especially with low-bureaucratic, and small-scale funding (A162, A184, A203).

In the case of the better recognized cork production in Portugal the importance of both formal and informal institutions and a broad range of actors in the innovation system are also confirmed, including multinational enterprises, international and national associations, national research entities and local public administration (A198).

6.7. Social innovation

In the last two years, social innovation became an increasingly researched topic in forestry (seven articles). Existing policy frameworks often hinder the development of social innovations due to the inherent "top-down" logic of public subsidies or other supporting initiatives (A205). Weak state infrastructure, weak governance structure and a weakly imposed rule of law are negative for social innovations (A205). This is confirmed in an analysis of implications of policy framework conditions for the development of forestry-based social innovation initiatives in Slovenia, which showed that the framework conditions do not comprehensively support non-market, forestry-based social innovation, when compared to social enterprises. This means that social innovations have to navigate through policy framework conditions, using their own capacities to apply for financial resources available through existing programmes that target cooperation and networking (A200). Social innovation initiatives emerge and develop primarily by the informal institutions of individual leadership and collective action of self-organised forest communities, building on interpersonal trust as the main driver of bottom-up processes (A214). Human values may be the primary catalysts (A224). Volunteer work together with small amounts of temporarily well targeted funding are important factors for the success of social innovations in forestry (A210). Findings suggest that social innovation action is more difficult in rural regions when they are less well developed and efforts of investment and resource mobilization needs are more demanding. Whilst in some cases, a lack of political support for social needs may actually function as a trigger for social innovations, it may also lead to weak conditions where social innovation cannot easily emerge from the local level in a bottom-up manner (A205). A heterogeneity of attitudes and/or improved

participation in decision-making to promote social innovation seems helpful in preventing and/or resolving potential conflicts, and in designing policy and practice related measures, and better targeting of projects, plans and decisions (A202, A226). The inclusion of intangible innovations (institutional, organizational, behavioral, social) reveals important insights into innovation processes that otherwise would be neglected (A226).

7. Research trends and gaps

Innovation research in the forest sector has established itself as an important and distinguished research field with publication numbers still growing. The current stage of development – when compared to the innovation adoption (Rogers, 1995) or product life cycle curves (Levitt 1965) – is difficult to determine since the future development can hardly be estimated. While some keywords or concepts seem less central today (e.g., adoption, diffusion, innovation system), new approaches are emerging and extending the research field (e.g., user-centred, open, inclusive or social innovation).

7.1. Research approaches

Standard concepts and definitions of innovation, innovativeness and innovation processes (Schumpeter, 1934; OECD, 2005; Rogers, 1995) are well received in forest sector innovation studies. Although studies usually recognize different types of innovations, there is overall a quite strong focus on technological innovations. This may reflect the companies' technology orientation but re-enforces an overemphasis of rationalization and the core products of the sector. It also risks missing opportunities from innovations in goods and services or business models, particularly in less traditional business fields and with a transformation towards a bio-economy (A174, A213).

The most popular models are those of innovation diffusion (Rogers, 1995) and innovation systems (Edquist, 1997), appropriately referencing to various technological or sectoral innovation systems or to a combination of systemic approaches. Those studies have provided a rich knowledge base on important factors for innovation processes in forestry and the forest-based industries and for the innovativeness of firms in the forest sector across the globe. Diffusion studies, however, predominantly put the industry firms in the centre of their attention but the role of users are hardly studied. The few existing studies do show the importance of the knowledge and perceptions of end-users and the public for industry strategies and public policies (e.g., A208).

The IS approach has proven useful in a holistic analysis of innovation processes on company and system level, deriving conclusions and recommendations for industry, research and governments. It is thus also applicable for systemic policy evaluation in innovation support with its ability to deal with complex structures and non-linear, iterative processes which are typical in policy making. The approach does not work with pre-defined delineations of policy fields and procedural models but empirically studies the relevant networks of actors and their interactions (A46). Classical IS studies, however, do not pay much attention to local natural resources since economic theory assumes largely substitutable production factors. Regional development studies often emphasize the importance of local resources for a sustainable, endogenous development. This seems even more obvious in the case of natural resource based sectors such as the forest industries. In consequence, for a comprehensive analysis of forest ISs with including sustainability aspects, a quintuple helix model or similar extended approaches that include ecological, environmental or natural resource elements seem necessary (A88, A153, A180).

More attention could be paid to the concept of entrepreneurship which is closely related to innovation and innovativeness in the literature. Entrepreneurship is implicitly considered in many studies but is more explicitly only applied in relation to smaller companies in the fields of NTFP and services (e.g. A114, A162).

The important role of human capacities is shown in several articles but while considerable attention is given to the role of the management, the role of workers' creativity (A193) or company climate (A97, A94) has been hardly studied.

Only few articles in our review specifically tackle questions of gender. In most cases, they start from gender compositions and ask for their relations to innovation. Some of them are actor-based, quantitative case studies, dealing with the adoption of agroforestry in developing countries (A22, A132, A173), showing that women face different (harsher) conditions, especially in sole female headed households. Similarly, gender roles are also important in the adoption of improved cookstoves (A63, A33, A139) and in the success of locally controlled, common good oriented business models in collective ownership in developing economy contexts (A201). In developed countries, gender roles were considered in relation to educational needs of US sawmill operators (A7) and in local people's participation in the management of Alpine communal forests (A80). Some studies include gender aspects together with other demographic characteristics, but most studies totally ignore this variable, although gender studies since long show its relevance. A review study asking if gender diversity in forest sector companies matters says yes, firms with more women in top management teams perform better in financial terms (Hansen et al., 2016). Future studies on women's roles in innovation in forestry and forest industry should consider that already an inclusion of gender as a simple dichotomous variable would lead to relevant insights. Furthermore, when looking at gender as a societal distinction that has strong implications on behavior, roles and material access to resources, even deeper insights can be gained. Future innovation research on the topic of gender has vast potential for continuing on making gender compositions and their impacts visible. It shall address inequalities and advance innovativeness and creativeness by using the full societal potentials for the forest based service sectors and firms and their incremental and process innovations.

The roles of institutional frameworks, policies and governments are quite well covered and many studies derive policy recommendations. Systematic policy evaluation is, however, very rare (e.g., A150, A179). It seems that not only do policy-makers show little interest in the evaluation of their programmes but also innovation researchers seem more interested in understanding the processes than in assessing effects and efficiency of public interventions. More rigid quantitative assessments and comparative analyses across sectors and countries would be needed to substantiate the insights derived from case studies.

Finally, future or foresight studies (A197) or action research for the support of innovation (A152, A177) are also very rare. They could give valuable information for companies and policy-makers on national or regional levels.

In our sample, newer innovation research approaches have been taken up, for instance, the study of quadruple/quintuple helices (A153), the concepts of open innovation (A152, A185, A207), inclusive innovation (A188, A190) and service-dominant logic (A129, A140), or the role of human values (A224). In connection to the bio-economy transformation, the concepts of disruptive business models (A217), co-evolutionary complexes (A222) and creative destruction (A223) have been applied. So, overall, such advanced approaches are rare and innovation research in the sector is rather conservative. Although the application of compatible models and frameworks are useful for a comparison of findings from different studies, a more progressive use of newer concepts from innovation research would be promising for generating additional insights on innovation in the sector. Since our sample is restricted to peer-reviewed articles we may have missed research studies exploring new approaches that are not yet ready for publication or that were carried out in applied contexts.

7.2. Methods

Innovation studies in the forest sector predominantly apply

qualitative case study approaches which are perfectly suited for gaining good understanding of innovation processes in firms or innovation systems. Still, the dominance of single case studies ignores the analytical insights that can only be gained in comparative studies across countries, sectors, innovation systems or innovation fields. Country comparisons and multi-sector studies are extremely rare but would have the potential to substantiate our knowledge and understanding of innovation processes, innovativeness, innovation patterns and success factors that up-to-date is mostly limited to certain countries and industries.

Also an increased use of quantitative models could be of high relevance for testing hypotheses and refining knowledge across value chains or in comparison with other sectors. The highly interesting quantitative studies to date illustrate what can be done already on the basis of existing statistical data or surveys (e.g., European innovation scoreboards) but that material is strongly underused. A specific research field for quantitative models would be the effects of innovation policies or support measures, a field hardly investigated to date.

Another promising direction for new methods development could be various participatory forms of investigation, shown on rare examples of participatory innovation development (A61, A100, A211) or foresight (A197, A149, A90). Possible participants range from managers and workers to innovation system actors and users/customers. Such methods would also be appropriate since current research funding programmes increasingly require strong stakeholder involvement and user orientation (Feliciano et al., 2019). We must assume that such projects have already produced rich material. Reasons for the limited publications in peer-reviewed journals might lie in a poorly developed methodical advancement and knowledge on the side of the researchers, or that journals are not sufficiently valuing those methods as being scientific. The use of participatory methods and the publication of the gained experiences would be important for others to appropriately apply such methods.

The rare application of deeper interpretative approaches of social research resulted in original new insights in innovation processes on various level (companies, policies, users). For a deep understanding of sectoral behavior or societal change, a more frequent use of discourse, narrative or frame analysis would be promising.

7.3. Aims and topics

We observe a striking cluster of articles on industrialized countries with more than half of all articles having their research object there and almost one third of all articles being on USA, Canada and Finland alone (74 articles, see supplementary materials). Although it might be good to have institutes or researchers specializing in a research topic and to have in-depth knowledge on certain countries or regions, a broader spread of experts and expertise should be welcome for a “sustainable” future development of the field. Having a rather limited number of research groups worldwide puts the stable development of the field at risk and is also limiting their possibilities to gain deep knowledge in different innovation fields and geographical regions and with methods and research approaches.

Also the topical orientation of the research appears to be quite narrowly focused on the traditional wood value chains and related technical improvements (see similar results in Lovrić et al., 2020). While we do have a significant and growing share of studies on various goods and services from the forest, new industrial applications such as in the chemical or pharmaceutical industry were hardly included in our sample of articles. Not only in a bio-economy context, the search for non-technological innovations in doing business seems promising and necessary for a globally competitive development of the sector, considering the fierce competition with other materials and for developing and utilizing new opportunities for land owners and industries alike. The recent studies on social innovation may be illustrative examples to make aware of the broad range of values the forest has in our society

and how non-timber uses of the forest do relate to business and innovation.

It seems that the emerging interest in a bio-economy is causing new impulses to innovation studies. While the consolidation period (2011–2015, see section 4.4) meant an intensified focus on the main value chains and classical innovation-related research questions, the recent articles related to the bio-economy are more diverse in their research questions, methods and objects. Questions on system transformation and dealing with newly defined or changing sector boundaries bring in new perspectives and earlier research topics such as bioenergy or wood construction are studied in new contexts. There is also new interest from research communities outside the forest sector with the potential for innovative research approaches (e.g., on the role of changing contexts for competing sectors, Wirth and Markard, 2011). Many studies in our review call for more cross-sectoral policy approaches but the same is true for innovation studies. Cross-sectoral comparisons and a better understanding of inter-sectoral relations (and barriers) is rarely studied but would be highly important – not only in the current bio-economy context.

Furthermore, the recently diversified publications are not limited to industrial applications of bio-based materials but other uses of the forest are also attracting new attention – for instance, agroforestry land uses in a European context, biodiversity conservation or carbon sequestration. This reflects that bio-economy is by no means the only relevant topic in the field or the fact that the bio-economy may be understood in different ways (Pülzl et al., 2014). Multifunctional, community-oriented or social forestry are concepts that have been gaining ground and seem to reflect increased societal interest in the multiple benefits and values of forests. A stronger attention towards users or the general public is needed in both commercial and non-commercial forest uses (Weiss et al., 2020) and can be done and is done via the selection of topics and research questions (e.g., on multiple uses and social or community values of forestry, such as in A200, A202, A210, A229), as well as approaches (e.g., service-dominant logic, Hujala et al., 2019).

In our review, we have found a fascinating, purposeful and insightful variety of approaches that study specific aspects within the broad field of innovation. Research approaches and topics always depend on the research interest and the available resources for the research. It may be tricky to suggest other topics, other approaches, other aims or methods. However, the clustering of single case studies on the innovativeness of certain sectors, in certain countries, and on certain innovation systems and policies seems discouraging. This raises the question if we do not repeat too much of the same, adding new cases with similar results to the existing body of knowledge. Without any intention of disqualifying the established models and approaches, we call on researchers to try out more progressively new innovation approaches, a broader set of methods and when they have the freedom to define research interests themselves, to move on to new research aims. At the same time, we call on research funders to request more comparative studies across sectors and countries and to give the researchers sufficient resources and freedom to apply innovative research approaches.

Author contributions

G.W. and I.Z. undertook the work on the overall conceptual design. I.Z. carried out the search process and documentation of the research steps, the quantitative analysis and presentation of the results. A.L. supported the analysis of research approaches and methods. I.Z. and G.W. led the selection and quantitative and qualitative coding of the articles. G.W. led the implementation of the research and the writing up of the results and conclusions. All authors contributed to the writing and revision of the paper.

Declaration of Competing Interest

The authors of this paper declare no conflict of interest.

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Appendix A List of the reviewed papers

Year decades	Article number	Authors	Title	Year	Publication Source
1980–2000	1	Moeller, GH; Shafer, EL	Important Factors in the Forestry Innovation Process	1981	Journal of Forestry
	2	Agarwal B	Diffusion of Rural Innovations: Some Analytical Issues and the Case of Wood-Burning Stoves	1983	World Development
	3	Francis P	Land Tenure Systems and Agricultural Innovation. The Case of Alley Farming in Nigeria	1987	Land Use Policy
	4	Evans, PT	Designing Agroforestry Innovations to Increase Their Adoptability: A Case Study From Paraguay	1988	Journal of Rural Studies
	5	Vail D	How to Tell the Forest from The Trees. A Comparison of Recent Technological Innovations in Logging Systems in Sweden and Maine	1989	Technology in Society
	6	West, CD; Sinclair, SA	A Measure of Innovativeness for a Sample of Firms in the Wood Household Furniture Industry	1992	Forest Science
	7	Bratkovich, SM; Miller, LE	Perceived Educational-Needs of Innovative Ohio Sawmill Operators	1993	Forest Products Journal
	8	Tödting F; Sedlacek, S	Regional Economic Transformation and the Innovation System Of Styria	1997	European Planning Studies
	9	Song, YJ; Burch, W et al.	New Organizational Strategy for Managing the Forests of Southeast China - The Share-Holding Integrated Forestry Tenure (SHIFT) System	1997	Forest Ecology And Management
	10	Globerman, S; Nakamura, M et al.	Innovation, Strategy and Canada's Forest Products Industry	1998	Canadian Public Policy-Analyse De Politiques
	11	Tewari DD; Isemonger AG	Joint Forest Management in South Gujarat, India: A Case of Successful Community Development	1998	Community Development Journal
	12	Collins L.	Renewable Energy From Wood And Paper: Technological And Cultural Implications	1998	Technology in Society
	13	Bumgardner MS; Romig RL	An Overview of Firm Innovativeness and the Role Of Public Sector Assistance in a Sample of Dimension and Millwork Firms	1998	Forest Products Journal
	14	Macdonald, P; Clow, M	'Just One Damn Machine After Another?' Technological Innovation and the Industrialization of Tree Harvesting Systems	1999	Technology in Society
	15	Shook, SR	Forecasting Adoption and Substitution of Successive Generations of Structural Wood Panel Products in the United States	1999	Forest Science
	16	Gray, AN	Adaptive Ecosystem Management in the Pacific Northwest: A Case Study From Coastal Oregon	2000	Conservation Ecology
2001–2005	17	Jensen, K; Pompelli, G	Marketing and Business Assistance Needs Perceived by Tennessee Forest Products Firms	2000	Forest Products Journal
	18	Cortner HJ, Burns S et al.	Governance and Institutions: Opportunities and Challenges	2001	Journal of Sustainable Forestry
	19	Franzel, S; Cooper, P et al.	Scaling Up the Benefits of Agroforestry Research: Lessons Learned and Research Challenges	2001	Development in Practice
	20	Glendinning, A; Mahapatra, A et al.	Modes of Communication and Effectiveness of Agroforestry Extension in Eastern India	2001	Human Ecology
	21	Rohracher, H	A Sociotechnical Mapping of Domestic Biomass Heating Systems in Austria	2002	Bulletin of Science, Technology and Society
	22	Gladwin, CH; Peterson, JS et al.	Agroforestry Innovations in Africa: Can They Improve Soil Fertility on Women Farmers' Fields?	2002	African Studies Quarterly
	23	Ryan, S	Cyborgs in the Woods	2002	Leisure Studies
	24	Spilsbury, MJ; Kaimowitz, D	Forestry Research, Innovation and Impact in Developing Countries - From Economic Efficiency to the Broader Public Good	2002	Forestry Chronicle
	25	Cote, MA	The Innovation System in Quebec's Forest Sector	2002	Forestry Chronicle
	26	Klooster, DJ	Towards Adaptive Community Forest Management: Integrating Local Forest Knowledge with Scientific Forestry	2002	Economic Geography
	27	Fell, D; Hansen, EN et al.	Segmenting Single-Family Home Builders on a Measure of Innovativeness	2002	Forest Products Journal
	28	Segura-Bonilla, O	Competitiveness, Systems of Innovation and the Learning Economy: The Forest Sector in Costa Rica	2003	Forest Policy and Economics
	29	Stanturf, JA; Kellison, RC et al.	Innovation and Forest Industry: Domesticating the Pine Forests of the Southern United States, 1920–1999	2003	Forest Policy and Economics
	30	Burch W.	Leadership for Sustainable Development: Lessons from Tao to Mao	2003	Journal of Sustainable Forestry
	31	Snider, AG; Pattanayak, SK et al.	Policy Innovations for Private Forest Management and Conservation in Costa Rica	2003	Journal of Forestry
	32	Beyers, JM	Selective Integration: Knowledge and Interests in the Model Forest Program	2003	Journal of Canadian Studies
	33	Muneer, S; Mohamed, E	Adoption of Biomass Improved Cookstoves in a Patriarchal Society: An Example From Sudan	2003	Science of the Total Environment
	34	Vlosky, R; Smith, T	eBusiness in the US Hardwood Lumber Industry	2003	Forest Products Journal
	35	Mercer, DE	Adoption of Agroforestry Innovations in the Tropics: A Review	2004	Agroforestry Systems
	36	Helynen S.	Bioenergy Policy in Finland	2004	Energy for Sustainable Development
	37	Song, YJ; Wang, GQ et al.	From Innovation to Adaptation: Lessons from 20 Years of the SHIFT Forest Management System in Sanming, China	2004	Forest Ecology and Management

2006–2010	38	Winn, Ml; Zietsma, C	The War of the Woods: A Forestry Giant Seeks Peace	2004	Greener Management International
	39	Vällimäki, H; Niskanen, A et al.	Indicators of Innovativeness and Enterprise Competitiveness in the Wood Products Industry in Finland	2004	Scandinavian Journal of Forest Research
	40	Hovgaard, A; Hansen, E	Innovativeness in the Forest Products Industry	2004	Forest Products Journal
	41	Gustavsson, L; Mahapatra K et al.	Energy Systems in Transition: Perspectives for the Diffusion of Small-Scale Wood Pellet Heating Technology	2005	International Journal of Technology Management
	42	Wagner, E; Hansen, E	Innovation in Large Versus Small Companies: Insights from the U.S. Wood Products Industry	2005	Management Decision
	43	Anderson, F	A Comparison of Innovation in Two Canadian Forest Service Support Industries	2006	Forest Policy and Economics
	44	Magcale-Macandog, DB; Visco, RG et al.	Agroforestry Adoption, Innovations and Smallholder Farmers' Motivations in Tropical Uplands of Southern Philippines	2006	Journal of Sustainable Agriculture
	45	Rametsteiner, E; Weiss G	Assessing Policies from a Systems Perspective - Experiences with Applied Innovation Systems Analysis and Implications for Policy Evaluation	2006	Forest Policy and Economics
	46	Van Horne, C; Frayret, JM et al.	Creating Value with Innovation: From Centre of Expertise to the Forest Products Industry	2006	Forest Policy and Economics
	47	Te Velde, DW; Rushton, J et al.	Entrepreneurship in Value Chains of Non-Timber Forest Products	2006	Forest Policy and Economics
	48	Bull, L; Ferguson, I	Factors Influencing the Success of Wood Product Innovations in Australia and New Zealand	2006	Forest Policy and Economics
	49	Rametsteiner E., Weiss G.	Innovation And Innovation Policy In Forestry: Linking Innovation Process With Systems Models	2006	Forest Policy and Economics
	50	Hansen E.	Structural Panel Industry Evolution: Implications For Innovation And New Product Development	2006	Forest Policy and Economics
	51	Šálka, J; Longauer, R et al.	The Effects of Property Transformation on Forestry Entrepreneurship and Innovation in the Context of Slovakia	2006	Forest Policy and Economics
	52	Kubeczko, K; Rametsteiner, E et al.	The Role of Sectoral and Regional Innovation Systems in Supporting Innovations in Forestry	2006	Forest Policy and Economics
	53	Xiaozhi, C; Hansen, EN	Innovation in China's Furniture Industry	2006	Forest Products Journal
	54	Crespell, P; Knowles, C et al.	Innovativeness in the North American Softwood Sawmilling Industry	2006	Forest Science
	55	Hansen, E; Dibrell, C et al.	Market Orientation, Strategy, and Performance in the Primary Forest Industry	2006	Forest Science
	56	Hansen, E	The State of Innovation and New Product Development the North American Lumber and Panel Industry	2006	Wood and Fiber Science
	57	Mahapatra, K; Gustavsson, L et al.	Bioenergy Innovations: The Case of Wood Pellet Systems in Sweden	2007	Technology Analysis & Strategic Management
	58	Shiro, C; Furtad, JI et al.	Coping with Pressures of Modernization by Traditional Farmers: A Strategy for Sustainable Rural Development in Yunnan, China	2007	Journal of Mountain Science
	59	Wolf, SA; Hufnagl-Eichiner, S	External Resources and Development of Forest Landowner Collaboratives	2007	Society and Natural Resources
	60	Madlener, R	Innovation Diffusion, Public Policy, and Local Initiative: The Case of Wood-Fuelled District Heating Systems in Austria	2007	Energy Policy
	61	Reed, MS	Participatory Technology Development for Agroforestry Extension: An Innovation-Decision Approach	2007	African Journal of Agricultural Research
	62	Funk, J; Kerr, S	Restoring Forest Through Carbon Farming on Māori Land in New Zealand/Aotearoa	2007	Mountain Research and Development
	63	Troncoso, K; Castillo, A et al.	Social Perceptions about a Technological Innovation for Fuelwood Cooking: Case Study in Rural Mexico	2007	Energy Policy
	64	Reiljan, E.	The Role of Cooperation and Innovation in Reducing the Likelihood of Export Withdrawals: The Case of the Estonian Wood Sector	2007	Journal of East-West Business
	65	Hansen, E; Jusfln, H et al.	Innovativeness in the Global Forest Products Industry: Exploring New Insights	2007	Canadian Journal of Forest Research
	66	Stendahl, M; Roos, A	Antecedents and Barriers to Product Innovation - A Comparison between Innovating and Non-Innovating Strategic Business Units in The Wood Industry	2008	Silva Fennica
	67	Van Damme, L; Duinker, P et al.	Embedding Science And Innovation In Forest Management: Recent Experiences At Millar Western In West-Central Alberta	2008	Forestry Chronicle
	68	Likar, B	The Influence of Innovation, Technological and Research Processes on the Performance of Slovenia's Woodworking Industry	2008	Wood Research
	69	Knowles, C; Hansen, E et al.	Assessing Innovativeness In The North American Softwood Sawmilling Industry Using Three Methods	2008	Canadian Journal of Forest Research
	70	Wan, Z; Bullard, S et al.	Firm Size and Competitive Advantage in the US Upholstered, Wood Household Furniture Industry	2008	Forest Products Journal
	71	Crespell, P; Hansen, E	Managing for Innovation: Insights Into a Successful Company	2008	Forest Products Journal
	72	Crespell, P; Hansen, E	Work Climate, Innovativeness, and Firm Performance in the US Forest Sector: In Search of a Conceptual Framework	2008	Canadian Journal of Forest Research
	73	Thomas, E; Vaidya, K	National System of Innovation and Technological Learning: An Integrated Framework for Understanding Technological Capability Development in the Russian Forestry Sector	2009	International Journal of Technological Learning, Innovation and Development
	74	Bishop, J; Kapila, S et al.	New Business Models for Biodiversity Conservation	2009	Journal of Sustainable Forestry
	75	Wunder, S; Wertz-Kanounnikoff S	Payments for Ecosystem Services: A New Way of Conserving Biodiversity in Forests	2009	Journal of Sustainable Forestry
	76	Szostak, A; Ratajczak, E	Results of the Innovation Activity of the Wood Sector	2009	Drewno-Wood
	77	Alfranca, Ó; Diaz-Balteiro L et al.	Technical Innovation in Spain's Wood-Based Industry: The Role of Environmental and Quality Strategies	2009	Forest Policy and Economics
	78	Innes, J	The Promotion of 'Innovation' in Forestry: A Role for Government or Others?	2009	Journal of Integrative Environmental Sciences
	79	Nybak, E; Crespell, P et al.	Antecedents to Forest Owner Innovativeness: An Investigation of the Non-Timber Forest Products and Services Sector	2009	Forest Ecology and Management
	80	Finger-Stich, A	Innovation in The Plural of the Alpine Cre-Actors	2009	Journal of Alpine Research
	81	Stendahl, M	Management of Product Development Projects in The Wood Industry	2009	

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	82	Jelacic, D; Pirc, A et al.	Seeking and Implementation of Innovation Opportunities	2009	Wood Research
	83	Macdonald, P, Clow, M	“Things Was Different in the South”: The Industrialization of Pulpwood Harvesting Systems in the Southeastern United States 1945–1995	2010	Technology in Society
	84	Tykkä, S; Mccluskey, D et al.	Development of Timber Framed Firms in the Construction Sector - Is EU Policy One Source of their Innovation?	2010	Forest Policy and Economics
	85	Quesada-Pineda, H	Innovation Activities in the Primary Wood Products Sector: A Case Study	2010	Wood and Fiber Science
	86	Åkerman, M; Kilpiö, A et al.	Institutional Change from the Margins of Natural Resource Use: The Emergence of Small-Scale Bioenergy Production within Industrial Forestry in Finland	2010	Forest Policy and Economics
	87	Aben, K; Hartley, ID et al.	Reducing Greenhouse Gas Emissions in the British Columbia Forest Industry, 1990–2005	2010	Technology in Society
	88	Belis-Bergougnan, M; Levy, R	Sharing a Common Resource in a Sustainable Development Context: The Case of a Wood Innovation System	2010	Technological Forecasting and Social Change
	89	Birch, K; Levidow, L et al.	Sustainable Capital? The Neoliberalization of Nature and Knowledge in the European “Knowledge-Based Bio-Economy”	2010	Sustainability
	90	Hansen, EN	The Role of Innovation in the Forest Products Industry	2010	Journal of Forestry
	91	Figueiredo, PN	Discontinuous Innovation Capability Accumulation in Latecomer Natural Resource-Processing Firms	2010	Technological Forecasting and Social Change
	92	Quesada-Pineda, H; Kenealy, D et al.	Transitioning Ideation to Commercialization: A Comprehensive Product Development Strategy with an Application in the Wood Products Industry	2010	Forest Products Journal
2011–2015	93	Buttoud, G; Kouplevatskaya-Buttoud, I et al.	Barriers to Institutional Learning and Innovations in the Forest Sector in Europe: Markets, Policies and Stakeholders	2011	Forest Policy and Economics
	94	Nybakk, E; Crespell, P et al.	Climate for Innovation and Innovation Strategy as Drivers for Success in the Wood Industry: Moderation Effects of Firm Size, Industry Sector, and Country of Operation	2011	Silva Fennica
	95	Bull, L; Thompson, D	Developing Forest Sinks in Australia and the United States - A Forest Owner's Prerogative	2011	Forest Policy and Economics
	96	Wolf, SA	Network Governance as Adaptive Institutional Response: The Case of Multifunctional Forested Landscapes	2011	Journal of Natural Resources Policy Research
	97	Bjorkdahl, J; Borjesson, S	Organizational Climate and Capabilities for Innovation: A Study of Nine Forest-Based Nordic Manufacturing Firms	2011	Scandinavian Journal of Forest Research
	98	Christensen, J; Lindgaard, D et al.	Patterns and Collaborators of Innovation in the Primary Sector: A Study of the Danish Agriculture, Forestry and Fishery Industry	2011	Industry and Innovation
	99	Seeland, K; Godat, J et al.	Regional Forest Organisations and Their Innovation Impact on Forestry and Regional Development in Central Switzerland	2011	Forest Policy and Economics
	100	Chugh, S; Valentino, S et al.	Strategising Innovations in Rural Housing Using Bamboo	2011	Journal of Rural Development
	101	Boon-Kwee, NG; Thiruchelvam, K	Technological Innovations in Malaysia's Wooden Furniture Industry: Knowledge and Linkages	2011	African Journal of Agricultural Research
	102	Hansen, EN; Nybakk, E et al.	A Multinational Investigation of Softwood Sawmilling Innovativeness	2011	Scandinavian Journal of Forest Research
	103	Stone, IJ; Benjamin, J et al.	Applying Innovation Theory to Maine's Logging Industry	2011	Journal of Forestry
	104	Barcic, AP; Vlosky, R et al.	Deconstructing Innovation: An Exploratory Study of the US Furniture Industry	2011	Forest Products Journal
	105	Ingold, K; Zimmermann, W	How and Why Forest Managers Adapt to Socio-Economic Changes: A Case Study Analysis in Swiss Forest Enterprises	2011	Forest Policy and Economics
	106	Stone, IJ; Benjamin, JG et al.	Innovation Impacts on Biomass Supply in Maine's Logging Industry	2011	Forest Products Journal
	107	Trigkas, M; Papadopoulos, I et al.	Economic Efficiency of Wood and Furniture Innovation System	2012	European Journal of Innovation Management
	108	Stern, T; Heil, G et al.	Identifying Innovation Barriers Using a Delphi Method Approach: The Case of Technical Lignin in the Wood-Based Panel Industry	2012	International Wood Products Journal
	109	Van Horne, C; Poulin, D et al.	Innovation and Value Creation in University-Industry Research Centres in the Canadian Forest Products Industry	2012	Canadian Journal of Forest Research
	110	Madrigal-Sanchez, Johanna; Quesada-Pineda, Henry	Innovation: Case Study Among Wood, Energy and Medical Firms	2012	Business Process Management Journal
	111	Aumeeruddy-Thomas, Y; Therville, C et al.	Resilience of Sweet Chestnut and Truffle Holm-Oak Rural Forests in Languedoc-Roussillon, France: Roles of Social-Ecological Legacies, Domestication, and Innovations	2012	Ecology and Society
	112	Ng, BK; Chandran, VGR et al.	Technological Knowledge, Learning and Linkages in the Wooden Furniture Industry in Malaysia: A Spatial Innovation Perspective	2012	Asian Journal of Technology Innovation
	113	Ng B.-K., Thiruchelvam K.	The Dynamics of Innovation in Malaysia's Wooden Furniture Industry: Innovation Actors and Linkages	2012	Forest Policy and Economics
	114	Notaro, S; Paletto, A et al.	Tourism Innovation in the Forestry Sector: Comparative Analysis between Auckland Region (New Zealand) and Trentino (Italy)	2012	Iforest-Biogeosciences and Forestry
	115	Jarvinen, J; Linnakangas, J	Firm Capabilities in the Finnish Forest Cluster: Comparisons Based on Self-Organizing Map	2012	Silva Fennica
	116	Nybakk, E	Learning Orientation, Innovativeness And Financial Performance In Traditional Manufacturing Firms: A Higher-Order Structural Equation Model	2012	International Journal of Innovation Management
	117	Sikora, AT; Nybakk, E	Rural Development and Forest Owner Innovativeness in a Country in Transition: Qualitative and Quantitative Insights from Tourism in Poland	2012	Forest Policy and Economics
	118	Pässilä, A; Uotila, T et al.	Facilitating Future-Oriented Collaborative Knowledge Creation by Using Artistic Organizational Innovation Methods: Experiences from a Finnish Wood-Processing Company	2013	Futures
	119	Shpak, N; Damary, R		2013	Economy of Region

- Government Support for the Developing Entrepreneurship in Switzerland and Russia with Emphasis on Forestry and Forest-Based Industries
- 120 Ratnasingam, J; Wai, LT et al. Innovations in the Forest Products Industry: The Malaysian Experience 2013 Notulae Botanicae Horti Agrobotanici Cluj-Napoca
- 121 Bolshakov, NM; Zhideleva, VV et al. Multifunctionality of Forestry as Basis for Creating Gross Innovational Forestry Product 2013 Economy of Region
- 122 Orozco, N; Hansen, E et al. Oregon's Forest Sector Innovation System: An Investigation Towards Advanced Performance 2013 Forestry Chronicle
- 123 Edenhoffer, K; Hayter, R Reprint of "Organizational Restructuring in British Columbia's Forest Industries 1980–2010: The Survival of a Dinosaur" 2013 Applied Geography
- 124 Nizialek, I Role of Workers in the Process of Innovation Implementation in Polish Wood Industry Companies 2013 Management and Production Engineering Review
- 125 Šipikal, M Tailoring Innovation Policies to Sectors and Regions - The Case of Slovakia 2013 Danube
- 126 Schroth, G; Da Mota, M et al. Technical and Institutional Innovation in Agroforestry for Protected Areas Management in the Brazilian Amazon: Opportunities and Limitations 2013 Environmental Management
- 127 Han, X; Hansen, E et al. Connecting Market Orientation, Learning Orientation And Corporate Social Responsibility Implementation: Is Innovativeness A Mediator? 2013 Scandinavian Journal of Forest Research
- 128 Korhonen, K; Hujala, T et al. Diffusion of Voluntary Protection Among Family Forest Owners: Decision Process and Success Factors 2013 Forest Policy and Economics
- 129 Mattila, O; Toppinen, A et al. Non-Industrial Private Forestry Service Markets in a Flux: Results from a Qualitative Analysis on Finland 2013 Small-Scale Forestry
- 130 Zhang, Y; Geng, W et al. Edible Mushroom Cultivation for Food Security and Rural Development in China: Bio-Innovation, Technological Dissemination and Marketing 2014 Sustainability
- 131 Alfranca, O; Voces, R et al. Effects of Innovation on the European Wood Industry Market Structure 2014 Forest Policy and Economics
- 132 Villamor, GB; Van Noordwijk, M et al. Gender Differences in Land-Use Decisions: Shaping Multifunctional Landscapes? 2014 Current Opinion in Environmental Sustainability
- 133 Hansen, E; Nybakk, E et al. Innovation Insights from North American Forest Sector Research: A Literature Review 2014 Forests
- 134 Dayneko, DV; Gustafson, EJ Institutional Innovations in the Forest Industry in Russia: A Case Study of Irkutsk Province 2014 Miscellanea Geographica
- 135 Sarvasova, Z; Salka, J et al. The Comparison Of Innovations In Slovakian Forestry Between 2002 And 2010 - A Shift To Multifunctionality? 2014 Seefor-South-East European Forestry
- 136 Abolina, E; Luzadis, V et al. Analysis of the Adoption of Willow Growing Practice in Latvia 2014 Baltic Forestry
- 137 Novotny, M; Laestadius, S Beyond Papermaking: Technology and Market Shifts for Wood-Based Biomass Industries - Management Implications for Large-Scale Industries 2014 Technology Analysis & Strategic Management
- 138 Kajanus, M; Iire, A et al. Business Model Design: New Tools for Business Systems Innovation 2014 Scandinavian Journal of Forest Research
- 139 Ramirez, S; Dwivedi, P et al. Diffusion of Non-Traditional Cookstoves across Western Honduras: A Social Network Analysis 2014 Energy Policy
- 140 Mattila, O; Roos, A Service Logics of Providers in the Forestry Services Sector: Evidence from Finland and Sweden 2014 Forest Policy and Economics
- 141 Nayha, A; Pesonen, H Strategic Change in the Forest Industry Towards the Biorefining Business 2014 Technological Forecasting and Social Change
- 142 Jarský, V Analysis of the Sectoral Innovation System for Forestry of the Czech Republic. Does it Even Exist? 2015 Forest Policy and Economics
- 143 Nybakk, E; Hansen, E et al. Chemical Suppliers' Perspectives and Impact on Innovation in the Wood Treating Industry 2015 Wood and Fiber Science
- 144 Morkovina, SS; Drapalyuk, MV et al. Innovational Mechanisms of Biotechnologies Support in Forest Sector for Providing Economic Security of the State 2015 Asian Social Science
- 145 Parra-López, C; Sayadi-Gmada, S et al. Production and Use of Biomass from Short-Rotation Plantations in Andalusia, Southern Spain: Limitations and Opportunities 2015 New Medit
- 146 Klenk N.L., Wyatt S. The Design And Management Of Multi-Stakeholder Research Networks To Maximize Knowledge Mobilization And Innovation Opportunities In The Forest Sector 2015 Forest Policy And Economics
- 147 Meijer, SS; Catacutan, D et al. The Role of Knowledge, Attitudes and Perceptions in the Uptake of Agricultural and Agroforestry Innovations among Smallholder Farmers in Sub-Saharan Africa 2015 International Journal of Agricultural Sustainability
- 148 Hansen, E; Knowles, K et al. A Modified Lead-User Approach for New Product Development: An Illustration from the US of a Marketing Research Tool for the Forest Industry 2015 International Wood Products Journal
- 149 Hurmekoski, E; Jonsson, R et al. Context, Drivers, and Future Potential for Wood-Frame Multi-Story Construction in Europe 2015 Technological Forecasting and Social Change
- 150 Sills, EO; Herrera, D et al. Estimating the Impacts of Local Policy Innovation: The Synthetic Control Method Applied to Tropical Deforestation 2015 Plos One
- 151 Mills, AJ.; Van Der Vyver, M Prescribing Innovation within a Large-Scale Restoration Programme in Degraded Subtropical Thicket in South Africa 2015 Forests
- 152 Schwerdtner, W; Siebert, R et al. Regional Open Innovation Roadmapping: A New Framework for Innovation-Based Regional Development 2015 Sustainability
- 5 153 Grundel, I; Dahlstrom, M A Quadruple and Quintuple Helix Approach to Regional Innovation Systems in the Transformation to a Forestry-Based Bioeconomy 2016 Journal of the Knowledge Economy
- 154 Hoberg, G; Malkinson, L et al. Barriers to Innovation in Response to Regulatory Reform: Performance-Based Forest Practices Regulation in British Columbia 2016 Forest Policy and Economics
- 155 Figueiredo, PN Evolution of the Short-Fiber Technological Trajectory in Brazil's Pulp and Paper Industry: The Role of Firm-Level Innovative Capability-Building and Indigenous Institutions 2016 Forest Policy and Economics
- 156 Hynynen, A Future in Wood? Timber Construction in Boosting Local Development 2016 European Spatial Research and Policy
- 157 Sterbova, M; Loucanova, E et al. Innovation Strategy in Slovak Forest Contractor Firms-A SWOT Analysis 2016 Forests

158	Zhang, K, Putzel, L	Institutional Innovation and Forest Landscape Restoration in China: Multi-Scale Cross-Sector Networking, Household Fiscal Modernization and Tenure Reform	2016	World Development Perspectives
159	Pehrsson, T	Is Innovation Research Contingent on Competitive Context? A Systematic Review of Research in the Agriculture and Forest Industry	2016	European Business Review
160	Mittlefehldt, S	Seeing Forests as Fuel: How Conflicting Narratives Have Shaped Woody Biomass Energy Development in the United States Since the 1970s	2016	Energy Research and Social Science
161	Bayne, K; Moore, J et al.	Structural and Relational Support for Innovation - Formal Versus Informal Knowledge Exchange Mechanisms in Forest-Sector Learning	2016	Forestry Chronicle
162	Ludvig, A; Tahvanainen, V et al.	The Practice of Entrepreneurship in the Non-Wood Forest Products Sector: Support for Innovation on Private Forest Land	2016	Forest Policy and Economics
163	Gilani, HR; Kozak, R et al.	The State of Innovation in the British Columbia Value-Added Wood Products Sector: The Example of Chain of Custody Certification	2016	Canadian Journal of Forest Research
164	Dandy, N.	Woodland Neglect as Social Practice	2016	Environment and Planning A
165	Rasmussen, CC; Nybakk, E	Growth Drivers in Low Technology Micro Firms	2016	International Journal of Entrepreneurship and Innovation Management
166	Jardon, CM	Human Capital as Source of Innovativeness in Subsistence Small Businesses	2016	Journal of Technology Management And Innovation
167	Grzegorzewska, E; Wieckowska, M	Selected Aspects of Innovation in the Furniture Industry - Empirical Research Findings	2016	Drewno
168	Jagger, P; Jumbe, C	Stoves or Sugar? Willingness to Adopt Improved Cookstoves in Malawi	2016	Energy Policy
169	Selomon, TT; Urassa, GC et al.	The Effects of Organizational Capabilities on Firm Success: Evidence from Eritrean Wood-And-Metal-Manufacturing Firms	2016	African Journal of Economic and Management Studies
170	Hansen, T; Coenen, L	Unpacking Resource Mobilization by Incumbents for Biorefineries: The Role of Micro-Level Factors for Technological Innovation System Weaknesses	2016	Technology Analysis & Strategic Management
171	Lawrence A.	Adapting Through Practice: Silviculture, Innovation And Forest Governance For The Age Of Extreme Uncertainty	2017	Forest Policy And Economics
172	Louah, L; Visser, M et al.	Barriers to the Development of Temperate Agroforestry as an Example of Agroecological Innovation: Mainly a Matter of Cognitive Lock-In?	2017	Land Use Policy
173	Martini, E; Roshetko, J et al.	Can Farmer-To-Farmer Communication Boost the Dissemination of Agroforestry Innovations? A Case Study from Sulawesi, Indonesia	2017	Agroforestry Systems
174	Lindgren, J; Emmitt, S	Diffusion of a Systemic Innovation a Longitudinal Case Study of a Swedish Multi-Storey Timber Housebuilding System	2017	Construction Innovation-England
175	Abrams, J; Becker, D et al.	Does Policy Matter? The Role of Policy Systems in Forest Bioenergy Development in the United States	2017	Forest Policy and Economics
176	Lindroos, O; La Hera, P et al.	Drivers of Advances in Mechanized Timber Harvesting - A Selective Review of Technological Innovation	2017	Croatian Journal of Forest Engineering
177	Thiger, E; Woxblom, L et al.	Empathic Design for Wood Product Innovation Based on Genuine Customer Needs - A Test Application on Swedish Builders	2017	Wood Material Science & Engineering
178	Zozulya, VV; Sakhanov VV et al.	Environmental Economy Development with Financial Mechanisms as a Part of Import Substitution in Timber Processing Industry	2017	International Journal of Ecology And Development
179	Sipikal, M; Siranova, M et al.	Evaluation of Innovation Support From EU Funds in the Manufacturing of Wood and Wood Products in the Slovak Republic	2017	Acta Facultatis Xylogiae Zvolen
180	Weiss, G; Pelli, P et al.	Forest Industry Clusters as Innovation Systems: Analysing Innovation Support Frameworks in Five European Regions	2017	Austrian Journal of Forest Science
181	Al Mamun, A.	Innovation Among Manufacturing Small and Medium Enterprises: A Cross-Industry Comparison	2017	Advanced Science Letters
182	Varga, A.	'Innovation From The Past': Silvopastoral Systems in Hungary in the Light of Hungarian Ethnographic Literature	2017	Acta Ethnographica Hungarica
183	Živojinović, I; Nedeljković J et al.	Non-Timber Forest Products in Transition Economies: Innovation Cases in Selected SEE Countries	2017	Forest Policy and Economics
184	Weiss, G; Ludvig, A et al.	Non-Timber Innovations: How To Innovate in Side-Activities of Forestry Case Study Styria, Austria	2017	Austrian Journal of Forest Science
185	Henttonen, K; Lehtimäki, H	Open Innovation in SMEs Collaboration Modes and Strategies for Commercialization in Technology-Intensive Companies in Forestry Industry	2017	European Journal of Innovation Management
186	Hansen, E; Rasmussen, CC et al.	Recessionary Period Activities in Forest Sector Firms: Impacts on Innovativeness	2017	Journal of Forest Economics
187	Paletto, A; Giacobelli, G et al.	Stakeholders' Opinions and Expectations for the Forest based Sector: A Regional Case Study in Italy	2017	International Forestry Review
188	Cavicchi, B; Palmieri, S et al.	The Influence of Local Governance: Effects on the Sustainability of Bioenergy Innovation	2017	Sustainability
189	Hanna, R; Hayter, R et al.	Threshold Firms: Innovation, Design and Collaboration in British Columbia's Forest Economy	2017	Growth and Change
190	Refsgaard, K; Bryden, J et al.	Towards Inclusive Innovation Praxis in Forest-Based Bioenergy	2017	Innovation and Development
191	Carton, W; Andersson, E	Where Forest Carbon Meets Its Maker: Forestry-Based Offsetting as the Subsumption of Nature	2017	Society and Natural Resources
192	Soesanto, H; Setiadi, R	Social Capital Dimensions in SMEs Manufacturing Firms in Central Java: Do They Matter?	2017	International Journal of Civil Engineering and Technology
193	Laukkanen, V; Siimekselä, M et al.	Best Practices in Capturing Employee Creativity: Forest Sector Firms in the USA and Finland	2017	International Wood Products Journal
194	Gebregeziabher, Z; Van Kooten, G et al.	Technological Innovation and Dispersion: Environmental Benefits and the Adoption of Improved Biomass Cookstoves in Tigray, Northern Ethiopia	2017	Energy Economics
195	Giurca, A; Metz, T	A Social Network Analysis of Germany's Wood-Based Bioeconomy: Social Capital and Shared Beliefs	2018	Environmental Innovation and Societal Transitions
196	Korhonen, J; Giurca, A et al.	Actors and Politics in Finland's Forest-Based Bioeconomy Network	2018	Sustainability
197	Hurmekoski, E; Sjølie, HK	Comparing Forest Sector Modelling and Qualitative Foresight Analysis: Cases on Wood Products Industry	2018	Journal of Forest Economics

198	Ferreiro M.D.F., Sousa C.	Governance, Institutions And Innovation In Rural Territories: The Case Of Coruche Innovation Network	2018	Regional Science Policy and Practice
199	Sterbova, M; Salka, J et al.	How Does the Innovation System in the Slovak Forestry Service Sector Work?	2018	Allgemeine Forst und Jagdzeitung
200	Rogelja, T; Ludvig, A et al.	Implications of Policy Framework Conditions for the Development of Forestry-Based Social Innovation Initiatives in Slovenia	2018	Forest Policy and Economics
201	Macqueen, D; Bolin, A et al.	Innovations Towards Prosperity Emerging in Locally Controlled Forest Business Models and Prospects for Scaling Up	2018	World Development
202	Nijnik, M; Nijnik, A et al.	Is Forest Related Decision-Making in European Treeline Areas Socially Innovative? A Q-Methodology Enquiry into the Perspectives of International Experts	2018	Forest Policy and Economics
203	Schunko, C; Vogl, CR	Is the Commercialization of Wild Plants by Organic Producers in Austria Neglected or Irrelevant?	2018	Sustainability
204	Aboal, D; Rovira, F et al.	Knowledge Networks for Innovation in the Forestry Sector: Multinational Companies in Uruguay	2018	Forest Policy and Economics
205	Ludvig, A, Weiss, G et al.	Mapping European and Forest Related Policies Supporting Social Innovation for Rural Settings	2018	Forest Policy and Economics
206	Borremans, L; Marchand, F et al.	Nurturing Agroforestry Systems in Flanders: Analysis from an Agricultural Innovation Systems Perspective	2018	Agricultural Systems
207	Vieira, FC; Do Vale, HV et al.	Open Innovation and Business Model: Embrapa Forestry Case Study	2018	Revista De Administracao Mackenzie
208	Stern, T; Ranacher, L et al.	Perceptions on the Importance of Forest Sector Innovations: Biofuels, Biomaterials, or Niche Products?	2018	Forests
209	Winder, GM; Bobar, A	Responses to Stimulate Substitution and Cascade Use of Wood Within a Wood Use System: Experience from Bavaria, Germany	2018	Applied Geography
210	Ludvig, A; Wilding, M et al.	Social Innovation in the Welsh Woodlands: Community Based Forestry as Collective Third-Sector Engagement	2018	Forest Policy and Economics
211	Edling, L; Danks, C	To Adopt or Not to Adopt? Insights on Energy Transitions from a Study of Advanced Wood Heating	2018	Energy Research and Social Science
212	Purkus, A; Hagemann, N et al.	Towards a Sustainable Innovation System for the German Wood-Based Bioeconomy: Implications for Policy Design	2018	Journal of Cleaner Production
213	D'amato, D; Veijonaho, S et al.	Towards Sustainability? Forest-Based Circular Bioeconomy Business Models in Finnish SMEs	2018	Forest Policy and Economics
214	Klúvanková, T; Brnkáláková, S et al.	Understanding Social Innovation for the Well-Being of Forest-Dependent Communities: A Preliminary Theoretical Framework	2018	Forest Policy and Economics
215	Adejuwon, O	An Examination of Linkages on the Sawn Wood Sector of the Nigerian Forest Industry: Policy Implications for Natural Resource-Based Development	2018	Technological Forecasting and Social Change
216	Guerrero, JE; Hansen, E	Cross-Sector Collaboration in the Forest Products Industry: A Review of the Literature	2018	Canadian Journal of Forest Research
217	Watanabe, C; Naveed, N	Digital Solutions Transform the Forest-Based Bioeconomy Into a Digital Platform Industry - A Suggestion for a Disruptive Business Model in the Digital Economy	2018	Technology in Society
218	Korhonen, J; Hurmekoski, E et al.	Firm-Level Competitiveness in the Forest Industries: Review and Research Implications in the Context of Bioeconomy Strategies	2018	Canadian Journal of Forest Research
219	Ratnasingam, J; Ark, CK et al.	Innovation in the Malaysian Furniture Industry: Drivers and Challenges	2018	Bioresources
220	Hansen, E; Nybakk, E	Response to the Global Financial Crisis: A Follow-Up Study	2018	Journal of Innovation And Entrepreneurship
221	Wilson, SJ; Coomes, OT	'Crisis Restoration' in Post-Frontier Tropical Environments: Replanting Cloud Forests in the Ecuadorian Andes	2019	Journal of Rural Studies
222	Watanabe, C; Naveed N et al.	Digitalized Bioeconomy: Planned Obsolescence-Driven Circular Economy Enabled by Co-Evolutionary Coupling	2019	Technology in Society
223	Lazarevic, D; Kautto, P et al.	Finland's Wood-Frame Multi-Storey Construction Innovation System: Analysing Motors of Creative Destruction	2019	Forest Policy and Economics
224	Sarkki, S et al.	Human Values as Catalysts and Consequences of Social Innovations	2019	Forest Policy and Economics
225	Khanal, PN; Grebner, DL et al.	Obstacles to Participation in Carbon Sequestration for Nonindustrial Private Forest Landowners in the Southern United States: A Diffusion of Innovations Perspective	2019	Forest Policy and Economics
226	Wilkes-Allemann, J; Ludvig, A	The Role of Social Innovation in Negotiations About Recreational Infrastructure in Forests – A Mountain-Bike Case Study in Switzerland	2019	Forest Policy and Economics
227	Kajanus, M; Leban, V et al.	What Can We Learn From Business Models in the European Forest Sector: Exploring the Key Elements of New Business Model Designs	2019	Forest Policy and Economics
228	Jagadish, A; Dwivedi, P	Deconstructing Networks, Unearthing Consensus: Diffusion of Cleaner Cookstoves in Rural Himalayas of India	2019	Energy Sustainability and Society
229	Minang, P; Duguma, L et al.	Evolution of Community Forestry in Cameroon: An Innovation Ecosystems Perspective	2019	Ecology and Society
230	Mac Donagh, P; Elias Velazco, SJ et al.	Logging Contractors' Growth in the Southern Cone: An Analysis of Contractor Business Strategies, Innovation, and Mechanization	2019	Forests

Appendix B The search queries

THE SEARCH QUERY – SCOPUS.

TITLE-ABS-KEY (“innovation*” OR “innovativeness”) AND (“forest*” OR “wood*” OR “timber*”).

Filtered applied – search was limited to LIMIT-TO:

LANGUAGE (English).

DOCTYPE (“ar”, “re”, “ip”).

SUBJAREA (“SOCI”).

PUBYEAR > 1980.

- We manually excluded (ticked individual boxes) for publication sources that clearly do not fit to our research area – EXACTSRCTITLE:

“Journal Of Educational Computing Research”, “Academic Medicine”, “American Antiquity”, “Journal Of Archaeological Science”, “American Journal Of Physical Anthropology”, “Evolutionary Anthropology”, “International Journal Of Crashworthiness”, “Journal Of Anthropological Archaeology”, “Journal Of Archaeological Science Reports”, “Oxford Journal Of Archaeology”, “Archaeology Ethnology And Anthropology Of Eurasia”, “Bsglg”, “International Journal For The History Of Engineering And Technology”, “Journal Of African Archaeology”, “Journal Of Security And Sustainability Issues”, “Journal Of Technical Writing And Communication”, “Kybernetes”, “Man In India”, “Post Medieval Archaeology”, “Railway Age”, “Telecommunications Policy”, “A Life In The Day”, “Ager”, “Agrekon”, “Ahuri Final Report”, “Anthropological Forum”, “Anthropology Of Work Review”, “Antiquity”, “Archaeologica Baltica”, “Archaeological And Anthropological Sciences”, “Archeosciences”, “Australian Archaeology”, “Azania Archaeological Research In Africa”, “Before Farming The Archaeology And Anthropology Of Hunter Gatherers”, “Bid”, “Black Music Research Journal”, “Bulletin Of The School Of Oriental And African Studies”, “Cadernos De Pesquisa”, “Canadian Geographer Le Geographe Canadien”, “Criminology”, “Ctbuh Journal”, “Current Anthropology”, “Techne”, “Childhood Education”, “Daedalus”, “Documenta Praehistorica”, “Dredging Port Constr”, “Educational Gerontology”, “European Romantic Review”, “Evolutionary Anthropology Issues News And Reviews”.

THE SEARCH QUERY – WOS.

TOPIC (“innovation*” OR “innovativeness”) AND (“*forest*” OR “*wood*” OR “*timber*”)).

- We manually refined the search, by excluding following categories in this order (ticked individual boxes) - [excluding]

LANGUAGES: (Portuguese OR Croatian OR Italian OR German OR Finnish OR Japanese OR Turkish OR Spanish OR Polish OR Russian OR Unspecified OR French OR Chinese OR Czech).

DOCUMENT TYPES: (Book Review OR Correction OR Biographical Item OR Early Access OR Meeting Abstract OR Discussion OR Editorial Material OR News Item OR Reprint OR Note).

PUBYEAR > 1980.

RESEARCH AREAS: (Geochemistry Geophysics OR Immunology OR Pharmacology Pharmacy OR Medical Informatics OR Engineering OR Water Resources OR Metallurgy Metallurgical Engineering OR Agriculture OR Information Science Library Science OR Mining Mineral Processing OR Area Studies OR Nutrition Dietetics OR Mathematics OR Orthopedics OR Operations Research Management Science OR Physics OR Polymer Science OR Radiology Nuclear Medicine Medical Imaging OR Behavioral Sciences OR Respiratory System OR Evolutionary Biology OR Cardiovascular System Cardiology OR Physical Geography OR Microbiology OR Sport Sciences OR Pediatrics OR Telecommunications OR Geology OR Surgery OR Toxicology OR Virology OR Biotechnology Applied Microbiology OR Marine Freshwater Biology OR Automation Control Systems OR Mathematical Computational Biology OR Biophysics OR Paleontology OR Crystallography OR Computer Science OR General Internal Medicine OR Demography OR Genetics Heredity OR Neurosciences Neurology OR Dentistry Oral Surgery Medicine OR Nursing OR Dermatology OR Construction Building Technology OR Oceanography OR Developmental Biology OR Biochemistry Molecular Biology OR Public Environmental Occupational Health OR Endocrinology Metabolism OR Chemistry OR Anesthesiology OR Family Studies OR Entomology OR Geriatrics Gerontology OR Fisheries OR History OR Imaging Science Photographic Technology OR Hematology OR Infectious Diseases OR Zoology OR Instruments Instrumentation OR Legal Medicine OR Health Care Sciences Services OR Mechanics OR Medical Ethics OR Life Sciences Biomedicine Other Topics OR Oncology OR Microscopy OR Meteorology Atmospheric Sciences OR Parasitology OR Physiology OR Food Science Technology OR Anatomy Morphology OR Psychiatry OR Urban Studies).

WEB OF SCIENCE CATEGORIES: (Psychology Applied OR Materials Science Ceramics OR Materials Science Coatings Films OR Psychology Clinical OR Psychology Experimental OR Thermodynamics OR Transportation OR Transportation Science Technology OR Veterinary Sciences).

SOURCE TITLES: (Annals Of The Missouri Botanical Garden OR New Phytologist OR Annals Of Botany OR Ecological Applications OR Ecological Modelling).

Appendix C Inclusion and exclusion criteria during selection procedure

	Inclusion criteria	Exclusion criteria
year	1 January 1980 - until 19 March 2019	articles before 1980 – as we could not access the articles and not fitting to research aims
types of publication	peer-reviewed scientific publications	editorials, practice cases, comments
Language	English	All other languages
Approaches	social science approaches.	Other approaches
Fields that we look at	forestry and the forest-based industries, but we include cross-sectoral fields such as agroforestry or bio-energy as well as larger fields such as rural development and rural innovations and studies of the larger agriculture-food-forest-fisheries sector whenever forest, wood or timber is specifically mentioned	other fields, anything outside the forest sector
Conceptualisation of innovation	phenomenon and process (innovation used without article and in singular form; in plural when relating to process)	results and outcomes (a specific innovation, singular or plural, when described in technical terms)
Research themes	adoption and diffusion of innovations; innovativeness and entrepreneurial attitudes of managers, entrepreneurs or users; innovativeness and innovation culture of organisations/ companies; innovation management and new product development; innovation networks and innovation systems; innovation policy or governance; and outcomes and effects of innovations.	life cycle analysis, ecological or environmental impacts or effects or evaluations, technological studies, technical analyses

Appendix D Categories for quantitative analysis of the final set of the articles

Year decades	1980–2000
	2001–2005
	2006–2010
	2011–2015
	2016–2019
Publication source	<i>Journal name</i>
Document type	Research article
	Review article
	Foresight study
	Technical article
Research organisations where research takes place	<i>Research organisation of lead author - as named in the article</i>
Country of lead author	<i>As named in the article</i>
Continent to which country of the first authors belong	<i>As named in the article</i>
Countries grouped per development status (<i>as defined in the UNOPS, 2018</i>)	Developed countries
	Developing countries
	Least developed countries
	Economies in transition
Country/ies of study focus	<i>As named in the article</i>
Continent to which country/ies of study focus belong	<i>As named in the article</i>
Country/ies of study focus grouped per development status (<i>as defined in the UNOPS, 2018</i>)	<i>As above</i>
Innovation type (<i>inductively taken from articles</i>)	Institutional
	Marketing
	Mixed
	Not specified
	Organizational
	Process
	Process and institutional
	Process and organizational
	Process and product
	Product
	Social
Thematic areas	<i>Innovation oriented research themes - listed as stated in the articles</i>
Theories & concepts (<i>inductively built groups</i>)	Systemic (other)
	Innovation systems
	Firm-level
	Policy analysis
	Adaptation (entrepreneurs)
	Discourse
	Other social sciences
	Socio-ecological systems
	Effects
	Sociology
	Innovation research
	Networks
Methods	Qualitative
	Quantitative
	Mix-methods
Methodological Approach	Case study
	comparative case study
	Comparative analysis
	Conceptual
	Literature review
	Discourse analysis
	Other survey based studies
Science area (<i>inductively built groups</i>)	Economics (Institutional)
	Business Administration (Innovation management)
	Policy
	Sociology
	Sociology (interdisciplinary)
	Silviculture
	Economics
	Geography
	History/Sociology (interdisciplinary)
	Ethnography

Topical (sectoral) focus of the paper

Forestry (forestry (general), biodiversity, carbon sequestration, multifunctional oriented forestry, non-timber forest products, recreation, forest management services)
 Forest-based industry (forest-based industry (general), wood, wood and paper, wood and furniture industry, timber construction, structural panel, pulp and paper, furniture, chemical)
 Agroforestry
 Bio-economy
 Bio-energy

* UNOPS, 2018. 2017 Annual Statistical Report on United Nations Procurement, United Nations Office for Project Services, Copenhagen, Denmark.

Appendix E. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.forpol.2020.102288>.

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ARTICLE 2

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Non-timber forest products in transition economies: Innovation cases in selected SEE countries



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ABSTRACT

Driven by political and economic reforms since 1990, the forestry sector in southeast European (SEE) countries has faced changes which have resulted, among others, in the rise of private businesses. Many of those businesses have demonstrated innovation in the sphere of non-timber forest products (NTFPs), although these products had been neglected in the past, and their potentials are still underestimated. Therefore, our aim was to get a better understanding of the innovation processes behind three case studies in selected SEE countries (Slovenia, Serbia and FYR Macedonia). For the purpose of this research, we conducted semi-structured qualitative interviews with people responsible for the selected innovation cases in three NTFP-based enterprises. The interviews revolved around questions related to the idea and product development, the firm foundation, the supporting and hindering factors and the actors and their roles in the entire process of business development. To understand the framework conditions, we interviewed representatives of the organizations that were in charge of supporting innovation and business development. The results show that several national policy programs (e.g., in the fields of SMEs, forestry and nature protection) form a framework for supporting NTFPs innovation. However, in all the selected countries, there were no policies specifically tailored for NTFPs. An analysis showed that these innovations were developed solely by the owners and their personal ideas, and most information and financing came from the businesses themselves. The innovation systems in the selected countries did not significantly contribute to the development and running of the businesses. The lessons provided by these cases can be significant for strengthening existing NTFP-related innovation systems and fostering their effectiveness in the future.

1. Introduction

1.1. Forestry in transition economies

The process of political and economic reforms in the transition economies of post-socialist countries in southeastern Europe (SEE)¹ have significantly influenced institutional forestry reforms (Glück, 2011; Sarvašová et al., 2014; Nonić et al., 2014; Weiss et al., 2012). Changes in the forestry sector have been made through the adoption of new policies and legislation, changes in the area of land tenure, and private property rights (Bouriaud et al., 2013; Weiland, 2010), which

have brought about new possibilities for improving the sector governance and for fostering multifunctional forest management. In the forest sector, wood-based products are still considered the main product due to their great economic importance and well-structured and competitive value chains (Lawrence, 2003). However, forest enterprises have been diversifying and expanding their portfolios through the addition of non-timber forest products (NTFPs) and services to their businesses (Donnelly and Helberg, 2003; Kathe et al., 2003; Niskanen et al., 2007; O'Brien Mee, 2009; Pettenella et al., 2007). In this paper, we look at NTFPs primarily as a sub-sector of forestry but also note that the realm of innovation in NTFPs can go beyond the forestry sector and include

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¹ For the purpose of this paper, the south-eastern Europe includes following countries: Albania, Bosnia and Herzegovina, Bulgaria, Montenegro, Greece, Croatia, Former Yugoslav Republic of Macedonia, Moldova, Romania, Serbia, Slovenia and Turkey (SEECP, 2017).

other economic sectors such as food and agriculture, leisure, recreation and tourism activities in the forests and woodlands, craft decorations, chemical substances and health products (Ludvig et al., 2016b).

In former Yugoslavia,² the NTFP sub-sector was dominated by state-owned enterprises and Agriculture Industrial Combinates (AIC),³ who were responsible for the buying, processing, trading and exporting of NTFPs (Nedeljković, 2015). During the transition period after the 1990s, NTFP-related activities of the state-owned enterprises were terminated. This provided a base for the development of private enterprises, who (re)entered the foreign markets and developed new products (Turudija Živanović, 2010). These enterprises “responded rapidly to systemic shocks, produced goods and services demanded by the population, and in the process, contributed to the generation of new jobs and incomes” (Gashi et al., 2014, p. 407).

1.2. Innovation related to NTFPs

Traditional sectors, such as forestry, are not always seen as a field where innovative activities occur. However, a growing number of scholarly articles (Jarský, 2015; Ludvig et al., 2016a; Nedeljković, 2015; Rametsteiner et al., 2005; Rametsteiner et al. 2010; Ranković et al., 2012; Tunzelmann and Acha, 2004; Weiss et al., 2011) are emphasizing the importance of the forestry sector in creating economic growth, improving the role of innovations, and enhancing the quality of life in rural areas.

Even though the use of NTFPs in many European countries is traditionally and culturally recognized as a very well-known activity, it has only become economically recognized in recent times (Maso et al., 2011; Sisak et al., 2016). NTFPs have shorter production cycles than timber and embody cultural and traditional values (Lawrence, 2003), and thus, they attract the interest of innovative businesses. Entrepreneurs recognize the potential of NTFPs as a significant opportunity for the promotion and development of rural areas that are dependent on forest resources (Kathe et al., 2003; Niskanen et al., 2007; O'Brien Mee, 2009), and entrepreneurial goals are to pursue given opportunities and to fill market niches (Šalká et al., 2006). These enterprises can have more success and better economic results when they are embedded in a larger innovation system where support comes through various mechanisms (such as financing, advice and knowledge) (Nonić et al., 2012; Rametsteiner et al., 2005; Weiss et al., 2011). Since the business around NTFPs implies the interaction of different and larger sets of stakeholders, as well as interaction with various policies, the most promising approach for an analysis of innovative cases in this sub-sector would be the innovation systems (ISs) framework (Edquist, 1997; Rametsteiner et al., 2005; Weiss et al., forthcoming).

1.3. Aims of the article

In SEE countries, both innovation systems and the NTFP sub-sector have faced a challenging transition period in the last two and a half decades. This article addresses NTFP innovation cases in Serbia, Slovenia and the Former Yugoslav Republic (FYR) of Macedonia. These countries were chosen based on their joint history (in ex-Yugoslavia) but currently differing relations to the EU (Slovenia as EU member and Serbia and FYR Macedonia in the process of accession). Until the beginning of 1990s, these countries were the main NTFP

exporters from SEE (Sitta and Floriani, 2008; Turudija Živanović, 2010). There was a significant link between the collection process (e.g., good raw material base in Macedonia and Serbia) and the processing and export of products (which were made in cooperation with Slovenian companies) among these countries.

In the selected countries, forestry constitutes an important sector, which has a long tradition in forest management and the use of NTFPs (Nedanovska, 2012; Nedeljković, 2015). During the transition period in the 1990s,⁴ the forestry sectors underwent a process of change (Pachova et al., 2004). Still, the narrow focus on wood-based products was prevalent in the forest policies of those countries. Bottom-up initiatives and private businesses were not given a prominent place in forestry development, especially when considering the innovative activities involving various forest goods and services (Weiss et al., 2011).

With this in mind, the overall aim of this research was to get an in-depth understanding of the innovation processes in the analyzed case studies. More specifically, we looked at the fostering and hindering factors in the process, on both internal (enterprise) level and external (institutional) level. The specific research questions were as follows:

1. What are the framework conditions for innovation in the selected countries?
2. What was the role of the actors in the analyzed innovation processes?
2. What was the role of the institutions in the analyzed innovation processes?
4. What kind of interactions existed in the analyzed innovation cases?
5. What were the main supporting mechanisms (information, coordination and incentives)?

With the analysis of the case studies, this paper aimed at demonstrating how innovations arise and develop in the NTFP sub-sector in the selected SEE countries with economies in transition. We believe that this paper can provide feedback to the NTFP-related innovation systems in place in these countries in particular and in transition countries in general and that it can foster effective policies for supporting future NTFP businesses in the region.

3. Conceptual framework

Innovations are identified as a key driving force behind economic growth, which is emphasized in many innovation-related policies at the EU (e.g., EUROPE 2020, A strategy for smart, sustainable and inclusive growth) and national levels. Perceiving innovation through the linear concept of the innovation process has gradually changed into a systemic model known as the innovation systems (IS) approach (Edquist, 1997; Rogers, 1995). The IS approach perceives innovation as an institutional process (Edquist, 2001; Lundvall et al. 2002; Moulart and Sekia 2003) where it is not only the entrepreneur that is responsible for the innovativeness of the enterprise but also a system of actors and institutions.

In this paper, we followed Rametsteiner and Weiss's (2006) explanation that “innovation system approaches are considered a conceptual framework rather than a formal theory” and that the main elements of ISs are actors and institutions and their interactions (Fig. 2). Actors, or the players of the game, are represented by a set of institutional actors that together play a major role in influencing innovative performance. Actors are usually considered organizations, which are seen as formal structures with explicit purposes that are

² The Socialist Federal Republic of Yugoslavia (SFRY) replaced the former Kingdom of Yugoslavia and was a federation of six socialist republics: Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia, and Slovenia. All of them gained independence as democratic republics at the end of the XX and the beginning of XXI century (Encyclopedia Britannica, 2017).

³ Type of social enterprise (existed during socialism) where assets are completely socially owned. Its capital was divided into shares, or portions, and recorded into a registrar. AICs were medium or large companies employing many employees in the different stages of the supply chain.

⁴ Most post-socialist countries of central and south-east Europe underwent a dramatic shift from central planning to capitalist-style market liberalization in the early 1990s (Banalieva et al., 2017). In Serbia, the transition started in 2000 when the basic conditions for its implementation were acquired (i.e., political change, trade and capital account liberalization, etc.) (Cvijanović et al., 2009).



Fig. 1. Case study countries and NTFP innovation cases.

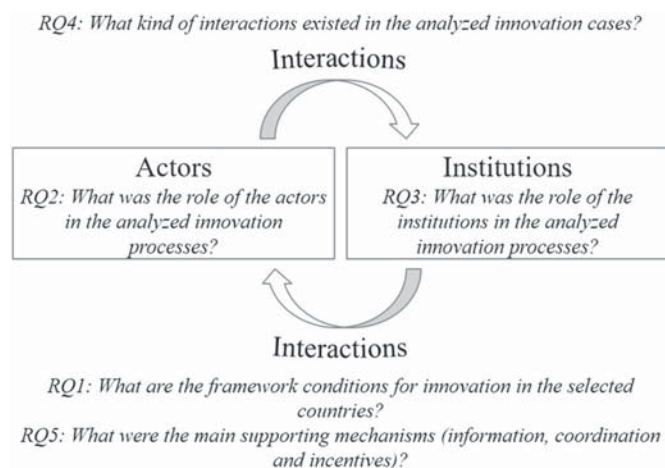


Fig. 2. The IS approach: main elements and links with the research questions.

consciously created (Weiss et al., 2011). Institutions represent the rules of the game by which these relationships are maintained (Edquist, 1997). According to North (1991), institutions are understood as a set of habits, routines, rules, laws or regulations that regulate the relations and interactions among individuals, groups and organizations. Innovation thus occurs within networks of actors that are of diverse types (public, semi-public or private organizations) and from different social systems (economy, research, state) (Küppers and Pyka, 2002). These actors are embedded in a system of institutions that support them. Institutions have a threefold role in the innovation process: the reduction of uncertainty by providing information, the management of conflict and cooperation, and the provision of pecuniary and non-pecuniary incentives (Edquist and Johnson, 1997; Rametsteiner and

Weiss, 2006). ISS, due to the interaction of actors and institutions, are open to and interact with the environment, which they depend on and contribute to (Rametsteiner and Weiss, 2006).

In the IS approach, innovations are mainly based on learning that is interactive among organizations (Edquist, 2001). Cohen and Levinthal (1990) also claim that a lack of knowledge can be a barrier for entering new markets. To recognize a business opportunity and market demands, one must have a certain level of knowledge (ibid.). In addition to learning, prior knowledge is also an important part of innovativeness. Shane (2000) identified three possible aspects of prior knowledge: (i) prior knowledge about markets (which influence entrepreneur decisions on which markets to enter); (ii) prior knowledge about how to serve the markets; and (iii) prior knowledge about customer problems (which influence entrepreneur decisions on which products to offer). Accordingly, new business formation “only emerges when specific opportunities for entrepreneurial profits such as market inefficiencies or newly discovered scientific insights meet prior knowledge of potential entrepreneurs, thus triggering opportunity exploitation by means of venture creation” (Cohen and Levinthal, 1990, p. 79).

In studying innovation, the following ISSs on different levels can be relevant: NISs (national innovation systems), SISs (sectoral innovation systems), and RISs (regional innovation systems) (Malerba, 2006). A NIS suggests that company innovativeness is influenced by a broad range of national institutions and can determine “whether and how national institutional settings have an impact on this phenomenon” (Acs et al., 2016, p. 2). The SIS approach provides an analytical framework to identify the performance of the systems in terms of the approach for supporting innovation in a specific sector (Malerba, 2006). RISs are more or less formally defined support structures or networks on sub-national or local level. Weiss and Rametsteiner (2005) explain that in forestry, “innovations are often not the result of established IS – neither national, sectoral nor regional. It might be

regarded as an ‘ad hoc’ IS or one-project IS. Particularly, innovations that are new to the sector are born ‘between’ sectors, and thus, they exist between sectoral innovation systems. Such examples are non-timber forest products and services; for instance, a service could be an offer of nature conservation services, tourist accommodation or bio-energy services” (p. 14).

Following this statement, we looked at specific NTFP innovations through the lenses of two IS approaches: the general innovation and entrepreneurship support policies related to NIS and the forestry SIS. The RIS approach was not used due to the governmental setup in the case study countries, where policy is developed at the national level and local authorities do not have direct influence.

3. Methods

In this study, we applied a comparative case study approach for analysing entrepreneurial level innovation cases within the relevant ISs in three different countries. In order to get a comprehensive understanding of a) the processes within the innovation projects, b) the institutional frameworks, and c) their interaction, we structured the data collection and analysis in two parts: the relevant ISs and the innovation projects. This allows to determine in how far innovation support offers are used or not used, and which role policies and actors actually play in real innovation processes. A similar approach had been applied in the analysis of forestry innovations in central European countries (Rametsteiner et al., 2005) and for non-timber innovations in Austrian case examples (Weiss et al., forthcoming). Data were collected by a mix of methods and in three distinct phases (Table 1).

In the first phase (October–December 2013), data on the national actors and policies relevant for NTFP innovations (e.g., forest, agriculture, rural and regional development, small and medium enterprises-SMEs, innovation) were collected. We applied qualitative content analysis to identify which actors and policies are relevant and what is their role in NTFP innovations. The template for the data collection was prepared to enable comparison across countries. It consisted of 11 questions, which aimed at gathering data on the relevant organizations that are important for supporting innovation processes, the national/regional policy programmes which support and/or hinder NTFP innovations.

For collecting the case study-specific data, we conducted two sets of face-to-face semi-structured qualitative interviews with: i) owners of case study enterprises (phase 2) and ii) experts from organizations offering innovation support for NTFPs (phase 3).

Under each case study, we examined examples of commercially or market-oriented innovations related to NTFPs developed by three privately owned companies: i) “Teaspoon-shaped bags” (Adonis/Serbia), 2) “Wooden knots as climbing wall holds” (U-Jaa/Slovenia) and 3) “Selling wild mushrooms on the domestic market” (InterMac/FYR Macedonia).

For the qualitative analyses of the single case studies, we conducted interviews with the owners of case study enterprises in September 2014, and they lasted approximately 90 min. The topics of the interviews covered five thematic segments, which were used to steer the interviewer-interviewee conversation (Fig. 1).

Table 1
Methods applied.

Data collection phases	Method		Data analysis	Sample	Interview coding	Research question
PHASE I	Screening NTFP-related legislation and actors		Qualitative content analysis	National actors and policies relevant for NTFPs innovation	n.a.	RQ1
PHASE II	Qualitative interviews	Face-to-face semi-structured		People responsible for innovation (i.e. owners)	Interviews 1–3	RQ2 RQ3 RQ4
PHASE III	Qualitative interviews	Face-to-face semi-structured		Experts - representatives of organizations offering support for NTFPs	Expert interviews 1–6	RQ1 RQ5

The interviewees were first asked how their work was related to NTFP innovations, what were the main activities and products of the company, and what kind of support existed in the region for supporting NTFP innovations. Next, the interviewees were asked questions on how they got the idea for the innovation and what necessary information was used to generate the innovation. Furthermore, they were asked about what information support they received during the process (e.g., from public authorities or funding institutions). The third interview segment was related to finances. They were asked how the innovation was funded (e.g., governmental grants, international research projects, bank loans, personal savings) and how the interviewees assessed the general economic situation in the region in regards to NTFPs. The fourth segment dealt with the aspects of coordination, interactions and conflicts in the innovation development and its implementation. The interviewees were asked to highlight the key actors and networks that contributed to the innovation and the positive and negative roles that those actors and networks played in the innovation process. They were also asked about any conflicts that emerged in the process. The last segment focused on the fostering and hindering factors for developing the NTFP novelties in the region and the existing knowledge in the development of new NTFPs.

The second set of interviews was conducted with the experts from organizations responsible for innovation support for NTFPs, in order to better understand the framework conditions for NTFP sub-sector. We conducted 2 interviews per country. According to the research problem, we considered judgmental sampling as the most suitable method because we focused on the organizations (governmental bodies, regional development agencies, and research and development organizations) that have an impact on the NTFP framework conditions. These were conducted in October 2014 with an average length of 45 min. The questions were related to the issues of institutional set-up, national/regional financial support and other support mechanisms (information, cooperation and monetary or non-monetary incentives) for NTFP businesses and relevant actors for this field. We asked interviewees about differences in the NTFP sub-sector between the times of Yugoslavia and after its disintegration. In this way, we aimed to describe the changes in the support systems and their relation to shifts in the political system.

The analysis of the documents and interviews applied a qualitative case study approach and followed the conceptual framework which is described in the next section.

4. Framework conditions for innovations in the NTFP sub-sectors of the selected countries

In Serbia, Slovenia and FYR Macedonia, NTFPs are underestimated by forest authorities and other official institutions compared to wood-based products (Nedanovska, 2012; Rekola et al., 2007). One reason for that is the absence of information and systematic data on NTFPs. Thus, the total benefits from forests are not maximized in forest investments and management decisions (Rekola et al., 2007).

4.1. General background

In former Yugoslavia, state-owned enterprises and Agriculture Industrial Combinates (AIC) were the main actors in NTFP business. These organizations created a network among the different states, which helped the functioning of the NTFP sub-sector. Private NTFP-based enterprises were less developed and mainly comprised of individual buyers who were not direct exporters. The private sector started to develop more significantly after the 1990s, with the process of economic transition and after the cessation of state-owned enterprise activities with NTFPs (Nedeljković, 2015).

Currently, a complex policy framework regulates NTFP sub-sectors in each of the three countries. Laws on forests and nature protection prescribe general conditions for NTFPs utilization, while legal acts regulate this issue in detail. However, due to the large number of legal documents, in all three countries, problems arise with their practical implementation. Another issue is that there are laws that regulate innovation activities, but none of them are directly related to NTFP or any related sector (i.e., forestry, rural development, agriculture, and nature protection).

In **Serbia**, the establishment of the Public Enterprise (PE) “Srbijašume” in 1991 brought significant changes in the organization of forestry. Some of these changes included a centralized bank account, the inability to carry cash payments, and priority of foreign currency over domestic. The emergence of private buyers influenced PE “Srbijašume” business with NTFPs. These factors caused PE “Srbijašume” withdrawal from the NTFP market. Furthermore, challenging political situations in the country lead to problems in NTFP marketing.⁵ At the same time, private sector development in Serbia was on the rise. Private NTFP businesses originated mainly from former buyers, who were employed by state companies. Today, private NTFP SMEs play a dominant role in Serbia (expert interview 1).

Before the transition process started, the NTFP sub-sector in **Slovenia** generally had a more significant role in the economy compared to its current situation. A widespread network of purchase facilities was organized by farming cooperatives and wholesalers that purchased mushrooms, forest berries, chestnuts and other forest fruits from collectors. Many products were exported, primarily to the neighboring countries (expert interview 3).

After independence and the start of transition (1991), the situation changed, especially in the case of mushrooms where a daily harvest limit was introduced. A few years later, the harvesting NTFPs became an activity defined as additional personal work, which needed to be registered and taxed. This created increased discontent among pickers and was followed by a drop in the official mushroom trade figures and a shift to the illegal market. Processing companies started to import NTFPs from other ex-Yugoslavian countries and Eastern Europe. At that time, there were no specific policies fostering NTFP production, except for hunting and beekeeping. Today, there are quite a few differences among individual NTFPs, with game, hunting and beekeeping being the most institutionally developed compared to the other products (e.g., mushrooms, chestnuts, forest berries and Christmas trees) that are lacking policy focus and organizational frameworks (expert interview 4).

After independence and the change of the political system (1991), the privatization process of social enterprises (i.e., AICs) in **FYR Macedonia** began under the law for the transformation of companies. The NTFP sub-sector was fast privatized since it was not dependent on agricultural land. During this process, many AIC employees decided to establish private companies with NTFPs (expert interview 5).

⁵ Slovenian enterprises, which were one of the most important players in the marketing of Serbian NTFPs into foreign markets, ended the business in Serbia. As a consequence, the buying stations, which belonged to PE “Srbijašume”, had to be closed, and there was a (partial) termination of activities related to NTFPs in the period from 1991 to 1997.

NTFPs are mentioned in forest management plans, but their share is not known because inventories have never been done. The big and diverse portfolio of NTFPs in FYR Macedonia is one of the reasons for establishing NTFP SMEs over the years. Collected NTFPs are exported in the EU, except for a small percentage, which are used by pickers for own consumption (expert interview 6).

4.2. Actors relevant for supporting innovation in NTFPs

Based on the screening of NTFP-related legislation and actors, it shows up that the relevant actors for innovation in NTFPs in the selected countries are mainly found in public organizations (Table 2).

Various types of public actors are relevant to NTFP innovations in the analyzed countries: ministries, agencies and others. The ministries are responsible for the following different sectors: economy, agriculture and forestry (in all countries), and tourism (Serbia). Agencies represent the following different sectors: entrepreneurship (in all countries), investments and export promotion (Serbia), agriculture and rural development (Slovenia). In Serbia and FYR Macedonia, also other public actors, such as innovation funds, have a role in the NTFP innovations.

The ministries in charge of the economy and the agencies that support and promote entrepreneurship provide financial and informative support to SMEs in all sectors. Direct roles in NTFP innovation have only been identified for the ministry responsible for agriculture in Serbia and an agency responsible for agriculture and rural development in Slovenia, who create tailored measures and provide favorable environments for investing in NTFP business. Other actors have only indirect roles.

4.3. Policies relevant for NTFP innovation

Several policy fields and related national policy programs form a framework from which support for NTFP innovations could originate (Table 3). However, in the analyzed countries, there are no policies specifically tailored for this sub-sector.

In all countries, forestry-related strategies influence NTFP innovation by framing the multifunctional development of the forestry sector. However, these statements are indirect in Serbia compared to Slovenia and FYR Macedonia, although even in these countries, the direct support for NTFP innovation is lacking. Strategies that support the development of SMEs and entrepreneurship in Slovenia and Serbia are not related to any economic sector in particular. Additionally, there are strategies from other sectors (e.g., biodiversity and natural resources related strategies in Serbia and rural development in Slovenia), which also prescribe measures related to NTFP innovation. For example, since Slovenia joined the EU, it adopted the European Common Agriculture Policy (CAP) and implemented the Rural Development Program, which offers possibilities for fostering NTFPs. Some of the CAP measures are relevant because they provide financial incentives for establishing and developing micro-companies that address atypical farm activities (e.g., processing NTFPs) as a way to diversify income. However, this is a part of the program related to agriculture. Measures aimed at the forestry sector do not cover NTFPs. In relation to the Rural Development Plan, it is essential to mention the LEADER program in Slovenia (EU member state), which aims to activate local communities and bring innovation into rural development via establishing Local Action Groups (LAGs). LAGs are designed to empower local communities through local strategy development and resource allocation.

Except for the LEADER program, in the EU member states, an important part of the support is generated via European funds such as the regional development fund, the cohesion fund and the social fund, which were made available also to Slovenia after joining the EU. In addition, in Slovenia exist measures (also financial incentives) that are independent of EU funding.

The IPARD⁶ Program (Axis 2⁷ and 3⁸) is a good opportunity for the NTFP sub-sector in Serbia and FYR Macedonia since both countries have status as “candidate” countries.

5. Three innovation cases

5.1. “Teaspoon-shaped bags”

5.1.1. General information on the company and chronology of the innovation

Family-owned company Adonis was established in 1991 in the eastern part of Serbia. The enterprise employs 27 people and hires only a couple of seasonal workers. The owner has no official training in this business but has considerable experience working with herbs.

The founder of Adonis stated that the main reason for starting his own business was a misunderstanding with the state enterprise management where he was employed. According to him, the management of the state-owned enterprise “...did not recognize the business opportunity in herb processing. Personally, I was not satisfied with only purchasing and selling. I thought of processing and making teas... and in the private sector, I could develop my ideas and make my own decisions” (interview 1).

His company has been purchasing, processing and selling herbs and herb products since its establishment. At the beginning of the seasons, the company makes annual collection plans with the collectors. They do not sign official contracts, but each collector is obliged to inform the company in case he/she is not able to fulfill the plan.

In 2007, the first public presentation of Teasy™ tea was held at the Fair of Medicinal Plants in Novi Sad, where the emphasis was on the packaging of “teaspoon-shaped bags”. In 2012, the company did a complete re-design of the packages, with the main goal of achieving a contemporary look by combining traditional forms and symbols.

5.1.2. Information sources

The idea for the Teasy™ package came from an old metal teaspoon and a children's toy for making bubbles. All necessary information and knowledge for starting the business were self-acquired by the owner, and knowledge on the technical characteristics of production was gained from a craftsman who constructed the machine for producing spoons. For the technological part of production, the company hired a technologist.

5.1.3. Finances

At the beginning, finances were necessary for constructing the machine, and thus, the company took a commercial bank loan of 50,000 EUR. Later, they received a certain amount of funding from SIEPA⁹ for the re-design of the packages.

5.1.4. Coordination, cooperation and conflicts

The coordination of actors in the innovation was not so important because it was a family-run company and all of the innovation work, from developing the idea to placing Teasy™ on the market, was done by the owner and his son. However, a highly important indirect role for the business came from the good organized and coordinated network of collectors. The company generally has very good cooperation with different faculties (consulting and technical support), the chamber of commerce of Serbia (consulting and other types of indirect support), the national agencies for regional development and investment and export promotion (financial support), and international organizations (USAID, GIZ) (financial and consulting support).

One challenge occurred after an article entitled “Do you like tea made of plastic?” was published in a weekly magazine about herbs. As a response to this, the company undertook an analysis to prove that used plastic is not harmful to human health, took the case to court and won. However, there is still a certain amount of hostility by some consumers.

5.1.5. Success factors

As success factors, the owner emphasized that “...it is very important to maintain good business relationships with both the collectors and customers” and “...to pay a lot of attention to a collector's education”. Furthermore, he pointed that “...insisting on high quality products and fulfilling the standards¹⁰ helps business a lot, as well as the efficient organization of business processes and openness to customers' ideas and suggestions” (interview 1).

5.1.6. Overall innovation analysis

Innovation helped this family-owned enterprise to develop their business and be different and distinguishable on the market. They realized that progress and development of the enterprise was impossible without innovations, which are important for entering new markets and fulfilling customer demands. However, in order to be more successful in the future, they need support. Support from local authorities exists, but it is not sufficient. As a small enterprise, they do not have enough resources to invest in research and development, but they have entrepreneurial spirit and open-mindedness. Thus, support is needed not only from research and scientific institutions but also from local and national authorities.

5.2. “Wooden knots as climbing wall holds”

5.2.1. General information on the company and chronology of the innovation

The company U-Jaa was established in 2012 with the aim to produce and market holds for climbing walls made out of tree knots. Holds are mounted on climbing walls and used for sport climbing. Climbing holds are usually made out of plastic (PVC); however, these were produced out of wood knots, which are in technical terms, imperfections in wood that develop through the growth of branches on a tree stem (Merriam-Webster dictionary, 2017).

U-Jaa is a micro company (1 employee) located in a small town in northwest Slovenia. The company is the only one offering this kind of a product in the country and one of a few at the EU level. Innovation was not only seen in making climbing holds out of renewable sources but also in the way of processing the holds. The company patented the thermal post-processing of the products, which makes them more durable and safe.

5.2.2. Information sources

The information needed to establish the company was obtained within the close social network of the owner with other small-scale entrepreneurs and larger companies producing plastic holds on the international level. Furthermore, the company used a government-supported entrepreneurship service and VEM-information points, which is a web-based information portal for obtaining the necessary information and tools for registering SMEs.

5.2.3. Finances

The funds required to start the production were allocated from personal savings. The main issues that U-Jaa still has to face are low market-based competitiveness due to the higher price of the product and the lack of designated subsidies or other financial incentive-based programs. The high price of the product originates from labor-intensive production and small production volumes. The latter reason causes

⁶ Instrument for Pre-Accession Assistance in Rural Development.

⁷ Preparatory actions for the implementation of the agri-environmental measures and LEADER.

⁸ Development of the Rural Economy.

⁹ SIEPA covered 70% of costs (as a grant), and 30% was covered by the enterprise itself.

¹⁰ ISO 9001, ISO 22000, PAS 220/ISO/TS 22002 – 1, FSSC 22000, HACCAP.

relatively small sales with irregular income, and thus, there are fewer possibilities to invest in production equipment.

Due to this, the company sought external sources of funding. At the start, the owner was successful in getting a one-time grant of 4500 EUR from a national program aimed at fostering entrepreneurship. This money was used entirely to pay business taxes. The company also applied to the Rural Development Plan (measure 312), which supports micro-level entrepreneurs in rural areas. However, the company failed to meet the eligibility criteria because the business is registered in the town. Furthermore, the company applied for an international tender¹¹ for innovative companies in forestry but without success. Even though there are more possibilities to apply for funding within the country, the owner is not planning to apply for any in the near future, as he believes that “they are focusing more on computer-based high technology businesses, where NTFPs are not considered as much” (interview 2).

5.2.4. Coordination, cooperation and conflicts

U-Jaa envisioned its product as an environmentally friendly product from locally available raw material obtained from forest owners or concessionaire companies who manage state owned forests.

The patent for the thermal processing of the holds was obtained at the national level. Additionally, the product complies with the national standard on technical characteristics and safety features. For this process, U-JAA consulted the patent office, which is a private firm that guided the company through the whole procedure.

Wooden climbing holds are subject to a loss of grip after long periods of intensive use as the surface gets smoother. Thus, the company plans to implement a novel coating. This coating is currently being developed by a different company in the region. The cooperation between these companies emerged at a demonstration event organized by a local climbing association. They are planning to market products jointly in the future.

5.2.5. Success factors

The company owner believes that the success factor is two-fold. First, the product is highly innovative in terms of material used (wood), which is far from common for climbing holds. That makes the product attractive for the market as it embodies nature and sports, which is appreciated. Second, the development of the product and setting up the production process would not have been possible without the good social network of the entrepreneur, where the majority of the information came from. Having advice from other entrepreneurs and friends was crucial in several steps: establishing the company, developing the product and patenting the thermal process.

5.2.6. Overall innovation analysis

This innovation depended very much on the personal motivation of the entrepreneur to offer an innovative product and to be successful in its marketing. It appears that the institutional framework in Slovenia is not in place for NTFP businesses, as considerable information support comes from other small and larger entrepreneurs. The lack of relevant policies on a national level, which would foster innovation related to NTFPs, indicates a gap that needs to be filled if this sub-sector should have more possibilities to develop in regards to job creation and utilizing forest resources.

5.3. “Selling wild mushrooms on the domestic market”

5.3.1. General information on the company and chronology of the innovation

The private company InterMak was founded in 2000 in Veles, a town in central FYR Macedonia. Its main occupation is collecting, processing and selling NTFPs. The owner was previously employed at

Agriculture Industrial Combinates (AIC). Today, the company has 25 employees and approximately 100 seasonally engaged workers. InterMak is one of the biggest FYR Macedonian exporters of NTFPs, offering a wide range of products (mushrooms, berries, junipers, blackberries, blueberries) in different processing stages (dry, frozen, fresh and marinated). Since its establishment, InterMak has increased its capacities for processing NTFPs. Its main export is to Italy (60–70%), followed by Germany, France and other EU countries. The owner stressed that the company is focused on “...a few fundamental concepts: quality, flexibility and customer service, which is very well recognized by EU partners” (interview 3).

Although some of the NTFPs, such as berries and herbs, can be found on the domestic local markets, almost all wild growing mushrooms are exported. In this regard and compared to the other companies active in NTFP sub-sector, InterMak is the first company that started offering wild mushrooms on the domestic market. The idea for this innovation came from experience gained at international fairs, where the owner recognized the potential for offering wild mushrooms as an end product. In cooperation with the large supermarkets chain CAREFORE, InterMak started with selling wild mushrooms on the market in FYR Macedonia in 2015.

In addition, InterMak organizes education for seasonal workers about the proper harvesting techniques, thus being the first company to offer such training in the business with wild products in the country. During the interviews, the owner of the company emphasized that this concept is a good example of enhancing social capital.

5.3.2. Information sources

The company has constantly grown since the beginning, starting with small production capacities and relying on the capabilities of the management team and employees. The owner's expertise from the previous engagement in the sub-sector was crucial for running the business.

5.3.3. Finances

The increase in production capacity and business development was maintained through the owner's personal investments and by obtaining bank loans. According to the owner, InterMak is not applying for state and EU subsidies (IPARD) because the bureaucratic procedure is too demanding. “I know many companies who apply for such subsidies, and the time, energy, money invested in this is not worth it” (interview 3).

5.3.4. Coordination, cooperation and conflicts

Currently, in FYR Macedonia, approximately 50 companies are active in producing NTFPs. InterMak has created networks and relations with many of them through sharing transportation and exporting costs, the supply of raw materials, and participation at international fairs.

The owner of InterMak stressed that “...overlap between regulations from two Ministries regarding the utilization and gathering of NTFPs confuses the companies. There is a need for clear regulations and jurisdiction. The time for issuing licenses and supportive documents for export are time and money consuming and a problem for picking NTFPs” (interview 3).

5.3.5. Success factors

For success factors, the owner identified cooperation with other international companies, as well as cooperation with business partners. They share similar thinking about the process of harvesting, processing and the transportation of NTFPs, which he sees as very important. Furthermore, they share similar notions of the quality standards that the business should meet, which they successfully transfer to the pickers, who participate in training on how to harvest sustainably.

5.3.6. Overall innovation analysis

The data from the interview indicates that the previous engagement

¹¹ <http://www.schweighofer-prize.org/index.php?lang=EN>

Table 2

Relevant actors for supporting NTFP innovations.

Type of actor	Organization name	Role	Relation to NTFPs
Serbia Ministry	Ministry of Economy - Sector for SMEs	Financial support for SMEs	Indirectly related
	Ministry of Trade, Tourism and Telecommunications - Sector for Tourism	Financial support for tourism development and innovations in tourism	Indirectly related
	Ministry of Agriculture and Environmental Protection - Directorate for Agrarian Payments	Subsidy program in agriculture	Subsidies for investments in production, processing, and sale of fruits and mushrooms
			Indirectly related
Agency	National Agency for Regional Development	Conducts projects that strengthen competitiveness and innovation by harmonizing business activities with the demands of foreign standards; improvement of business processes, products and services, and strengthening human resources	Indirectly related
	Serbia Investment and Export Promotion Agency (SIEPA) ^a	Helps companies to export products and services and become competitive on foreign markets; provides subsidies for standards and certification, design and promotional material for new products, visiting fairs abroad	Indirectly related
Other public actors	Innovation fund	Provide funding for innovations, through cooperation with international financial organizations, donors and the private sector	Indirectly related
Slovenia Ministry	Ministry of Economic Development and Technology	Support companies in fostering their competitiveness and adapting to changing global market	Frequent public tenders for supporting innovative companies
	Ministry of Agriculture, Forestry and Food	Provides institutional framework for forestry, especially through legislative, regulation and consultancy support	Funding research projects
Agency	Agency for Agricultural Markets and Rural Development	Key organization for the implementation of the Rural Development Plan (e.g., issuing tenders, assessing applications and processing the payments).	Providing a favorable environment for investing in business in rural areas
	SPIRIT Slovenia - Public Agency for Entrepreneurship, Internationalization, Foreign Investments and Technology	Realization of national development programs aimed at achieving innovative, technologically developed, export-oriented economy and attracting foreign investments	Public tenders for companies to apply - innovative businesses
FYR Macedonia Ministry	Ministry of Economy - Sector for SMEs	Financial support for SMEs	Indirectly related
	Ministry of Agriculture, Forestry and Water Economy	Providing subsidies; financial support for SMEs	Subsidies and other financial support
Agency Other public actors	Agency for Entrepreneurship	Financial support for SMEs	Indirectly related
	Fund for Innovation and Technology Development	Financing newly established and co-financing existing SMEs with the aim of encouraging and implementation of innovation activities	Indirectly related

^a SIEPA stands for the Serbia Investment and Export Promotion Agency.**Table 3**

Relevant policies for innovation in NTFPs.

Name of the documents	Relation to NTFPs
Serbia Strategy for support of the development of SMEs, entrepreneurship and competitiveness (2015–2020) National Strategy for Sustainable Use of Natural Resources and Goods (2012) Forestry Development Strategy (2006)	Not related to any economic sector in particular, but to the whole SME sector
	Directly related to NTFPs - fostering actions aimed at adding value to all forest products and encouraging forest management for NTFPs
	Two objectives are indirectly related to innovations and NTFPs: (1) the education of a competent professional staff for the forest sector and (2) fostering applied multidisciplinary research, the development of forestry technologies and capacity building in research institutions
Slovenia Rural Development Program (2014–2020) Resolution on National Forest Program (2007) National Program of Measures for Fostering Entrepreneurship and Competitiveness (2007–2013) Framework for State Aid for Research, Development and Innovation (2014) Research and Innovation Strategy of Slovenia 2011–2020 (2011)	Support in the establishment and development of micro-companies; support in the diversification of agricultural activities (2007–2013); support for investments into non-agriculture activities (natural and cultural heritage and traditional knowledge) (2014–2020)
	Gives a set of directions for the future development of the NTFP sub-sector; foster processing of NTFPs as a way to add value, foster entrepreneurship linked to NTFPs and increased trade with NTFPs
	Public tenders for financial grants aimed to foster innovation in entrepreneurship - also related to NTFP
	Public tenders for financial grants aimed to foster innovation in entrepreneurship - also related to NTFP
	Development of infrastructure for innovative business; increase the number of innovative enterprises and start-ups; complete system of support for innovative business
FYR Macedonia Strategy for Sustainable Development of Forestry (2006) Innovation Strategy of the Republic of FYR Macedonia (2012 – 2020)	Promotion of NTFP-based enterprises to provide employment and income to rural households
	Drives competitiveness and economic development based on knowledge and innovation

of the owner in the NTFP value chain was crucial for starting the business. The network and cooperation inherited from the past combined with the owner's expertise were main supporting factors for the innovation. By offering trainings on NTFP harvesting, the company had established (social) capital with the pickers and wanted to secure sustainable harvesting and good quality of products. The possibility for replication of the innovation and main business activities are the main challenges that the company is facing. In the interview, the owner stressed “we know that other companies will follow our example, and therefore, we are already prepared for next innovative “projects” that will come in the near future” (interview 3).

6. Discussion

This paper aimed to understand innovation systems and processes related to NTFPs in three SEE countries. The joint history of these countries in ex-Yugoslavia gave a similar starting point for the development of the NTFP sub-sectors, which poses the question which different directions the countries took in supporting businesses in NTFPs.

6.1. Role of institutional systems in innovation support

Our results show that organizations at the national level (public and semi-public) have mostly indirect roles in the NTFP sub-sector through the creation and implementation of various policies for general business support.

The threefold role of institutions in the support of innovation processes (Rametsteiner and Weiss, 2006) was not fully confirmed in the analyzed case studies and that there are differences in the fulfillment of these roles in specific countries (e.g., in FYR Macedonia, they provide subsidies, while in Slovenia, they mainly provided information).

We can note that many of these policies exist only from the 2000s, meaning that some of the innovation cases (Serbia, FYR Macedonia) were operating for a long time without specific institutional support. Other studies (Ludvig et al., 2016a, Nedanovska, 2012; Nedeljković, 2015; Nonić et al., 2013) also show that at in EU as well as non-EU countries, there are only a few NTFP specific policies, which are often included in a broader context with broader goals, e.g., for rural development, entrepreneurship and business development, environmental or nature conservation, etc. This is probably due to the lack of comprehensive innovation policies within the forestry sectors in Europe (Rametsteiner et al., 2005; Weiss et al., 2011), which counts even more for wild forest products as they are very often not seen as part of the forest sector (Ludvig et al., 2016a; Weiss et al., forthcoming).

In all the cases, the innovations were largely carried out solely by the companies – a fact which is not untypical in the field of NTFPs in Europe (Ludvig et al., 2016a,b), but not always so pronounced as in our cases.

6.2. Support mechanisms in innovation processes

We identified in more detail the support mechanisms that were functioning well and the ones that were not functioning well over time (Table 4).

In our study, prior knowledge, which was marked by Shane (2000) as an important aspect of company innovativeness, was present in all of our cases. Macedonian and Serbian entrepreneurs were engaged in similar businesses before they decided to start private companies. Hence, they had prior knowledge about the markets, how to serve them, and what the customers' problems were. The Slovenian entrepreneur is a climber himself, so despite not being in business, he had previous knowledge in the field. NTFP innovators from different European countries also had prior knowledge of how to create a “for-profit” venue, collected information on their own initiative in step-by-

Table 4
Internal sources and external innovation support in the three cases.

	Financial sources (incentives, grants)		Information sources (from other actors, relevant organizations) & previous knowledge		Cooperation & coordination (with other actors)	
	Internal (enterprise level)	External (institutional level)	Internal (enterprise level)	External (institutional level)	Internal (enterprise level)	External (institutional level)
“Teaspoon-shaped bags” (Serbia)	/	Bank loan support from SIEPA	From previous experience (work in public enterprises in ex-YU) own ideas for new product	/	Good cooperation with collectors	/
“Wooden knots as climbing wall holds” (Slovenia)	Personal saving	One-time grant from national program	The owner is a climber and had installed a number of climbing walls From other small scale entrepreneurs; a larger company producing plastic holds	Government service e-VEM	With forest owners or concessionaire companies With company working on coating for climbing holds	With the patent company
“Placement of wild mushrooms in the domestic market” (FYR Macedonia)	Personal savings	Bank loan	From previous experience (work in public enterprises in ex-YU)	/	With 100 seasonally engaged workers; other NTFP companies	Export companies in Europe

step increments through self-education efforts and “relied very much on their own initiative and a continuous trial-and-error kind of research rather than formal scientific knowledge or research” (Ludvig et al., 2016a, p. 36).

All three companies developed innovations largely due to their high interest and efforts using mainly their own sources of income or bank loans. When starting up their business, these entrepreneurs were mainly driven by personal desire for profit and autonomy, which are, among others, major driving forces recognized in the literature (Hessels et al., 2008). Sometimes, the cause can be that people are simply “forced into entrepreneurship because they have no other options” (ibid, p. 324). However, “hardly anybody starts a business in order to achieve innovation, job creation, or economic growth at the national level” (ibid, p. 324). Our case studies confirm these statements, i.e., these innovations were made spontaneously. However, it is important to mention that innovations “may be instrumental to achieving a higher income” (ibid, p. 326), which was the situation in our cases.

As stated in the literature (Aidis, 2005; Cull et al., 2006), SMEs in “poor” and/or transition economies very often have difficulty obtaining access to financing. Due to that, they “have to rely largely on their proprietors’ financial resources, which are likely to be limited” (Cull et al., 2006, p. 2). According to Jarský (2015), having a financial means can have a significant influence on innovation implementation, i.e., public financial support is evaluated as very significant. Other studies discovered that in many countries, there is a lack of support to SME development in forestry, and if the support exists, it is often insufficient or poorly targeted (Macqueen, 2007). Such situations are often not dependent on the sector from which the firms are originating. In those terms, similar results were found in Sweden, indicating that “not many SMEs utilize publicly financed support systems” (Boter and Lundström, 2005, p. 255). Curran (as cited in Boter and Lundström, 2005) explains two possible reasons for the low level of utilization of public support. From one side, entrepreneurs are usually characterized by strong willingness to be independent and autonomous. On the other hand, “the content in support programs is frequently standardized, which makes it less useful to specific SME premises” (Boter and Lundström, 2005, p. 255).

In our research, external financial support was obtained for the Serbian and Slovenian cases, which were one-time grants from national support programs. However, their amount was not significant for the success of the businesses. Information support was also missing for all cases, especially in regards to specific business aspects. In this respect, all three companies relied on their own experience and knowledge from previous work experience. Similar findings were also observed in other studies, which claimed that entrepreneurs involved in NTFP business had to rely on own initiatives and efforts, i.e., “their own retail and institutional networks were most important” (Ludvig et al., 2016a). In the Slovenian case, information was obtained only for the bureaucratic aspect of business development.

Cooperation aspects were important for all three companies. In the Serbian and the FYR Macedonian case, these aspects were related to cooperation with collectors and their engagement in business. In the Slovenian case, it was observed through the good network with forest owners or concessionaire companies from whom material is collected. Furthermore, the Slovenian case developed regular cooperation with a university and another company that is doing the thermal processing of the wooden knots. In the Serbian case, good cooperation with collectors and customers in order to ensure the quality of the products (standards) were regarded as relevant. In the FYR Macedonian case, the education of seasonal workers, good knowledge of the sector and specific products were important from the start. Cooperation with other companies, through knowledge exchange, is a very important part of business because “learning allows a company to be more innovative” (Nybak et al., 2009). Nybak et al. (2008) claimed that social networking and level of innovativeness are positively linked. Mary George et al. (2016), in their review study on entrepreneurial opportunity recognition,

emphasized the importance of social capital as one of the main influencing factors in this process. This is because “firms with stronger ties to local and sectoral communities may have greater access to information on new technologies, which feeds back into the firm’s ability to assimilate and exploit this information” (Micheels and Nolan, 2016, p. 128).

6.3. Possible reasons for low innovation support levels

The poor existence of external support in the three cases can be first related to the early stage development of the innovation support system, and second, to the specificity of the NTFP business field. With regard to the first reason, we see that the necessary interactions between organizations, the institutions in place and the companies was not set to a significant level, resulting in the low profile cooperation in both directions. Organizations were seemingly less proactive in providing information and/or finances and thus not successful in reaching target customers. Similar findings were found in the research of Rametsteiner et al. (2005), who state that institutional level actors usually underestimate the relevance of information as an essential factor for innovation and overestimate the difficulties that forest owners face with administrative and legislative obstacles. Furthermore, the absence of targeted financial support for innovative business (Rametsteiner et al. 2005; Tieguhong et al., 2012) can be a big obstacle because financing gaps of forest-based enterprises differ (Tieguhong et al., 2012). For example, in the Czech Republic (in the period 2007–2013), there was a greater number of operational programs (which theoretically means more potential funding opportunities for forestry), but many of them remained unused by forest entities due to the lack of clarity in eligibility. However, a lack of policy coherence is not necessarily a negative characteristic because it might be a triggering factor for innovativeness as it might force actors to consider other solutions (Jarský, 2015). This was proven to be the case in these three examples. On one side, we discovered a range of different support measures, but they were unused by the case study companies for various reasons. The companies were reluctant and not well trained to take necessary actions. In the Macedonian case, the main reason for low activity in receiving support was because the bureaucratic procedure was perceived as being too complicated. In the Slovenian case, the initial will and enthusiasm was reduced over time due to the specificity of the funding calls and the overly specific features of the product, which thus did not qualify for support. Thus, the owners were forced to find other solutions for financing (mostly self-financing), which is similar to many NTFP-based enterprises in other European countries (Ludvig et al., 2016a).

Following this specificity of the products, we come to our second assumption to explain reasons for the low support for the presented innovations. Based on the expert interviews, it can be noted that the role of NTFPs and related innovations is still very marginal and secondary in the investigated countries. The challenge lies in the characteristics and problems of NTFPs, which are often presented as potentially promising but at the same time a neglected opportunity (Buttoud et al. 2011; Kubeckzo et al. 2006). NTFPs are often termed as “side-products”, “niche markets” (Mantau et al., 2001) or even “non-market goods” (Mavsar et al., 2008). Thus, NTFPs usually have few or no innovation policies formulated and are often somewhere in-between sectors or seen as by-products (Weiss and Rametsteiner, 2005; Weiss et al., forthcoming). In this way, as also concluded in a study of entrepreneurship in the NTFP sub-sector in Western European countries (Ludvig et al., 2016a), external innovation support is hardly active in supporting the innovations of small-scale NTFP companies.

7. Conclusions

In the past, the NTFP sub-sector was organized in each of the countries similarly through the involvement of state-enterprises that

were responsible for all stages of the NTFP value chains, including processing and export activities. Private businesses dealing with NTFPs existed but were very limited and mainly low profile, primarily buying and selling the product on the local markets. The framework description shows that regular cooperation between countries in ex-Yugoslavia existed and was important for the strength and existence of the sector. Currently, in each country, the NTFP sub-sector is dominated by private enterprises, such as some of those that were involved in the analyzed case studies. The NTFP sub-sector seems to be marginal from an innovation perspective in all three countries. An analysis of the framework conditions for NTFP innovations shows that support was low (or almost missing) in all cases. The responsibility was left to the private sector to find opportunities and implement innovation in the market. This challenge was related to the lack of specific NTFP actors, policies and support measures, as analysis of relevant actors and policies showed that only the ministry responsible for agriculture in Serbia and the agency responsible for agriculture and rural development in Slovenia have direct role in NTFP innovations. In addition, as shown in Table 3, forest-related strategies are lacking direct support for NTFP innovations. Similar situation is with SMEs and entrepreneurship-related strategies, because these are not focused on any economic sector in particular. Furthermore, it was related to the issue of “not belonging” to any specific sector, which resulted in mixed jurisdiction over these products. As a result, this created confusion and discouraged private entrepreneurs from being more active in the search for support.

In sum, the poor support for NTFP businesses is similar in all three countries due to poorly developed innovation systems for rural businesses in general as well as due to the fact that the field of NTFPs are neglected by the established agricultural and forestry sectors. From this observation we conclude that the companies struggle with problems very similar to western European EU member states (Ludvig et al., 2016b), although it seems that institutional support structures for rural businesses are better developed in some western European countries such as in Austria (Weiss et al., forthcoming) or Finland, Wales and Italy (Ludvig et al., 2016a, b). More detailed analyses would be needed to trace down support factors in innovation processes and their effects on business development.

We can conclude that the studied innovations were developed due to the individual engagement and persistence of the company owners, as well as their prior knowledge. Other important aspects were related to the specificity and uniqueness of the NTFPs, which were able to satisfy the niche market and were easily recognized by customers. Cooperation with other companies and/or collectors at the national level was also identified as important in all cases.

In a situation where there is a shift in society's needs towards new forest goods and services, it is necessary to provide a framework for public policy with consistent and well coordinated objectives, strategies and instruments. Developing specific, product-by-product or more locally related policies, as well as responsible organizations for NTFPs, would certainly improve the situation in the analyzed countries. For an upscaling of innovations in the NTFP sub-sector, institutional innovations would be needed that provide effective structures for innovation support in the field, including the provision of specific information, financing and coordination support (Ludvig et al., 2016b; Weiss et al., forthcoming). Policy goals, financial support schemes and informational measures should better correspond to the specific nature of NTFPs. More effective innovation support systems for NTFPs would also have to find synergies between related sectors such as forestry, agriculture, and tourism. Sectoral boundaries are a major hampering factor for innovation in forestry (Rametsteiner et al., 2005). Measures are needed for two-way communication between companies and the relevant actors regulating NTFPs. This would potentially lead to the recognition of bottom-up initiatives within the institutional system and would be a precondition for an establishment of focused and tailor-made support measures for the sector (Weiss et al., forthcoming).

It seems that both the innovation systems and the perceived

importance and value of NTFPs need to progress further in the transition process in order to become recognized and find their place between the sectors.

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ARTICLE 3

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Article

Social Innovation to Sustain Rural Communities: Overcoming Institutional Challenges in Serbia

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Abstract: Responding to a number of longstanding challenges such as poverty, wide-ranging inequalities, environmental problems, and migration, requires new and creative responses that are often not provided by traditional governments. Social innovations can offer socio-ecological and economic solutions by introducing new practices that reduce social inequalities, disproportionate resource use and foster sustainable development. Understanding the role of social innovations is especially complicated in unstable institutional environments, e.g. in developing countries and countries in transition. This paper analyses nine social innovations in rural areas in Serbia, based on in-depth interviews and document analysis. This analysis reveals factors that facilitate or constrain social innovations whilst simultaneously identifying related formal and informal institutional voids, for example, poor law enforcement, a lack of adequate infrastructure, lack of trust, as well as norms and values that bolster patriarchal systems. The results that emerged from this research show that social innovations are operating in spite of these challenges and are facilitating improvements in a number of the aforementioned challenging areas. Some innovators engage in social entrepreneurship activities because of subsistence-oriented goals, while others follow idealistic or life-style oriented goals, thus creating new social values. Moving beyond these observations, this paper also identifies means to overcome institutional voids, such as creation of context-specific organisational structures, improved legal frameworks, and innovative financial mechanisms.

Keywords: institutions; policy support; institutional void; transition countries; forestry; rural development

1. Introduction

Societies around the world are facing a great number of complex and longstanding challenges such as poverty, hunger, increasing inequalities in different spheres of life, environmental challenges, and unprecedented levels of migration [1]. It is becoming increasingly apparent that solutions for such pressing problems cannot be addressed solely by traditional governmental approaches as they are not delivering the required policy results [2]. This weakening of state capacity to deal with these issues has been accompanied by evolution within civil society that has seen the emergence of new citizen-actors and new forms of mobilisations [2] which find innovative ways to fill these capacity shortfalls. In such situations, where there are no generally accepted rules and norms about how policymaking and politics are to be conducted, we can talk of existing institutional voids.

The existence of institutional voids means that an institutional framework necessary to guide and support the proper functioning of activities within a given context is absent, weak or deficient [3,4]. Such voids stem from information problems as well as misguided and inefficient regulatory implementation

mechanisms [3], but may also include the lack or failure of informal institutions [5]. Such conditions constrain and impede solving specific policy issues [6] and lead to severe social inequalities [5]. In these conditions, multiple actors (companies and other types of organisations) seek innovative solutions to mitigate social problems [7,8].

In such contexts, social innovation has gained interest among policymakers, foundations, and researchers largely because they are assumed to offer solutions to not just localised problems but also to systemic and structural ones [9]. In policy discourse, social innovations have been presented as a solution to many kinds of old and new social challenges at a time when there is growing economic pressure on public administrations [10,11]. Social innovations are seen as an opportunity to support social wellbeing [12,13], tackle marginalisation [14], and trigger transformative changes through collective action [15].

Numerous definitions of social innovation have been proposed over time [11,16–21]. Some of them focus on new actor-relationships, interactions and new decision-making processes, whilst other definitions arise from having their focus elsewhere [22]. What is common to most of them is that they focus on various “new arrangements” to address societal needs and problems [23]. For the purpose of this research, we apply the following definition developed by the SIMRA consortium which states that social innovation is “the reconfiguring of social practices, in response to societal challenges, which seeks to enhance outcomes on societal well-being and necessarily includes the engagement of civil society actors” [13] (p. 1). We understand social innovation as a broad process, encompassing the concepts of social entrepreneurship and social enterprise, but also a range of other social initiatives and activities, which can be identified as socially innovative in certain settings. We stress this issue to clarify that we do not restrict the term “social innovation” to the establishment and activities of social enterprises, not all of which are innovative [7]. As such, this study focuses on institutional settings that are of relevance for various types of social innovations and enterprises within the Serbian context.

The Role of Social Innovations in Rural Areas

There is agreement that the contribution of social innovations is bringing positive change that can influence the overall development of urban communities [24]. However, the potential of social innovations has also been acknowledged and studied in the context of rural areas [8,23,25–30]. Developing new arrangements and cooperation modes for specific regions and local problems can support rural communities in their efforts to address their current challenges as well as contribute to reducing social inequalities and disproportionate resource use. Many studies have shown that the common aim for engaging with social innovation is an increased sense of belonging to a local area and community and the desire to prevent excessive emigration [28] by creating innovative and vibrant rural societies [16].

As noted by Copus et al. [8] social innovation is simultaneously dependent on local resources and participation on the one hand, and interconnections across geographical and organisational boundaries on the other. Such a multi-stakeholder perspective emphasises the importance of links between civil, public and private sector actors and the reinvention of the traditional roles of actors, which is seen to be crucial for rural social innovation processes [8,31]. Studies that explore how social capital stimulates social innovations and entrepreneurship in rural areas show that the complex interplay of different forms of social capital is important for developing socially innovative initiatives [32–35]. Lang and Fink [32] emphasise the complexity of the intermediary role of social entrepreneurs, linking local communities to powerful regime actors in multilevel network arenas within rural contexts. This also shows that social innovations are related to the much broader and dynamic political-economic context. Understanding how social innovators are impacted by the institutional framework in the process of generating ideas and solutions is important for effectively improving any institutional environment. This is especially important in unstable and deficient institutional environments, e.g. in developing, war-ravaged, or transition countries—where policy problems need to be solved despite significant institutional voids [3]. One strand of literature assumes that new socially responsible initiatives need

strong and functioning institutional arrangements, where the government, markets and civil society create and maintain an enabling environment for innovations [36–38]. However, another strand of literature empirically shows that social innovation initiatives usually emerge in environments that are institutionally deficient [7,39–42].

This paper aims at examining the assumption that institutional voids impede the contributions of social innovations to sustain and develop rural communities in Serbia. For this purpose, we focused our research on both supporting and hindering factors which influenced the selected case studies of social innovations. We assumed that by elaborating a deeper understanding of the respective innovation processes we will also identify institutional voids. For this, we aimed to provide answers to the following two research questions:

- What are the particular institutional voids that hindered the emergence and development of social innovations?
- Which supportive factors are helping to overcome identified institutional voids?

This paper contributes to the research field of social innovation in rural areas, more specifically, in rural areas of countries in transition. In doing so, it explores empirical evidence in case studies and draws on experiences of social innovators from Serbia, a country with an economy in transition. The research field of this contribution is still in an embryonic phase. Only a few articles have currently been published that investigate how institutional factors affect and shape social innovation processes in the fragile contexts of emerging market economies [7,40–42]. In fact, there are no empirical studies involving social innovation in rural sectors in Serbia. This article serves to fill this gap.

Following the introduction, we first outline the theoretical background by introducing an institutional void perspective. Section 3 begins by describing the research design as well as the methods of data collection and analysis as applied to our case studies before introducing the institutional context of social innovations in Serbia. The following results section, Section 4, is organised into three parts: part one provides descriptions of our nine case studies, based on the data collected; part two identifies factors that support social innovations, and part three describes those factors that were found to hinder the social innovations researched in our collection of case studies. The Section 5 discusses our findings from an institutional void perspective. Finally, the concluding section demonstrates that there is a pressing need to improve the institutional context in Serbia to better support and sustain social innovation initiatives in the long run.

2. Theoretical Background

We built our research on institutional theory, recognising that human behaviour is shaped jointly by the constraints, incentives and resources provided by formal and informal rules (institutions), which can be more or less compatible with each other [43]. Institutional theory defines institutions as humanly devised rules that structure political, economic and social interactions [44]. Institutions can be formal and informal [44,45]. In the category of formal institutions, we understand these to be the set of regulatory institutions, such as laws, regulations, strategies, as well as the constraints and incentives arising from government regulations. Informal institutions refer to more implicit, slowly changing, culturally transmitted and socially constructed rules of behaviour. These can be further divided into cognitive and normative institutions [45] and represent more tacit constraints on societies which guide expectations and ensure greater predictability in social exchanges thereby shaping individuals' and organisations' choices and actions [44]. Guided and facilitated by institutions, profit and non-profit entities provide numerous products or services designed to respond to social needs which are not always addressed by institutions [46]. Similarly, innovations occur under the influence of existing institutional environments and their success or failure is largely determined by this influence [46].

Examining social innovations, most of the literature focuses on social innovations in developed countries in Western contexts [47]. Such cases represent situations markedly different from those in developing or transition economies, where poverty, unemployment and diverse social problems are much more pronounced [7,40–42] and are characterised by institutional voids [3,4].

As is the case with the division of institutions into formal and informal, there is also a division of institutional voids into formal and informal. Formal institutional voids assume a lack of or failure of formal institutions (i.e., laws, regulations, infrastructures, and supporting apparatuses) to facilitate efficient and effective market transactions and operations [3]. Greater stability in and efficacy of formal institutions in principle can better support entrepreneurial activities [46,48]. Formal institutional voids can take different forms, manifesting themselves as ill-defined regulations, a lack of well-defined property rights and minimal investment sources provided by the state or the absence of or poorly developed infrastructure. Other voids relate to the lack of formal educational organisations which lead to a pool of unskilled potential employees. Furthermore, inadequate provision of specialised information, non-participative procedures by governmental bodies, coupled with the absence or non-functional institutionalised intermediaries are also types of such institutional gaps [46,49,50]. Such voids can hamper development by prohibitively increasing operational costs or favouring one segment of the population over another [5,46]. These voids can differ even within a country because the implementation of formal rules can vary across regions [51]. This especially becomes relevant when we focus on rural areas, which do not have the same support in terms of infrastructure and other resources when compared to urban areas.

It is assumed that informal institutions can compensate for the deficiencies resulting from a formal institutional void [5,52]. However, there may also be informal institutional voids, i.e. a lack of or a failure of informal institutions to support efficient and effective market transactions. This conceptualisation does not refer to missing norms, values and beliefs, but to settings in which there is a lack, suppression, or limited manifestation of very specific informal institutions that could support efficient and effective market transactions [5]. Informal voids exist for a number of reasons, can differ significantly between localities [5] and can be dependent on the durability of informal institutions [53]. For example, in a number of countries' patriarchal-based systems women have been excluded from participation in economic activities and lack access to property rights. Such voids create barriers for women to build personal financial security and negatively influence their ability and/or willingness to invest in a business [46]. This is social exclusion or marginalisation, which stems from norms and beliefs in a society that certain individuals, based on their gender, ethnicity, age, or other demographic attributes, lack the status to take part in certain market activities, to own property, and/or to participate in certain activities [54]. Other informal institutional voids may also exist when dominant societal beliefs allow elites to leverage their own power and misallocate public resources that satisfy their own personal interests rather than supporting efforts that further broad local development. Because of their socially accepted status, elites may also be allowed to ignore other norms to the detriment of other groups [46]. Additionally, various technological advancements impacting a society (i.e. climate science, transportation, and medicine) can be met with varying levels of institutionally-derived scepticism. This often becomes manifested with the favouring of ineffective practices or applying traditional management that can hinder the developmental processes of enterprises or result in ineffective use of resources [46]. Other observable informal institutional voids include relationship barriers arising from a lack of trust in society for various reasons [46], e.g. because of corruption [46,55].

3. Methodology and Methods

3.1. Research Design, Data Collection and Analysis

Since the aim of this study is to provide in-depth analyses of social innovations and related institutional voids, we applied a qualitative research design to yield thick descriptions of processes of social innovation in a multiple case study research design. The first part presents factors that enabled

or hindered the development of social innovations in Serbia and summarised characteristics of the selected case studies. The second exploratory stage [56] was designed to provide a better understanding of the institutional void concept in this particular setting and related supporting institutional factors that to a greater or lesser extent succeed in filling those gaps. In this study the term “hindering factors” encompasses a broad scope of factors that are or create barriers for social innovations. However, it must be noted that such hindering factors are not necessarily manifested as or even result from an institutional void.

For data collection purposes several qualitative techniques were applied, such as in-depth interviews, content analysis of organisations’ websites and other materials and a literature review. Triangulating data collection by applying these various techniques allowed us to cross-check data validity and reliability. Primary data was collected by conducting nine qualitative in-depth interviews, with the key representative of each social innovation case study, i.e. with those people who initiated and further developed the respective innovation. They provided extensive knowledge of the cases, the respective context and individual perspectives. In order to understand the meanings that the respondents assign(ed) to institutional factors, an interview guide with nine open questions was developed. Interviews were conducted from September 2018 to February 2019 and lasted from 45 to 90 minutes, with an average length of 60 minutes. They were conducted face to face, in the Serbian language and recorded. Secondary data was collected by content analysis of various organisations’ websites and materials as well as a literature review of publications on social innovations and entrepreneurship in Serbia, inter alia for gaining a richer understanding of the contextual factors when undertaking the case study analyses.

Data analysis started with a transcription of interviews in the NCH software. Subsequently, we applied an analysis of the transcripts by inductive coding, assisted by Atlas.ti software. Through an iterative process, initial codes were grouped into more focused and substantive categories of supportive and hindering factors, which are of relevance to the particular case studies (see Appendix A) and these codes were then related to concepts of formal and informal institutional voids.

3.2. Case Study Sampling

All case studies selected for this research are located in Serbia, which was chosen for this research as it is a rich empirical site where social innovation discourse has emerged in the recent years with an increasing number of social innovation initiatives. Due to its historical background and current transition phase, Serbia was viewed as highly relevant for this research not only because of its overall socio-economic system but also because of its accession process for EU membership and its resultant processes of harmonisation, legislation, and regulation.

The selection of social innovation cases for analysis was done by purposive sampling. Cases were identified through various methods—initial desktop research and screening, and expert’s interviews with actors active at the national level [57]. Some cases were identified by the snowball technique (innovators suggesting other cases) [58].

The selection of the nine case studies was based on the following criteria: (1) “innovation” in terms of our definition of social innovation [13] (p. 1), (2) being active in rural areas, (3) representing different types in terms of organisation and size. We also desired to have cases with a broad geographical distribution across Serbia in order to identify specific challenges occurring in different local contexts.

3.3. Background Descriptions

After Serbia’s democratic change in 2000, the economy and provision of social services virtually collapsed after decades of state control [59]. Serbia entered a transition process requiring profound economic and political reforms that took important steps toward firmly establishing democracy and a functional market economy. The initial steady growth rate was stopped with the financial crisis in 2008, from which the country is still struggling to recover. Currently, the most pressing social problems are widespread poverty, rising unemployment, regional disparities combined with corruption and

inefficient public administration [59,60]. The high unemployment rate is one of the largest problems facing the Serbian economy with some 14.8% of the workforce being unemployed in the first quarter of 2018 [61]. The widespread poverty and social problems, together with limited support from both the private and the public sector, has created a need for innovative models that could support recovery and growth, bringing further economic reform and positive social change [59].

The private sector started to develop significantly after the 1990s with the process of economic transition and after the cessation of state-owned enterprise activities in many sectors [62]. However, socialist and post-socialist governments have not encouraged and supported an entrepreneurial culture [59,62], meaning there is still genuine reluctance on the part of the population when it comes to starting private businesses. As such, the level of development of the private sector in the Serbian economy is still low, even in regional comparison [63].

In the past decade, social economy models were introduced [59] which stimulated the emergence of social enterprises and recent social innovation concepts, often mixed with social entrepreneurship concepts, have become prominent in debates in the last few years. Despite limited institutional support and recognition of such concepts by policymakers, there is a growing interest in social innovation and social entrepreneurship in Serbia, mainly by civil society organisations. Social enterprises and innovations are emerging in an evolving institutional framework without targeted support or specialised public sector partners [64]. A major factor driving interest in this social innovation and entrepreneurship is the accession process to the European Union and the large inflow of European and international funds [63].

Some researchers argue that the social entrepreneurship sector in Serbia has entered its institutionalisation stage with the introduction of social cooperatives as a category with the law on cooperatives and the recognition of social enterprises as service providers in social care [64–67]. Since 2012, there have been several attempts to also pass the Law on Social Entrepreneurship by the Ministry of Labor, Employment, Veterans' and Social Affairs, but the various drafts have thus far not met the expectations of stakeholders. A major point of disagreement has been that the law restricts the social entrepreneurship concept to the employment of vulnerable groups, puts an obligation to the organisations to transfer 50% of their profits into a state fund and limits the level of profit that social enterprises can make. When considering the broader perspective, social innovation in Serbia is regulated primarily by a number of policy documents stemming from different sectors and there is clearly a lack of strategically oriented and legally-binding legislation supporting social innovations [57].

4. Results

The analysis of nine cases of social innovations in rural areas in Serbia provides a very rich and manifold picture of how various factors can support or hinder the development and existence of these initiatives. This paper focuses on the identification of institutional voids, which are revealed by looking at hindering factors and identified needs. This, together with the overview of supporting factors, serves as a solid foundation for a better understanding of how social innovation cases are coping with and addressing institutional barriers or voids, and best facilitate drawing conclusions about potential solutions.

4.1. Overview of Cases

The nine cases represent examples of social innovations initiated by civil society organisations. They started operations after the year 2000, i.e. following the start of the transition process in Serbia.

“... after the 2000s when we chose our European perspective, which I cannot grasp for life of me, there was a period of 10 years of complete idiocy and a rural policy without ideology and clear aim ... that only served to reduce the attractiveness of the agri-business sector in order to privatise it to big companies. And when this was done, sometime in 2011, the state realised that our young people were in exodus, especially from the village, it was total devastation of rural areas ... ” (CS7)

It was against this backdrop and the environment it had created that the social innovations we used as our case studies came into being. Our nine case studies represent examples of social entrepreneurship and innovation development in various rural areas of Serbia. The geographical distribution provides different contextual and institutional conditions for developing social innovations [64] given the variations in infrastructure availability and development between the northern (autonomous province of Vojvodina) and the southern part of Serbia, which is more under-developed and is rather isolated and marginalised. This is connected to the socio-economic power of the regions, where the north, west and central parts of Serbia feature more stable economic conditions and higher involvement of various actors. For example, in the province of Vojvodina, the presence of the regional government, as well as the number of organisations who work and support minority groups, provides a much stronger portfolio of economic and other types of support for development. This, at the same time, is challenging as it leads to weaker support from the central government (CS1, 8 and 9). A further difference between the regions is found in terms of natural resource potential. Figure 1 presents the geographical distribution of the cases selected for this study.

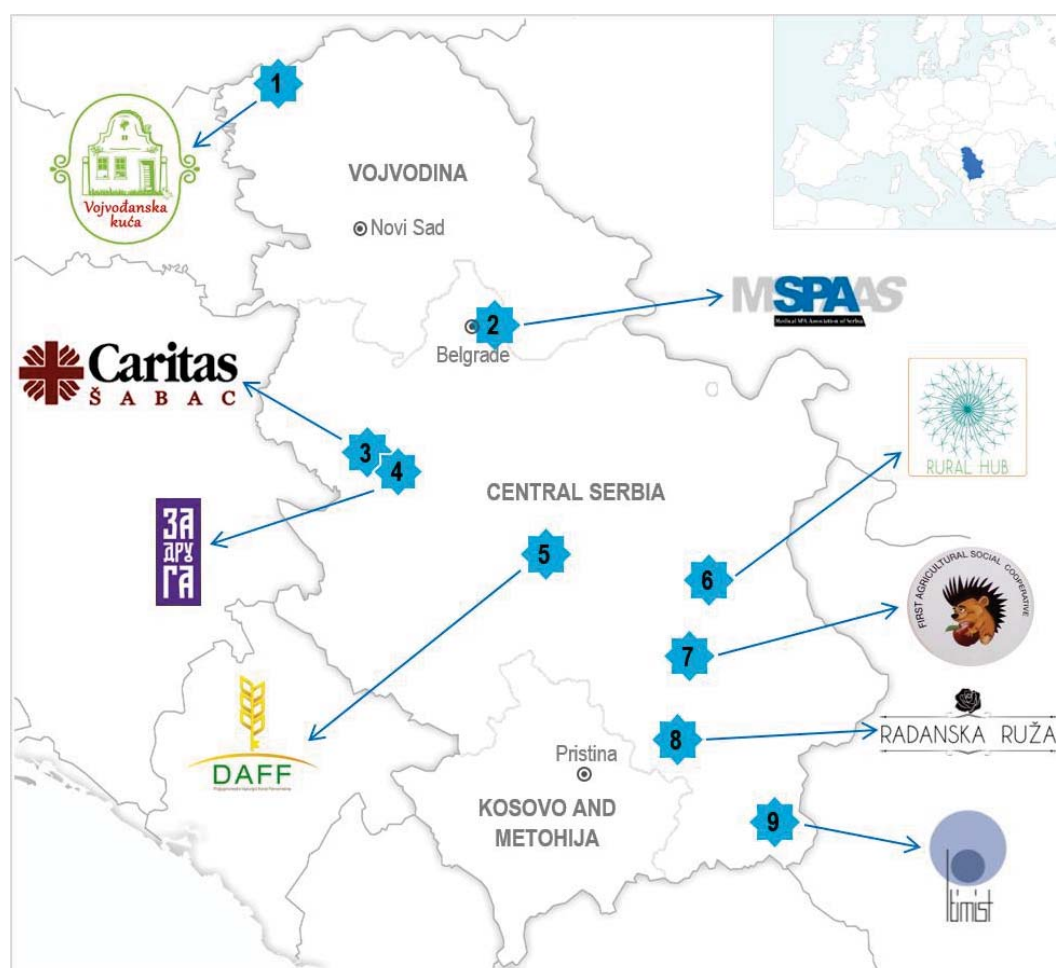


Figure 1. Geographical distribution of case studies (created by the authors).

These social innovations are tightly linked to the initial work of initiating associations and their work with various vulnerable groups such as people with disabilities (CS 3 and 8), unemployed youth (CS 7), women victims of violence or human trafficking (CS 1, 5, and 9), the Roma population (CS 9), efforts to address social injustice (CS 4), gender equality (CS 1, 5, 8, and 9), rural development (CS 6) and nature-health issues (CS 2). Through their previous work, these associations identified many problem areas which their local communities face and at the same time they identified opportunities to

improve local living conditions, often by providing work opportunities, or by creating conditions in the villages that will, in the long run, prevent emigration and contribute to the sustainable development of their initiatives.

“... we plan that what we do has multiple effects on the community, to also have an environmental impact, a social impact, to look at society from a broader perspective...” (CS5)

In terms of formal organisational structure, some of these are registered as associations, under the Law on Associations (2009) (CS1, 2, 3, 4, 5, 6, 9). Some of them are undertaking economic activities according to the same law, which allows the formal registration of the economic activities of associations in order to provide additional resources necessary for carrying out their basic (non-profit) activities (CS1, 3, 4, 9). The “Radanska Ruza” initiative (CS8) is another example, of a non-profit limited liability company that is a public-private partnership between “Women’s Association Ruza” and the municipality Lebane. The “First Social Agricultural Cooperation” (CS7) is operating under the Law on cooperatives (2015), which for the first time recognises “social cooperative” as a formal type of organisation.

A majority of our cases started from the formation of social enterprises with production-oriented activities primarily in the field of organic agriculture (CS1, 3, 4, 7, 8) or non-wood forest products (CS9). Pursuing such economic activities was designed to secure the financial and long-term sustainability of the work of the association and reduce their dependence on donors’ funds (chiefly international funds) whose initial support enabled all the organisations to be established in the first place. The profit generated from these activities is reinvested by the associations in social projects of their own or other similar organisations aimed at enhancing the wellbeing of their local communities. Apart of the economic activities, each of these organisations are creating different partnership models with the users and producers, thus giving these latter two groups equally important roles in the various social innovation aspects. Additionally, the organisations are actively working on educating and improving the skills of their producers/partners, frequently in partnerships with other civil society organisations (e.g. business plan development, branding, marketing, etc.).

In other case studies, social innovation is provided through the active involvement in the improvement of living conditions in local communities, by taking a participative approach for involving the communities in the work of the organisations. The case of “RuralHub” (CS6) works on empowering a village population by connecting rural and urban values and producing a portfolio of activities which succeed in activating and promoting the village, e.g. creating co-working space, the production of traditional products, conducting educational programmes, and improving tourism opportunities. The central role of the community is illustrated by the following quote from a “RuralHub” founder:

“What is innovative about RuralHub is the community, where the Hub is the whole village” (CS6)

The “Fenomena” association (CS5) with its Development Agriculture Fund Fenomena (DAFF) works on raising funds for individual agricultural producers in the region who are selected on very strict socially-oriented criteria. Thus, it integrates marginalised groups within local society into the market and seeks to prevent their exodus from the area. The “Medical Spa Association” (CS2) is socially innovative because it works to connect various disciplines in establishing and promoting a new concept of forest therapies. Thus, it promotes the use of natural resources and contributes to rural area development by means of new and attractive offer.

A list of all selected case studies with a short description and their main characteristics is provided in Table 1. Additional information is available in Appendix C.

Table 1. Description of selected social innovation cases (elaborated by the authors).

Name		Location of Case Studies from North to South	Description of the Social Innovation	Legal Registration Form
CS1	Vojvodina House (Vojvodjanska kuća)	Stanišić village, Sombor municipality	A village women's association promoting self-sustaining economic initiatives. Focused on modernising the rural practices and experiences, e.g. by means of education in organic agriculture and production and agro-tourism. The goal is to empower women who are victims of violence.	Association of Citizens "Women's Association Udahimo zivot"
CS2	Forest Therapy (<i>Šumska terapija</i>)	Active in different rural regions	The association provides education for conducting "forest therapy" treatments, a spectrum of techniques or treatments for improving mental and/or physical health. Work is based on combining expert knowledge of several sectors (e.g. medicine, forestry, food)	Association of Citizens "Medical Spa Association"
CS3	Garden of Sustainable Development (Avlija održivog razvoja)	Bogatić village, Šabac municipality	This initiative integrates social protection, agriculture, tourism and hospitality services. It aims to further the social integration and inclusion of people from socially vulnerable groups and to promote rural development in marginalised areas.	Association of Citizens "Caritas Sabac"
CS4	"ForFriend" (ZaDruga)	Šabac municipality—more villages	A social enterprise designed to support small and medium-sized agricultural producers from rural areas. They harvest fruits and vegetables from their family orchards, which are dried and packed in high-value products.	Association of Citizens "Initiative for Development and Cooperation"
CS5	Development Agriculture Fund Fenomena (DAFF)	Kraljevo municipality—more villages	Association of Citizens Fenomena established the "Development Agriculture Fund Fenomena" (DAFF), which operates as a "business angel" in support of integrated, sustainable agriculture in Serbia.	Association of Citizens "Fenomena"
CS6	Rural Hub	Vrmdža village, Sokobanja municipality	Co-working space located in Vrmdža village is a community of creative individuals and an innovative organisation that aims to explore, build and connect its urban and rural knowledge in a sustainable way. Efficiently working on activating local populations for various activities for community development and wellbeing.	Association of Citizens "Centre for Education and Personal Development"

Table 1. Cont.

	Name	Location of Case Studies from North to South	Description of the Social Innovation	Legal Registration Form
CS7	First social agricultural cooperative (Prva poljoprivredna socijalna zadruga)	Kamenica village, Nis municipality	Engages young people who have land and resources for vegetable and fruit production. Jointly they produce value-added products, branded as “Art of flavours” enabling the producers to earn more and be better placed in the market.	Social cooperative, initiated by “Kamenica Local Development Association”
CS8	Radanska ruža	Lebane municipality—more villages	A social enterprise securing employment for women from vulnerable groups, especially women with disabilities. Collaborating with local producers in partnerships to assure the availability of agricultural resources and then producing natural fruit-products based on traditional recipes.	non-profit limited liability company, initiated by “Women’s association Ruza”
CS9	Optimist	Bosilegrad municipality—more villages	A social enterprise producing non-wood forest products and employing poor and vulnerable groups. Working in partnerships with families for collecting and processing non-wood forest products and promoting these products to the broader public.	Association of Citizens “Optimist Bosilegrad”

4.2. Factors Supporting Social Innovation

All case study representatives identified that a growing interest to engage in social innovation work represents the greatest potential for their work. They observe that some people are getting involved because of economic needs, but some are drawn in because of their attitudes, such as being pro-environmental, a desire to volunteer, or being inclined toward political activism. Many of them also feel the need to take personal responsibility for community development. Even though this interest was not as high at the beginning, it can be seen from interviews that there is growing solidarity around and trust in their work.

“My biggest investment and personal investment is in people . . . we need to have patience, they (people) don’t trust you upfront, first, they check it out in practice and if what they see makes sense to them then they are ready for change and for further learning.” (CS6)

Many of the social innovation analysed for this paper benefited from the increased involvement of women and families, as well as some disadvantaged groups, which then resulted in them enjoying greater public acceptance and recognition.

“Family is the key to survival, in rural social innovation, because a man alone in the village cannot succeed” (CS6)

The most significant source of impetus in establishing and running the social innovation cases has been strong international donor support [63]. Direct funds from the European Union came from the EU PROGRESS programme, which is part of the EU Programme for Employment and Social Innovation (EaSI), European support to municipal development programmes (EU PRO), and the instrument for pre-accession assistance for rural development (IPARD). Support was also provided by national governments, e.g. from Switzerland (Swiss Pro programme) as well as donors from among UN organisations such as UN Women or development agencies such as the German Corporation for International Cooperation (GIZ), the Austrian Development Agency (ADA), the United States Agency for International Development (USAID); and international foundations such as the Rockefeller Brothers Fund, the Heinrich Böll Foundation, or organisations such as HELP-Germany, Caritas Italy, and Caritas Austria (Appendix C).

Along with foreign donor support, domestic banks now also offer special loans or grants to support social enterprises. One example of this comes from Erste Bank, that developed a loan programme called “Step by Step” which is backed by a European Union-funded guarantee under the auspices of the EU’s EaSI Programme established by EU Regulation (No 182/2011. 1296/2013) of the European Parliament and of the Council [68,69]. A further example is that of UniCredit Bank’s “Ideas for Better Tomorrow” programme that provides financial grants for projects with a clear social component. This programme is conducted in cooperation with the NGO Smart Kolektiv and the Ana and Vlade Divac National Foundation [70].

Active support is also provided by the very engaged non-governmental (NGO) sector at the national level. The most active in this regard is the Coalition for Development of a Solidarity Economy (KoRSE), which is an informal network of Serbian NGOs created in 2010. Members of the coalition are the TRAG Foundation, the European Movement in Serbia (EPuS), Group 484, the Initiative for Development and Cooperation (IDC) and the Smart Kolektiv. At the moment, the KoRSE coalition drafted the Law on Social Entrepreneurship in cooperation with GIZ. Representatives of the National Alliance for Local Economic Development (NALED), Citizens’ Initiatives, Eurocontact, Group 484 and other interested representatives drawn from the civil sector all participated in the drafting process and the proposal has now been submitted to a Working Group of the Ministry of Labour, Employment, Veterans’ and Social Affairs for discussion [71]. Outside of this coalition, the Social Economy Network of Serbia (SENS) has also been very active in promoting the work of social enterprises and innovations. Furthermore, national foundations (i.e. Trag, Delta, Ana and Vlade Divac) are also supporting social

innovations. All the aforementioned organisations supported our cases, either in terms of direct financing of their work or by providing advisory and educational support to increase knowledge capacities of the initiatives' representatives and users. The following quote highlights the importance of these contributions to one of the case studies we considered:

“You cannot rely on state organisations, for them, it is important to end the conversation with you as soon as possible, so this assistance from the TRAG Foundation and the SMART Kolektiv was so very, very important.” (CS9)

As regards public bodies it is important to emphasise the role of the Social Inclusion and Poverty Reduction Unit (SIPRU), which was formed by the Serbian government in 2009. Since 2018, it has operated within the Office of the Prime Minister. The mandate of SIPRU is to strengthen government capacities to develop and implement social inclusion policies based on good practices in Europe. However, it should be noted that this body is financed by the Swiss Confederation for a limited period of time. One of the major successes of the SIPRU team was to enable direct financial support to social enterprises through the IPA 2013 programme (Instrument for Pre-Accession Assistance) [72,73]. The initiative studied in CS5 was supported by this programme, but SIPRU was also important in other cases in terms of consulting and the promotion of results.

Improved access to technologies also contributed to the successful work of the analysed social innovations. e.g. by providing enhanced means for communication, exchange information and to access knowledge. Another supportive factor for all our case initiatives was the existence of valuable natural resources and favourable conditions, e.g. for growing marketable plants. Furthermore, social innovators recognised and benefitted from being able to meet new societal needs and demands, such as the growing demand for handmade, organic, and healthy products, and indeed, for more healthy lifestyles generally. These new demands proved to be supporting factors by providing opportunities that were helpful for all our case initiatives, by opening up markets for their products and providing impetus to innovate. In some cases, the demand for organic products has been so great that it has even allowed some initiatives to export to foreign markets.

4.3. Factors Hindering Social Innovation

Our analysis revealed numerous hindering factors as well. We grouped identified barriers according to the following aspects: local level policy-making, national policy-making, political influence, interest expression or representation, administration and bureaucracy, finances, social aspects, communication, coordination, education and skills, market, technological and finally infrastructure (Appendix B). In the following text we will elaborate on some of the most prominent hindering factors.

When it comes to “social” innovation, the issue of terminology is a widespread problem, as is evidenced that the terminological difficulties exist within many of the various barriers that we identified [73]. In the Serbian language the term “social” usually implies that something relates to social policy (welfare), which in the minds of many narrows down the meaning and then hinders application to the support mechanisms of social innovations which, unsurprisingly, in turn limits SI's potential. This view is also rooted in Serbia's history as the term “social” often related to “socially owned” enterprises in the socialist era. This creates reluctance on the part of people to engage in collective endeavours to some extent. Spear et al. [74] describe this as a problem which is a common issue in many former socialist countries. Thus, NGOs often employ terms such as “societal innovation” (“društvena inovacija”) or “solidarity innovation” (“solidarne inovacije”, related a solidarity economy) as these are perceived not be stigmatised with a negative connotation [63,73]. Such terms capture a broader spectrum of topics and issues that are societally relevant and should be addressed under the umbrella of “social innovations” (CS 1, 3, 4, 6, 7 and 9).

Considerable dissatisfaction of interviewees results from the inactivity of local municipalities. Our respondents point to a lack of interest and virtually non-existent support from local administrations, which is accounted for by both the disinterest of civil servants for the topic (lack of sensitivity) and the fact that social innovation is not placed on their agenda.

The inertia of local administration for not taking up new issues, resulting in them not properly targeting local needs, was stressed throughout our research. This is illustrated by the inefficient allocations within local budgets. Such budgetary allocations are usually not taken up, due to the fact that they finance activities which are of no interest to local communities.

“It would be much more beneficial if the local government would think about the interests of the local population” (CS5)

Respondents also pointed to a lack of capacities in local administration to deal with their issues.

“... some good legislation or initiatives from the higher level, people in local governments cannot follow because they do not have the capacity” (CS3)

The recent draft of the Law on Social Entrepreneurship (proposed by the by the Ministry of Labor, Employment, Veterans’ and Social Affairs) is discouraging for all case representatives. They perceive that ministry in charge of the law will introduce a very narrow understanding of social entrepreneurship and innovation concepts, narrowing it down to the employment of vulnerable groups. The long and non-participatory process of drafting this law [71], together with the inactivity of the state in this field, indicates a lack of strategic and sustainable planning. This can be illustrated with following quote:

“There is a lack of a body who would essentially deal with this issue at some strategic level, not from government to government, but in a more permanent process, and so that the state sees the potential in it.” (CS4)

According to many respondents’ views, it would be better if this law is never enacted because of the constraints it may introduce. Furthermore, poor enforcement of laws is also generally seen as a problem.

“So you have laws, but you don’t have a realisation ... you don’t have the infrastructure that goes with that realisation, whether it is laws or by-laws ...” (CS6)

Some interviewees reported that they cannot rely on the state in some cases and that this insecure position sometimes threatens the existence of initiatives.

“... you have an absurd situation—a good, efficient business, beneficial to the people, comes to be at risk because the state simply does not fulfil its obligations... and you have no instrument to force them because you are at the bottom in that hierarchy.” (CS3)

Regular changes in government add to the challenge as policy programmes change and so do state activities. Sudden and repeated changes make it difficult to rely on state organisations. In some interviews, differences between the current and previous governments were emphasised and respondents identified an increased distrust in civil society activities coupled with increased political pressure. In general, they saw the impacts of politics as a big threat rather than a boon in all societal spheres. As indicated by one of the respondents, everything at the local level is now extremely political. They reported that since they are not members of the ruling party it is forbidden for the local commission to approve funds to them, and they were told this was the reason.

Furthermore, respondents reported about corruption and illegal practices, both at the local and the national level and also about the misuse and a lack of transparency with regards to the expenditure

of public funds, such as abuses concerning funding non-governmental organisations. In this way these organisations are discouraged to apply anymore for funds.

The indecent offers to some of the case studies were as well pointed out. One respondent among our interviewees indicated that help for accessing funds is offered only against prior payment to persons involved in decision-making. Other reported that they were offered approval of organic certification without fulfilling prescribed criteria.

A lack of transparency concerning the provision of funds is noted as a challenge also when it comes to funding by donors. Some organisations think that there are no clear rules about who gets the funding and also report that some recipients are changing their focus depending on donors' preferences. This shrinks the pool of resources available for them but also results in a loss of trust.

"There are some, not to mention now names, organisations that, between us, we call 'sects' ... I am ashamed to know that there are organisations that for 10 years have gotten the same international donor money for every project ... with absolutely no results behind them." (CS8)

The lack of financial resources is generally recognised as an issue where the greatest concerns involve meeting the costs of human resources, which are often not covered by donors. Thus, much of the work is necessarily done on a voluntary base, which is only possible because of the heartfelt enthusiasm and persistence of the people who are involved. The following quote typifies the concerns arising from the lack of funding for human resources:

"... you have projects, but you do not have the resources for the people who need to implement the projects, which is, in my opinion, a great barrier to the development of the third sector in Serbia." (CS3)

Dependence on foreign donors creates a very unstable situation for all cases. They agree that ongoing financial support from the Serbian state would be beneficial. The current state practice of providing a one-time investment is not seen as providing a sustainable situation, especially not to local communities.

"Giving one-time grants does not essentially lead to any further progress, neither of those supported farms nor of the community." (CS4)

Dealing with government, or project applications, administration and bureaucracy is reportedly very complicated, both when trying to obtain funds and also when fulfilling legal requirements in some cases, e.g. obtaining certificates, licences, etc. for organic produce.

Respondents also indicated a number of social aspects that were hindering factors, most notably all case studies reported that it was very hard to motivate people to become engaged in various projects.

"... we faced deep distrust from the local population, the broader picture was not clear to them ... to do something together, to sell and then distribute money afterwards was somehow not clear to them ... They have logic 'we give you the goods, you give us the money'" (CS4)

Moreover, our respondents noted increasing apathy among people in the last few years, primarily explained by the unstable socio-political conditions in the country. The result of this was seen in the fluctuation of interested, involved people and the loss of interest after some time which was also at times connected to excessively high initial expectations not being met (e.g. in terms of economic benefits). Challenges in sustaining a positive community spirit were reported as the benefits gained are not derived immediately and frequently need considerable time to bear fruit. Human nature being what it is, it was also reported that it was difficult for individuals in needy sections of rural society to rate community interests over direct, personal interests.

“... it is important that people understand that we do this not only for the association, just for a group of women, but that it is for the wider community ...” (CS1)

The especially vulnerable position of women in rural areas was reported in many cases as a barrier. According to our respondents, the status of women is not effectually recognised. Therefore, women are quite often seen as the most important target groups of social innovation activities.

“Women are ‘another’ category. I have women in the association who had some kind of support ... and if I remember, they faced many inconveniences, not just from family but their wider surroundings ... You can empower women by pointing out that they are the ones who can earn, but it is important to put them always in the context of family.” (CS6)

Respondents also reported about the inactivity of people in rural areas, who often rely on state support and work. Rural areas also lack effective leaders and, even if a leading figure is found, a whole initiative or business can be placed at risk if it becomes overly dependent on the one person.

A lack of communication on all levels, as well as coordination among different actors and political levels combined with the lack of education and skills (in different fields of expertise) were also reported as hindering factors.

In relation to more contextual factors, a lack of infrastructure in rural areas is still a huge problem [69], even though with the passage of time some improvements can be observed. Market access and difficulties to become competitive in the market are seen as further barriers to the success of social innovations. This is illustrated with following quote:

“However important that social character is, it is important that the product is affordable ... and on the other hand, that (social character) may be our competitive advantage at the market.” (CS4)

5. Discussion

“Until the supporting system for our business is developed, the problem of our survival is enormous, and we are really making a superhuman effort just to survive.” (CS8)

Similar to other transition economies [60], social innovation and social entrepreneurship are a relatively new phenomenon in Serbia when compared to their profile in developed countries [73,75]. Looking at social innovations from an institutional void perspective, and by understanding the situations in the analysed cases by identifying supporting and hindering factors, we are able to ascertain a number of institutional voids in the current institutional setting in Serbia and relate them to the institutional factors that help to overcome the deficiencies resulting from these voids (Table 2).

The lack of regulatory frameworks or strategies on social innovations and entrepreneurship has been identified as a formal institutional void. Social innovation organisations have to navigate between existing regulations and/or tailor their business models to fit existing rules while accepting adverse effects for their businesses. The introduction of a “social cooperative” category within the Law on Cooperatives (2015) is seen as an institutional measure that partly fills this gap [59,67] and was certainly supportive for the CS7 business model, for example. According to this law, social cooperatives undertake various activities to promote the social, economic, or other related needs of vulnerable social groups. Social cooperatives are obliged to invest at least half of their profits into the improvement and realisation of a set of social objectives which are explicitly contained within each cooperative’s statute [59].

However, all our case studies stressed that while they are able to work within the existing regulatory system, they all expressed a need for better-tailored policies when it comes to social innovation, either in the form of a law or a specific national level strategy. In this regard, we have to be mindful that our cases represent a sample that features a positive bias as we did not research ideas and initiatives that had failed to successfully establish themselves and did not become operational

for a significant period of time. Indeed, it may well be that a number of initiatives failed shortly after being established because of this lack of an appropriate regulatory framework. Addressing this situation has proven to be problematic in Serbia, as is evidenced by the already 10-year long process of developing the Law on Social Entrepreneurship in which the ministry has proposed three different drafts. None of these drafts met the expectations of the concerned social enterprises and NGOs. As recently as September 2019, the KoRSE coalition, in cooperation with GIZ, drafted a Law on Social Entrepreneurship which was in line with proposals received from civil society actors. This draft law was submitted to the ministry and is now under discussion at the political level [71], which will naturally further extend the period of regulatory inadequacy.

Table 2. Indicated institutional voids in the case studies involving social innovations in rural areas of Serbia and related supporting factors to overcome voids (elaborated by the authors).

Identified Voids in Case Studies and Supporting Factors to Overcome Voids			
Formal Institutional Voids	Supporting Factors to Overcome Formal Institutional Void	Informal Institutional Voids	Supporting Factors to Overcome Informal Institutional Void
Lack of and poorly enforced regulations for social innovations	Law on cooperatives (2015)—“social cooperative” Draft Law on Social Entrepreneurship proposed by NGOs	Traditional norms and values constrain more productive resource use	Incentives to sell to export markets assisted by certification programmes
Lack of financial mechanisms for supporting social innovations	Specific funding lines by foreign donors Specific financing mechanisms by the domestic banking sector and foundations	Weak position of rural women in the patriarchal system	Programmes for involving and empowering women Potentially gender-responsible budgeting
Absence of institutionalised intermediary organisations	SIPRU unit and the KoRSE coalition could assist the government in their activities	Some accepted level of corruption/acceptance of political elites misuse of power for self-enrichment	
Lack of cooperation mechanisms between state organisations, and between state and non-state actors	NGOs formed a coalition to coordinate activities (KoRSE Coalition) Social enterprises are joining an association of social agro-businesses	Lack of informally institutionalised coordinative mechanisms	no specific counter-factor identified
Inadequate (institutionalised) provision of specialised information	KoRSE Coalition, SENS network and SIPRU serve as platforms to support information exchange	Lack of trust and solidarity in society	
Lack of formal educational institutions	NGOs providing training and mentoring	Apathy within parts of society	
Non-participative procedures by governmental bodies			
Incongruence of national and local policy-making and implementation	no specific counter-factor identified		
Insecure contracts with state			
Weak position of civil society			

The critique of the existing legal framework as raised by respondents strongly highlights their discontent with being treated as any other profit-oriented business and the lack of state financial support mechanisms specifically assisting social innovations and enterprises. This void has been filled by active financial support provided by foreign donors, the domestic banking sector as well as financial support by private domestic foundations (see supporting factors). Case five features a small-scale example of how the establishment of a social innovation itself, i.e. the establishment of the “Development Agriculture Fund Fenoemena” (DAFF) aims to overcome the lack of institutionalised funding opportunities by operating as a “business angel” in support of integrated, sustainable agriculture.

Compounding all of the above problems, even where workable rules exist poor enforcement is often perceived as facilitating opportunistic behaviour. Local administrations, for example, are perceived to foster those rules which benefit specific societal groups, i.e. their clientele. This may be accompanied by a lack of transparency and participation in procedures, such as public budgeting and spending, policy formulation, and policy implementation at both the national and the local level. Furthermore, national and local policy-making and implementation are not always congruent, leading to gaps, missing rules, or even contradictory rules being applied. As a result, organisations active in social innovation cannot fully rely on state structures, even when it comes to formal contracts. Similar voids were reported in the study on Ukrainian entrepreneurship development in a transition context, where the government has yet to fully implement an effective institutional framework for productive entrepreneurship [76].

A general lack of provision of relevant information on social innovations has been noted throughout Serbia. Many of the social innovation initiatives are completely reliant on personal contacts and knowledge. Additionally, a lack of education and educational support seems evident, resulting in labour markets having to draw on an unskilled and ill-prepared workforce. To improve the knowledge and skill base for social innovations’ workers would prove to be prohibitively expensive resource-consuming activities that the individual social innovation organisations would have to bear themselves. This was also confirmed in a study on the institutional voids related to the business environment in Serbia and Turkey [49]. Thus far these gaps were partially addressed by NGOs which provide training, advisory services and mentoring activities with the SIPRU unit also working to some extent to support social innovations in this regards.

A further significant void was found in the absence of institutionalised intermediary bodies, namely organisations which should be dedicated to the coordination and support of social innovation initiatives. The literature on institutional voids already emphasises these kind of deficiencies, which “occur when specialised intermediaries are absent” [50] (p. 184). Social enterprises or civil society organisations which advocate improved working conditions for social entrepreneurship and innovation may take over this role in the future [32]. The SIPRU unit and the KoRSE coalition could provide practical assistance to the government via their activities in support of social innovators. The extent of these roles and activities has been rather limited (with sporadic activities). However, civil society organisations are in weak positions in Serbia. Their activities are distrusted by the state. Such an environment is not supportive for “bottom-up” initiatives, as was also confirmed by the report of BTI [77] which noted that the interests of civil society organisations are not highly regarded in public policy discussions, both nationally and locally. Civil society organisations influence public policymaking by an individual or joint coalition initiatives, e.g. in areas such as the EU accession process with regards to issues of human rights, youth unemployment, environmental or security issues. The stigmatisation of civil society organisations started in the 1990s in Serbia and has gained considerable momentum in the last couple of years. They are often described as “foreign mercenaries” and “domestic betrayers,” not only by some political parties, far-right extremist groups, and certain tabloid media outlets but also by representatives of the government.

The lack of institutionalised cooperation between state organisations, as well as between the state and other various private sector actors was also identified as a formal void, a problem which may partly stem from the strong sectoral fragmentation of the public administration [23,30]. However social innovations, as with innovations in general, are dependent on external knowledge and competences.

The provision of such competences could be facilitated by the formation of cluster structures, i.e. geographic agglomerations of companies, suppliers, service providers, and associated institutions in a particular field, linked by externalities and complementarities of various types [78]. Cluster organisations would potentially support networking among regional enterprises, facilitate knowledge exchange and cooperation, improve access to investments, to subsidies, to training and to research and development services. Such structures could provide invaluable support to innovation system functionality [49,79]. In fact, the KoRSE coalition advocates for such multi-sectoral cooperation in the social enterprise sector. Some of the representatives of the social enterprises analysed in this paper also see great potential in joining forces, e.g. in an association of the social agro-businesses, a process which is still in its initial phase (CS3, 9).

Our data also hint at a high number of informal institutional voids, which also harmonises with some other scholars' results that indicate the importance of normative and cultural voids in certain contexts [6]. The study in Bulgaria identifies 'institutional asymmetry' between formal and informal institutions which hampers the development of economically and socially productive entrepreneurship. The authors claim that despite reforms to formal institutions the asymmetry persists as a result of irregularities within informal institutions, such as entrepreneurs engaging in informal and corrupt activities [80].

From the examination of our cases, we identified various informal institutional voids. Some are related to traditional resource use where it is difficult for rural people to change existing practices used in agricultural production and to engage in local community activities. Societal needs for organic products for example, pushed some of the initiatives researched in our case studies to undertake organic agriculture according to prescribed standards. Thus, the introduction of the organic farm products certification process induced real world changes in some local agricultural practices.

Tradition and a (still) dominant patriarchal system create another informal institutional void that in particular results in a weak position for women, especially in rural areas. There is some persistent prejudice that women's work only concerns the household and not agricultural production. In many cases, this becomes even more challenging as women are usually not the legal owners of agricultural holdings. Thus, they are in an inferior position to their husbands or other males in their families. In some of our cases, their engagement in social innovation initiatives faced consternation in or even mockery from their communities and families which took much time and energy to overcome. This void is being addressed by various programmes (incl. the rules and goals of funding by donors) that are aimed at including and empowering women, but also other vulnerable groups and minorities whilst simultaneously raising awareness of the valuable roles of these groups. At the national level, a few regulations were enacted which have applicability to overcome this gap, including the new National Strategy for Gender Equality 2016-2020 and an action plan for 2016-2018 [77], and rules for gender responsive budgeting adopted in 2015 [73]. However, a European Union Report noted a serious delay in passing these regulations [81] and also went on to note that the institutionalisation of the coordination body for gender equality still needs to be clarified and an efficient institutional set-up with adequate resources needs to be ensured. The report furthermore stresses that older, rural and Roma women as well as women with disabilities continue to be among the most discriminated against groups in Serbian society.

Furthermore, the manipulative use of the power of public administration, both at the national and municipal level, entails informal voids. Public resources are misallocated and community development is steered in wayward directions not always corresponding to the needs of rural populations. Reported cases of corruption also demonstrate the misuse of this power. Indeed, the European Union concluded that corruption is prevalent in many areas throughout Serbia and remains an issue of concern [81]. All this creates a serious lack of trust between communities and social innovators that limits individuals' willingness to engage in relational and investment activities. Another very relevant void is manifested in the growing general apathy of people, often seen as a result of many years of socio-economic crisis in Serbia, but also due to value systems which favour political nepotism.

Quite a number of the institutional voids relevant for social innovation, as discussed above, are also relevant for the broader business community in Serbia. There are many burdensome procedures and overlapping authorities, as well as a high incidence of corruption among state officials and bureaucrats. The legal framework is partly inconsistent and prone to unexpected and significant changes, all of which is detrimental to any entrepreneurial endeavour [77].

6. Conclusions

We have drawn on institutional theory to examine how formal and informal institutions, both directly and indirectly, influence the development of social innovations in rural areas in Serbia. The influence of institutional voids is particularly pronounced in unstable institutional environments, often found in countries such as Serbia that are in transition. During a transition process, countries find themselves experiencing constant changes in their institutional environment. This poses extraordinary challenges for companies, producers, and civil society organisations to adapt to and function under these conditions. Policymakers usually have a strong focus on the state and further development of the formal institutional environment, hence, adapting and adopting laws and regulations to suit the new situations and desired political and economic models. The valuable role of informal institutions is often underestimated, neglected, or even completely ignored and thus giving rise to institutional voids [49].

Overall, our case studies show that numerous institutional voids exist in Serbia when it comes to the development of social innovations and enterprises. All the case representatives reported insufficient supporting activities and understanding of the concept by both national and local authorities, coupled with inadequate or nonexistent regulatory and financial mechanisms, a lack of coordinating bodies, and dysfunctional communication channels and educational offers, all of which need to be improved to effectively support social innovation activities. These formal institutional voids are furthermore accompanied by informal voids such as norms rooted in traditional societal beliefs which constrain the productive use of resources and continue to neglect and discriminate against certain groups of society.

All the analysed social innovations in Serbia operate successfully to some extent, but under very unfavourable conditions. Currently, they have to contend with a somewhat hostile environment, given the existing regulatory system and societal context. All case study initiatives are highly dependent on external financing by donors, thus they operate under rather tenuous circumstances and struggle to sustain their operations. More stable and innovative financing mechanisms are needed. Nevertheless, a high level of interest and activity by national non-governmental organisations is very important for the proper functioning of the analysed social innovation initiatives. Together they work to advocate a broader understanding of the societal value of social innovation and entrepreneurship and to ensure that adequate national legislation is passed that supports such endeavours. With regards to some of these formal and informal voids that became manifest through our case studies, we identify related supporting factors that—at least to some extent - are helpful to and have some potential to overcome obstacles created by the various institutional voids. Even though, the “sector” of social innovation is still in an infantile state, some improvements were achieved over the course of the last decade.

All our considered case studies are engaged in strong socially-oriented activities, with some focused on social entrepreneurship activities because of their subsistence-oriented aims, namely satisfying ‘survival’ needs and the need to reach a financially sustainable position. These tend to then gradually transform into growth-oriented aims, which lead to productive benefits across product markets and create employment opportunities. Other case studies we examined follow quite idealistic and life-style oriented aims, pursuing innovative solutions which are less oriented to market-based results. Generally, they all succeed in offering new options and approaches which serve to motivate and involve rural populations and build trust among community members. Our case studies provided a comprehensive view of the issues that relate to institutional challenges for social innovations in rural areas in Serbia. Obviously, this is a fertile area for future research, with high societal relevance. Avenues for improvement in this field are to be further researched. Our intention with this piece was

to bring existing challenges to the forefront and to lay a foundation that will serve to stimulate not only future research, but also policymakers, development agencies and other interested actors to strengthen their support for social innovations as a means to sustainably develop all rural areas that could benefit from such innovation, not just those in Serbia

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Appendix A

Table A1. Supporting factors for analysed social innovations (elaborated by the authors).

Supporting Factors	Codes	Groundedness
Social aspects	High enthusiasm, persistence and volunteering of involved people is key	8
	Built trust	6
	Solidarity is important	4
	Women as potential for rural areas	2
	Family as key to sustainability	1
	Idealistic approach, without any rational approach	1
	Interested users/target group	1
	Personal attachment of employees to company	1
Policy aspects	People’s sensitivity to social problems	1
	Sufficiently broad legislative legal environment that can be utilised	5
	New regulation on the production of fruits, vegetables, dairy products	2
	Law of Professional Rehabilitation provides financing for PwD	1
Governance aspects	The Law on Cooperatives provides for the possibility for forming social cooperative	1
	Networking of social enterprises and initiatives	4
	Bottom-up initiatives are important	1
	Cooperation with high schools	1
	Cooperation with NGOs that work in this sector	1
Donor aspects	Personal connections are important	1
	International donors and advice important for starting	8
	Donations came also from private sector	1
Communication aspects	Philanthropic investing	1
	Good examples stimulated others to join and increase visibility	5
	Public acceptance and recognition	3
	Advocacy role is important	2
	Mentoring is important	1
Incentives	Relaying of friends and personal contacts	1
	Support of media is important	1
	Obtaining certificate for picking of wild products	1
Knowledge/Skills aspects	Obtaining certificate for business plan preparation	1
	Offering higher prices for raw material	1
	Importance of knowledge transfer from practice/NGOs	6
	Education possibilities of local people	3
Technology aspects	Mutual learning	2
	Skilled team for management	1
Market aspects	Availability of technology	2
	Internet connection	1
	Importance of good branding	2
	Placing product in the right market	2
New needs of society	Geographic origin	1
	Territorial branding	1
	Adapting traditional products to modern needs	1
	Importance of ecology issues	1
	Importance of healthy living style	1
	Interest in handmade, organic, healthy products	1
	Interest in organic products	1
	Forest bathing is a leading global trend	1

Appendix B

Table A2. Hindering factors for analysed social innovations (elaborated by the authors).

Hindering Factors	Codes	Groundedness
Local level policy-making	Lack of interest of local administration	11
	No support from local administration	5
	Inertia of administration	5
	Inefficient budget spending	4
	Corruption	4
	Contradicting information and advice from local administration	3
	Contradictions with national strategies exist at local level	2
	Inspection is weak	2
	Local needs are not addressed by local administration	2
	Non participative decision making at local level	2
	Lack of capacities in local administration	2
	Communication with local administration is built on personal connections	1
	Fear to confront to the local administration	1
	Local administration equalise rural development and agricultural development	1
	Local administration reduce funding	1
	Local government in not reliable partner (as cofounding partner)	1
	Not functioning local administration	1
	Social responsibility is lacking in the local governments and employed people there	1
National level policy-making	Current draft Law on Social Entrepreneurship is discouraging	13
	Lack of strategic and sustainable planning	8
	Weak enforcement of law	8
	State does not recognise the potential of social entrepreneurship	7
	Hard to rely on state organisations	6
	Narrow understanding of social entrepreneurship and innovation concepts by state	6
	Inertia of administration	5
	Corruption	4
	Challenge of top down governing	3
	Changing government structures	3
	Distrust in NGO activities from state	2
	Lack of bylaws, regulations and measures	2
	Laws are not targeting small producers sufficiently	2
	Law on Associations limits opportunities for using state funds, or taking loans	1
	Low awareness of policy-makers	1
	Lack of regulations and financing mechanisms to support organic production	1
	Rural policy, after 2000, was without concrete aims	1
	State insists on incorporating social enterprises into the Companies Act	1
	Unequal support of Ministries to Vojvodina and the rest of the country	1
	We fitted our model to the existing regulations of the state	1
Political influence	Politically favorable organisations are supported	3
	Overarching problem is the impact of politics in all spheres	1
	Some civil servants installed politically	1
Interest expression or representation	Terminology issue of social entrepreneurship/social innovation	5
	Issue is addressed just by NGO sector	1
Administration and bureaucracy	Administration and bureaucracy is complicated	9
	Bureaucracy is very complex for organic production	4
Financial aspects	Lack of transparency in providing funds	7
	Lack of financing (in general)	6
	Lack of financing for human resources	6
	Lack of financing from the state	4
	Challenge of fitting donor's funds to various organisational forms	3
	Change of the donors focus is challenging	2
	Funds comes mostly from donors and foreign funds	2
	One-time investments are not profitable enough	2
	Misuse of financial resources	3
	Risk funding for donors	2
	Calls for funding do not relate to real needs	1
	Challenge to address high number of very small plot holders with financing mechanisms	1
	Costs for going on market is same for us and big companies	1
	High costs for licensing	1
	High personal financial investments	1
	It is hard to obtain finances for scaling	1
	Private businesses are more open for one-time support	1

Table A2. Cont.

Hindering Factors	Codes	Groundedness
Social aspects	Hard to motivate people to join	10
	Status of women is not effectually recognised	9
	Fluctuation of interested people is challenging	5
	Hard to change existing practices	3
	Hard to perceive community interest over direct/personal interest	2
	Hard to rely on self-organisation and cooperation of community members	2
	High expectations of local people when they engage in social innovation	2
	Loss interest after some time	2
	High voluntary involvement	2
	Lack of leaders	2
	Apathy of people	1
	Challenge to sustain community spirit	1
	Culture of sanctioning those who make mistakes	1
	Ethics are of a low level	1
	Inactivity of people in rural areas-relying on state support	1
	Low awareness of the potential of resources readily available	1
	Risk if whole process depend on one person	1
	Skepticism in the potential of improvement at macro level	1
Communication aspects	Lack of communication	4
	Lack of information for rural people	2
	Need to have an intermediary actor who would support communication	1
Coordination aspects	Not willing to cooperate with state under current conditions	2
	Not satisfied with functioning of this public private partnership	1
	Private business are not interested in partnering with NGOs	1
	Superficial cooperation with the local government	1
Education and skills aspects	Lack of education of people living in rural areas	6
	Lack of human resources	3
	Lack of experiences	2
	Lack of knowledge on business functioning	1
	Lack of organisational skills	1
	Lack of skills for project writing	1
Market aspects	Lack of willingness to learn new things	1
	Small producers cannot be concurrent on the market	2
	Challenge of market valuation	1
Technological aspects	No potential for mass production	1
	Challenge of crating adequate technological process	1
Infrastructure aspects	Small parcel cannot be productive	1
	Lack of infrastructure	5

Appendix C

Table A3. Details of case studies (elaborated by the authors).

	Case Study Name (with Name in Original Language)	Target Users	Cooperating Organisations		
			International	National	
			UN, Funds, NGOs	NGOs, Funds, Banks	Public Organisations
CS1	Vojvodina House (Vojvodjanska kuća)	Women who are victims of violence, unemployed women	UN women, Heinrich Böll Foundation,	fondB92, Delta foundation, Ecumenical women's initiative	Agricultural Expert Service Sombor
CS2	Forest Therapy (Šumska terapija)	Urban and rural population in general	Cross-border international projects	Private companies	Faculty of Forestry, High School of Health Professional Studies
CS3	Garden of Sustainable Development (Avlija održivog razvoja)	Persons with special needs, handicapped, poor and socially disadvantaged, former prisoners or addicted, Roma and other minorities, elderly, young people	IPARD, GIZ, Caritas Austria, Caritas Italy	TRAG Foundation, European Movement, SMART kolektiv, SENS, Erste Bank	Local municipality (financing care services)
CS4	"ForFriend" (ZaDruga)	Small and medium-sized agricultural producers, households	ASB Austria, USAID	Coalition for Solidarity Economy, Design Taste Center	Municipality of Šabac
CS5	Development Agriculture Fund Fenomena (DAFF)	Small and medium-sized agricultural producers, households	SWISS Pro, GIZ, Rockefeller Brothers Fund, UN Women	Slow food network, SOS Children Villages Serbia	SIPRU, Municipality of Arilje and Kraljevo, Regional Development Agency Zlatibor, Agricultural Chemistry School, National Employment Service
CS6	Rural Hub	Local population of Vrmdža village	GIZ	European Movement, Kamenica Local Development Association	Municipality of Sokobanja, SIPRU
CS7	First social agricultural cooperative (Prva poljoprivredna socijalna zadruga)	Unemployed young people in the hard to employ category	GIZ, Rockefeller Brothers Fund	Delta foundation, Erste Bank	Ministry of Youth and Sports, Cooperative Union of Serbia
CS8	Radanska ruža	Women belonging to vulnerable groups	EU Progress,	Caritas, Erste bank	Municipality Lebane (not succesful cooperation)
CS9	Optimist	Women belonging to vulnerable groups, Roma families, young people	EU Progress, SWISS Pro, ADA, Rockefeller Brothers Fund	TRAG foundation, SMART kolektiv, Delta foundation, Erste Bank	Municipality Bosilegrad (superficial cooperation)

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ARTICLE 4

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**Non-timber innovations: How to innovate in side-activities of forestry –
Case study Styria, Austria**

**Nichtholz-Innovationen: Über Innovationen in forstlichen
Nebentätigkeiten, Fallstudie Steiermark, Österreich**

Gerhard Weiss*, Alice Ludvig, Ivana Zivojinovic, Marelli Asamer-Handler,
Patrick Huber

Keywords: Forestry, innovation system, non-timber forest products (NTFP), case study, Styria, Austria

Schlüsselbegriffe: Forstwirtschaft, Innovationssystem, Nichtholzprodukte (NHP), Fallstudie, Steiermark, Österreich

Summary

Since non-timber forest products (NTFP) are usually associated with side-activities of forestry, their development is often neglected by companies and innovation systems. Their real value, however, is underestimated and interesting innovative examples of marketed NTFP exist. Our article thus asks: How do innovations happen in a situation where there is very limited institutional innovation support, and how could non-timber innovations be fostered? This is studied in the regional case study of the Austrian province Styria in which the role of policies and actors in innovation processes is ex-

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amined. We find that support for non-timber products is given from several sectoral innovation systems, including forestry, agriculture and nature conservation. Their influence, however, is limited as in none of them NTFP are in their specific focus but only recognised on the side. Non-timber innovations are typically generated from bottom-up in small, regional and often cross-sectoral “ad-hoc” networks. Effective diffusion of innovations is only reached through institutional innovations such as the formation of producers’ associations. The best model for fostering innovations in NTFP would be “top-down support for bottom-up innovations”. The article documents two successful examples for this model where the institutional system was able to give substantial and systemic support to local creativity and capacities, namely the forest-oriented LEADER-Region “Zirbenland” and the Styrian Nature Parks Association.

Zusammenfassung

Da Nichtholzprodukte (NHP) üblicherweise mit forstlichen Nebentätigkeiten assoziiert werden, wird deren tatsächlicher Wert oft unterschätzt und NHP werden von Forstbetrieben und relevanten Innovationssystemen wenig beachtet. Da in der Praxis aber interessante und innovative Beispiele zu finden sind, stellen wir folgende Frage: Wie laufen Innovationen in einem solcherart ungünstigen Umfeld ab und wie können sie besser unterstützt werden? Zur Beantwortung untersuchen wir anhand der regionalen Fallstudie Steiermark die Rolle von innovationsrelevanten Akteuren und politischen Programmen in entsprechenden Innovationsprozessen. Es zeigt sich, dass die Entwicklung von Nichtholzprodukten von unterschiedlichen Innovationssystemen (Forstwirtschaft, Landwirtschaft, Naturschutz) unterstützt werden, wobei deren Einfluss aber sehr begrenzt ist, da keines dieser Innovationssysteme auf diese Produkte fokussiert. Nichtholzinnovationen entstehen typischerweise in kleinen, regionalen und vielfach sektorübergreifenden Netzwerken, die sich ad-hoc im Einzelfall bilden. Eine wirksame Verbreitung von Innovationen wird aber nur durch institutionelle Innovationen erreicht, etwa als Zusammenschluss der Produzenten. Als bestes Modell für die Förderung von Nichtholz-Innovationen erscheint eine „zentrale Unterstützung von dezentralen Innovationen“ oder die „Unterstützung von oben für Innovationen von unten“. Der Artikel dokumentiert zwei Beispiele, in welchen lokale Ressourcen und Kreativität erfolgreich durch das institutionelle System unterstützt wurden. Diese sind die forstlich orientierte LEADER-Region „Zirbenland“ und der „Verein Steirische Naturparke“.

1. Introduction

Non-timber forest products (NTFP) are often presented as a potentially promising but neglected business field of forest holdings (Lawrence, 2009). As forestry understands

itself as being oriented towards timber production, NTFP are often termed „minor“ or „secondary forest products“. Forest laws often talk of „by-products“ or „side-products“ of forestry, and research projects on NTFP markets are oriented towards „niche markets“ (Mantau et al., 2001) or even „non-market goods“ (Mavsar et al., 2008). Much more often than of a business field, non-timber products and services are talked of as ecosystem services and they are assumed as being provided in the „wake“ of regular timber production. NTFP are then dealt with from a welfare economics perspective as „forest ecosystem services“, as part of „total economic value“ or as an element of „quality of life“ or „well-being“. In view of the broad range of market sectors that are concerned – including food and beverage, medicinal, pharmaceutical and chemical products as well as craft and decoration – a generalisation is, of course, very difficult. Except for a few products such as cork or mushrooms in some Mediterranean countries, it is certainly the typical case that forest holdings and forest industry and policy actors focus on the production of timber and do see other products as side-, by-, or minor products (Weiss and Rametsteiner, 2005; Vacik et al., 2014). As a result, the field of non-timber products and related business opportunities is hardly visible and recognized, although their potential seems to be bigger than often thought (Vacik and Wolfslehner, 2009). Following this, the basic reasons and challenges behind the fact that these latent opportunities of NTFP are often neglected, are found with regard to two issues, marketability and innovation. First, there is a limited marketability of many forest products and services, which is sometimes connected to an often existing public good character of such products (Mantau et al., 2001; Mavsar et al., 2008) as well as to a weak competitiveness against cheaper imports or against cultivated products originating from plantations. Second, on top of this challenge, there is also a limited attention of established sectoral innovation systems, thus providing only limited support of or acting even as barriers against their development (Rametsteiner et al., 2005; Weiss et al., 2011). In primary sectors such as forestry, innovation efforts are typically directed towards rationalisation and less towards diversification or higher value products (Breschi and Malerba, 1997; Hansen et al., 2014; Hirsch-Kreinsen and Jacobson, 2008). Barriers may arise when established actors direct the support measures of innovation systems towards self-interested sectoral innovations and fight other interest groups or products (Buttoud et al., 2011). Regional innovation systems may be better suited to support that kind of innovations (Asheim, B.T. and L. Coenen, 2005).

In Austria, innovations in non-timber products or services have often been developed without specific support from single policy fields or, in other words, „between“ established innovation systems (Kubeczko et al., 2006). Instead of sectoral, regional innovation systems or regional development policies may rather play important roles; examples include the development of the very successful biomass-based district heating plants (Weiss, 2004) and recreational services of forests (Weiss et al., 2007).

Non-timber forest products are neither in the focus of national or regional innovation policies nor of forest sectoral policies, an appraisal which is confirmed also for other European countries (Ludvig, Tahvanainen et al., 2016). Relevant policy measures that

may be utilised are related to regional or rural development programmes. Their aims are to develop new (sustainable) products and markets in order to counteract emigration from rural areas, increase attractiveness of the regions by creating or securing job opportunities and to enhance cooperation within the rural population through networking to support knowledge transfer. Appropriate institutional support becomes a central question if non-timber innovations should get a chance to develop and diffuse (Ludvig, Corradini et al., 2016). The EU LEADER programme is well suited because of its innovation orientation and because of its bottom-up working method. The LEADER instrument, however, has not been strongly used within forestry throughout Europe (Feliciano et al., 2011).

This paper starts from the observation of a limited innovation system support and aims to analyse in an empirical example what this unfortunate institutional environment means for innovations in the field of non-timber products. Our research question thus reads as follows: How do innovations happen in a situation where there is very limited institutional innovation support, and how could non-timber innovations be fostered?

2. Methodology

In order to answer our research question, this study applies an innovation system approach as described above and chooses the region of Styria (Austria) as an empirical case study (Yin, 2009). The methodological approach to study the role of sectoral and regional innovation systems in supporting forest sector innovations has been developed over years and applied in several studies, including forestry innovations in central Europe (Rametsteiner et al., 2005) and a comparison of five regional forestry clusters across Europe (Weiss et al., forthcoming-a).

2.1. Case study: Styria, Austria

Austria is a predominantly alpine Central European country with an area of 83,871 km² situated in the Central European climatic zone (moderate, humid). Styria is the second largest province out of nine federal states in Austria with an area of 16,401 km², situated in the south-eastern region of the country and influenced by illyric, pannonian and sub-alpine climate. Around 1.2 Mio. inhabitants are spread across 13 districts with a strong conglomeration in the capitol of Graz and its surroundings where approximately 33 % of total inhabitants are located (Statistics Austria, 2011).

In the last decades there have been massive structural changes in the agricultural and forestry sector in Austria in general (e.g. decrease in traditional family holdings, increase in sideliners/part-time farmers and "new" forest owners). In 2010 the number of forest holdings in Styria, which is continuously decreasing since the end of the 1990s,

was around 39.000 providing employment for nearly 96.000 people (Statistics Styria, 2013). Timber production is the main production goal of forest enterprises and has helped to develop a strong timber industry. NTFP have been of high relevance historically (e.g. resin tapping, leaf and litter collection) with some traditional uses that are still important today (e.g. hunting, fishing, gravel digging). New modes of utilization that often strongly relate to forest services emerge additionally, for instance: i) protection against natural hazards, ii) kerbing of drinking water, iii) horse-back riding, or iv) mountain biking (Rametsteiner et al., 2005). Nevertheless, NTFP are being reinvigorated recently – and this holds true for small-scale forest owners as well as for bigger forest enterprises. Vacik and Wolfslehner (2009) estimated the value of marketed forest-related NTFP and services in Austria for the year 2005 to nearly 220 Mio. €, comprising 43 % of total value (i.e. 95 Mio. €) for NTFP and 57 % (i.e. 125 Mio. €) for services. Although the income from NTFP is still low compared to that generated by timber production (i.e. 770 Mio. €), there seem to be high latent potentials for Austrian forestry (Vacik et al, 2014). As the majority of forest properties in Styria belong to rural areas it can be assumed that this may trigger an array of positive effects for regional development, taking into account that product diversification has the potential to increase labour opportunities and to provide new ways of income generation.

2.2. Material and methods

The methods used include document analyses, questionnaires and interviews. Documents on and from relevant organisations and policies that are important for supporting innovation processes in the field of non-timber forest products in the region of Styria have been qualitatively analysed. The documents have been screened in order to determine their relevance regarding NTFP innovations, including their respective aims, measures and activities. A questionnaire has been sent in 2014 to 19 potentially relevant public and private sector organisations with a response rate of five, who explicitly considered the theme relevant for them and answered. The other actors explicitly or implicitly considered themselves not relevant for this topic. Semi-structured face-to-face interviews have been conducted with central innovation system actors and with innovators in specific innovation case studies between 2014 and 2015. Analysis questions include from which administrative levels the relevant support policies are and from which sectors, and what are the goals and measures applied. Besides of financial support mechanisms, the analysis specifically considers research and development, education, training and information activities related to non-timber forest products. In addition, in-depth analyses of innovation processes in selected innovation examples from the region were conducted. These embedded enterprise-level case studies include the following products: game meat, Christmas trees, mountain pine essential oils, chestnuts, mushrooms, herbs and forest fruits. Some of the included cases are supported by policy programmes, marketing organisations and/or labels, for example, the LEADER+ programme, Nature Park Specialities, the Styrian Christmas tree asso-

ciation, Urlaub am Bauernhof (farm holidays) and Genussregion Österreich (Region of Delight Austria). The analyses include the role of actors with regard to information, financing and coordination within the innovation processes in these examples. The analyses have been conducted as part of the European research project StarTree, between 2014 and 2016.

3. Results

3.1. Characteristics of non-timber forest products in Styria, their markets and institutional framework conditions

The NTFP portfolio produced in Styrian forests covers a wide range of species from three taxonomic kingdoms including plants, animals and fungi. Apart from forest related services, which often act as a key driver for the marketing of NTFP, the most relevant product categories in terms of economics are Christmas trees, honey, game meat and forest reproductive materials (Vacik and Wolfslehner, 2009).

The main types of products NTFP are used for include food stuff, beverages and decorative items, as identified by an expert consultation on relevant taxa (i.e. single named entities), and mainly reflect a variety of traditional use forms (e.g. mushrooms, schnapps, trophies). However, various innovative approaches have emerged recently, spanning from new products out of Swiss Stone pine (*Pinus cembra*) to new ways of marketing game meat, guided tours, or the revival of traditional knowledge applied for the medical use of plant- or animal-based raw material.

The majority of NTFP are niche products and are subject to local or regional trade, with only some of them being distributed at national level. The share of NTFP that are internationally traded seems to be negligible, at all for NTFP that originate from Styria. Increasing activity with respect to embedded products (i.e. NTFP as an intrinsic part of a marketed service) can be recognized in the region, typical examples being homemade products marketed together with farm holidays or guided tours or similar.

Most prominent NTFP, including several game species (e.g. *Cervus elaphus*, *Sus scrofa*), wild mushrooms (e.g. *Cantarellus cibarius*, *Boletus edulis*) and berries (e.g. *Vaccinium myrtillus*, *Rubus fruticosus*), are usually harvested in the wild and thus originate from semi-natural forests. Christmas tree production is commonly executed on plantations and dominated by a single tree species (i.e. *Abies nordmanniana*). The number of forest owners who focus on NTFP production, either by inclusion of relevant tree species or by particular silvicultural practices, is negligible. Harvesting of NTFP is executed manually and mostly by coincidence, as they are not actively managed.

In Styria, the main legal acts in force which deal with forests are the Forest Act (Forstge-

setz, 1975, on national level) and the Hunting Law (on provincial level). Besides, there are no specific laws for NTFP. Game is specifically regulated in the Styrian Hunting Law (Steirisches Jagdgesetz, 1986).

In Austria, public access to forests for recreational purpose is legally acknowledged (Forest Act, 1975, Article 33) although public access is granted by law only for walking and it may be subject to certain restrictions. The right for recreational access includes picking of mushrooms or other forest fruits for personal use as long as the forest owner does not explicitly prohibit it.

In Styria (and Austria in general) a distinction is made between use for self-consumption and commercial use of NTFPs. The Austrian Forest Act allows the collection of NTFP such as fruits, seeds, mushrooms, twigs, earth or other soil constituents in small quantities. Collection of mushrooms is legally restricted by quantity (2 kg/day/person) and collection of fruits/seeds is related to the intent of the pickers. Any commercial utilisation of these products, as well as conducting or participating in collection events, is subject to the consent of the forest owner, and is subject to a penalty when done without permission (Forest Act §174). The owner is by law allowed to exclude others from any use of NTFP or to give out licences, although this is rarely implemented.

3.2. Role of innovation in NTFP development

Non-timber products are generally poorly developed, with some exemptions that may be seen in the production and marketing of Christmas trees where the majority of the domestic market is supplied by own production, and a few food products for which small markets exist, including game meat, honey, and liquor or jam from forest berries or fruits. Swiss stone pine (*Pinus cembra*) or rowan and service tree (*Sorbus spp.*) products are specific examples which are marketed.

A common characteristic which illustrates the poor development level is the semi-professional and small-scale production, meaning that it is often home-made jam, liquor, soap, etc., produced and marketed by farmers or other small producers on farmers' markets or directly from their farms or homes. In the whole field of NTFP, only a few larger producers or trading companies exist in Styria. Direct marketing by farmers is a typical business model which implies a number of tax advantages for the producers when they do it as part of their farming business. Once the business becomes the main economic activity and builds on additional employees, these incentives are lost. An institutional hindrance can also be seen in the often weak connection between producers and land-owners as the collectors/producers are not necessarily the land-owners but there are often no formal contracts.

Emerging fields which are carried by small innovations include a renewed interest in

traditional food or health products, including, for instance, chestnut (*Castanea sativa*), resin or herbs. Another trend seems to be what could be termed “embedded products” which are combined with experiential or tourism services. Recreational services that are directly or indirectly related to non-timber products are quite well developed in Styria, for example forest pedagogics. Tourism services such as guided tours or farm holidays are sometimes related to forest products or activities, e.g. to wild herbs, berry or mushroom picking. It is expected that all of these activities that connect to new societal demands and values have high potential in the future. The central challenge in these cases is to bring together rural and urban spheres and thinking.

3.3. Innovation policies

According to the cross-sectoral nature of NTFP, a range of policies and organisations may become relevant for supporting innovations, from public and private spheres and from various market sectors. When looking at public policies, we screened sectoral policies beyond forestry and included various innovation and development policies in our analysis. The most relevant policy documents are given in Table 1.

Table 1: Policy programmes relevant for supporting innovation in NTFP in Styria

Tabelle 1: Politische Programme, die für Innovationsförderung bei Nichtholzprodukten relevant sind

Policy field	Document Name	Type of document	Year of issue	level of the policy programme
Forestry	Federal Forest Act 1975 (<i>Forstgesetz 1975</i>)	Legal act	1975/2013	National
	Austrian Forest Dialogue (<i>Österreichischer Walddialog</i>)	Policy programme	2006	National
Hunting	Styrian Hunting Act (<i>Steirisches Jagdgesetz</i>)	Legal act	1986	Regional
Regional development	National Strategic Framework Plan STRAT.AT 2007-2013 and 2014-2020 (<i>Nationale Strategie STRAT.AT</i>)	Policy programme	2007/2014	EU/National
	European Territorial Cooperation INTERACT (<i>Europäische Territoriale Zusammenarbeit</i>)	Policy programme	2014	EU level
Rural development	Austrian Programmes for Rural Development 2007-2013 and 2014-2020 (<i>Österreichisches Programm für die Entwicklung des Ländlichen Raums</i>)	Policy programme	2007/2014	EU/National
	LEADER – Regions “Land of the Swiss Stone Pine” (<i>Zirbenland</i>) and “WoodWorld Murau” (<i>Holzwelt Murau</i>)	Policy programme	2007	EU/Local
	Rural/countryside development/local agenda21 (<i>Landentwicklung</i>)	Policy programme	Since 1996	Regional
Agriculture	Region of Delight Austria (<i>Genussregion Österreich</i>) and Region of Delight “Game from Gesäuse” (<i>Genuss Region Gesäuse Wild</i>)	Policy programme / Product Label	2003/2008	National/Local
	Farmers’ direct marketing association (<i>Gutes vom Bauernhof</i>), Farm Holidays (<i>Urlaub am Bauernhof</i>), Domestic Christmas trees (<i>Heimische Christbäume</i>)	Agricultural Associations	1990s	National/Regional
Nature Conservation	Nature Parks Austria/Styria (<i>Naturparke Österreich/ Steiermark</i>),	Association	1996	National/Regional
/Tourism	National Park Gesäuse (<i>Nationalpark Gesäuse</i>)	Policy programme	2002	National/Local
Innovation	Wood Cluster Styria Ltd. (<i>Holzcluster Steiermark</i>)	Cluster programme	2001	Regional

There are several EU-level programmes, the European Territorial Cooperation for cross-border cooperation, the National Strategic Framework Plan with a regional development focus and the Austrian Programme for Rural Development under the EU Common Agricultural Policy which also includes the LEADER instrument. LEADER is of specific importance as it is thematically open and explicitly focused on innovation

support in rural areas. In the period 1999-2015 there have been two LEADER regions in Styria which specifically focus on forest and trees, "Zirbenland – Land of the Stone Pine" and "Holzwelt Murau - Wood World Murau". While Wood World Murau aims to foster the use of wood, Zirbenland fosters cooperation and development around both wood and non-wood products from the local characteristic tree "Zirbe" (Swiss stone pine, *Pinus cembra*). The region of Zirbenland is innovative in terms of wood and related products and gains profile through regional marketing, awareness raising and networking activities. They have developed new forms of use of Swiss stone pine products in the food and non-food sectors, for instance, promoting health and wellness effects of the wood, needles and cones of this specific tree species. The provincial regional/rural development programme Landentwicklung has rather limited relevance.

The Austrian Forest Act and the Styrian Hunting Law regulate forest and wildlife management and have rather indirect effects on innovation. The Forest Act provides for several subsidies to improve the economic, ecological and social value of the Austrian forests but with a rather limited scope on innovation support.

A few agricultural associations are relevant, such as the direct marketing association on farm specialities ("Gutes vom Bauernhof") and the Austrian farm holidays association "Urlaub am Bauernhof". These specific associations under the umbrella of the Chamber of Agriculture offer important services such as joint marketing and information exchange. The only forestry-specific is the Styrian association of Christmas tree producers which offers support and advice, joint acquisition as well as a label for the marketing of Styrian Christmas trees ("Steirischer Christbaum").

"Region of Delight" is a direct marketing instrument, initiated by the Federal Agricultural Ministry and implemented in cooperation with the Chambers of Agriculture, which emphasizes the importance of regional specialties and thus contributes to attractive and future-oriented regions. One of the 17 gourmet regions in Styria is an example of a forest product: "Gesäuse Wild" is producing high quality game meat. It is located in the National Park area Gesäuse and combines tourism and marketing of local products.

With the aim of a sustainable rural development and applying an integrated nature conservation approach, nature conservation policies may contribute to the development of NTFP. The Austrian Nature Parks are active in developing forest products such as liquors, jam and herbal products. Their aims are to preserve characteristic cultural landscape types through a sustainable use of local resources and to strengthen the local and regional economy by integrated land management and adding new values to traditional land uses. They promote local specialties by their label "Naturpark-Spe-

zialitäten" (Nature Park Specialities) and offer educational services with local products embedded, e.g. guided tours, educational trails or "cooking from the meadow".

The Styrian Wood Cluster was launched under the provincial innovation programme and may contribute to non-timber innovations, however, its current strategic plan focuses on timber only. The cluster manages also the Wood Innovation Centre Zeltweg (Holzinnovationszentrum Zeltweg) which supported the LEADER region Zirbenland.

Case analysis: LEADER-Region Zirbenland

The LEADER region Zirbenland was formed by 12 municipalities in Upper Styria with the aim to focus rural development process around wood, in particular the wood of the rare Swiss Stone Pine which is typical for the region. The region was formerly part of another larger wood-oriented LEADER region ("Holzwelt Murau") and the group of municipalities had initiated already earlier a local wood-focused innovation centre ("Holzinnovationszentrum"). The crucial event to form an own region came together with a large regional exhibition ("ZirbenLand & ZukunftsGeist") in the frame of which it became clear how strong a potential of creative actors exists in the region.

In the frame of the LEADER period 2007 to 2014, the LEADER region Zirbenland invested around 6 Mio. € from LEADER itself and mobilised another 7 Mio. € from other funding sources, mostly around projects connected with the Swiss Stone Pine. Besides the use of timber, they also developed non-timber products, first of all its essential pine needle oil as well as touristic activities. The management initiated numerous co-operations, including research partners and regional actors from various sectors. A central activity was a scientific study on the pine needle oil with the University Graz, the realisation of a pine needle oil distillery in the region, a specific online shop and the creation of a range of products from this essential oil, including health, personal care and food products. At the same time a tourism marketing campaign was initiated and led to a rise of touristic overnight stays of 30%. Although the majority of activities and budget are in the field of wood, tourism and other economic sectors, the public awareness centres more on the non-timber forest products around the pine.



Figure 1: Swiss Mountain Pine product range from LEADER Region Zirbenland (source: I. Zivojinovic)

Abbildung 1: Zirbenproduktpalette aus der LEADER-Region Zirbenland (Quelle: I. Zivojinovic)

Activities in the LEADER frame are mainly cooperation projects and information services. The following themes were covered: i) wood innovations for wood processing companies in the region, ii) energy innovations with biomass district heating plants, pilot projects and start-ups, iii) research, training and education cooperations in a “learning region”, iv) pine products development and marketing, v) developing potential uses of the essential oil, vi) tourism marketing, and vii) cultural archaeological projects.

This case illustrates nicely a successful application of the LEADER method and how it can be useful for NTFP. Its innovation and bottom-up principles together with the strategic and systemic approaches are the strengths which have been fully applied here. Thus the success factors can be seen in first, the provision of not only subsidies but also personnel capacities for networking and information, and second, the flexibility and openness of the instruments towards local resources, actors and initiatives.

3.4. Innovation actors

The relevant innovation actors are often related to public policies, for instance, as being the implementing organisations, or sectoral interest groups. In certain cases, the organisations are specifically formed under a programme, for instance, in the case of associations, national parks, nature parks or LEADER regions. In the following, relevant organisations are presented according to their actor type (Table 2).

Table 2: Innovation-relevant actors in the field of NTFP in Styria

Tabelle 2: Innovationsrelevante Akteure im Bereich von Nichtholzprodukten in der Steiermark

Type of actor	Name (English translation)
R&D and innovation support organisations	Asamer-Handler & Co (member of ÖAR Regional Consulting Ltd.)
	Styrian government, Department for land-use planning and regional development
	Styrian government, Department for agriculture and rural development
	<i>LEADER – Region Land of the Stone Pine / Regional Development Association Land of the Stone Pine</i>
	<i>LEADER – Region Wood World Murau</i>
	<i>LEADER – Region Southern Styria</i>
	Rural network association / LEADER network
	Wood Cluster Styria Ltd. and Wood Innovation Centre (HIZ)
	Joanneum Research Ltd.
	Forest + Culture Network
Interest groups	Association of Styrian Forest Land Owners
	Styrian Chamber of Agriculture
	Styrian Forest Association
	Nature Parks Styria association
	Styrian Farm Holidays network
	Styrian association of direct marketing “Goodies from the farm gate”
	Association of Styrian Christmas tree producers
	Chestnut initiative
	Styrian hunters association
	Beekeepers association
Education and training organisations	Forestry College Bruck/Mur
	Forestry training centre Pichl, of the Styrian Chamber of Agriculture
	Agricultural vocational schools <i>Grottenhof-Hardt, Silberberg and Raumberg-Gumpenstein</i>
	University of Natural Resources and Life Sciences, Vienna
Public administration	Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management
	Styrian Forest Authority
	Styrian Hunting Authority

Research, development and innovation support actors are a quite diverse set of public and private organisations, whereby research is rather limited but regional or rural development has an important role. The LEADER network and regions are prominent,

together with a few consulting companies which are most often directly linked to the LEADER management. Education and training organisations are usually semi-public actors from the field of forestry and agriculture. It seems that forestry vocational training has the ability to react to new trends and demands very flexibly as their programmes include specific courses on old forest-working skills which are not commercially relevant any more (e.g., traditional wooden fences or shingles, medicinal herbs), various non-commercial themes (e.g., bird watching, caring for ants) and new trends and skills (e.g., wood gasification, hand-made cosmetics, wilderness education, green care). Their activities are often not only education as such but also awareness raising or networking. An example is the chestnut initiative (ARGE Zukunft Edelkastanie) which organises training and knowledge exchange among chestnut growers and is supported by agricultural schools in Styria. This initiative had a great impact on the development of new chestnut plantations and a flourishing local market.

The relevant interest groups are primarily from the forestry and agricultural field as the producers of NTFP are mostly farmers. Within the framework and with the support of the Chamber of Agriculture, a number of specific associations provide important support for Christmas tree producers, direct marketers and farm holiday providers. Although farmers primarily market agricultural goods, some of them also have forest products such as forest berry jams or mushrooms in their portfolio, usually in addition to their main products. Forest products have some relevance also for farm holidays as home made products are a specific asset of those touristic activities and the farm holidays organisation uses that in marketing. It is especially the Chamber of Agriculture which is relevant and active because their members are farmers. In comparison, the Association of Styrian Forest Land Owners is not actively promoting NTFP because larger forest holdings see less business opportunities in this field but rather a conflict potential (e.g. with other pickers).

Case example: Nature Park Specialities

The Austrian Nature Parks have an interest in maintaining traditional forms of land use and offer support for producers of products from the Nature Parks with the label "Nature Park Specialities" which was developed in the Association of Austrian Nature Parks and which currently includes agricultural and handcrafted food products. As some Nature Parks are strongly shaped by woodland, the idea arose to develop wild forest products in the frame of the label. Examples are cowberries [*Vaccinium vitis-idaea*], rowanberries [*Sorbus aucuparia*] and blackthorn [*Prunus spinosa*] which are made into jams, chutneys or schnapps, other examples are wild honey, oils with herbal extracts, essential oils (Swiss pine [*Pinus cembra*], spruce [*Picea spp*]) and various bouquets garnis (partly of wild harvested material), which find a use as teas or bath additives. The producers are in most cases smallholders who process and merchandise directly on their farms, at farmers' markets, to regional food retailers and also through service points of the Nature Parks.



Figure 2: Rowan tree in Nature Park Almenland (source: Naturpark Almenland)

Abbildung 2: Vogelbeere im Naturpark Almenland (Quelle: Naturpark Almenland)

A possibility to implement the idea was found in the framework of the European FP7 research project StarTree and in the form of action research which was implemented by the regional development consultant M. Asamer-Handler. After presenting the idea and possibility to the 48 Austrian Nature Parks, three Parks were interested to join, each with their own specific focus. Those initiatives started from the specific situations and interests of each Park and developed their own specific activities. The following two initiatives were in Styria:

1. Project “Colourful hedges and edges of woods”: In the Nature Park Almenland, there existed already an initiative to promote the planting of certain local trees and shrubs such as rowanberry and blackthorn in private gardens in order to replace exotic species. In the project, this idea shall be expanded to planting the colourful trees at forest edges as the fruits can be used by farmers and small processors of the region for producing rowanberry Schnapps and other products. At the same time, the project shall make the landscape (even more) attractive and thus serve tourism.

2. Business plan for a merchandising enterprise: In the Nature Park Südsteiermark, two options for establishing a merchandising and promoting business for the local “Nature Park Specialities” were assessed in the frame of a business plan. Currently, 25 producers market their products under the label, one third being wild forest products, especially herbs. This enterprise was intended to serve as a hub for combining the scattered production. From the two options i) of establishing an own shop with an assortment of products with a long shelf life (jams, syrups, liquors, herbal teas, etc.) targeting at tourists, and ii) to supply local shops, hotels, restaurants and wineries with a variety of durable products on special shelves, the first was eventually selected because a suitable locality was available and a carrier was found to run it.

In this case example it is interesting that the initiative comes from outside the sector, namely from nature conservation which aims at an integrated sustainable development of the rural cultural landscape in the Nature Park areas. With this external impulse and the accompanied support, the local resources, traditions and creativity are bundled into innovative activities and product development. With a fairly restricted budget but a well-directed support quite significant outputs have been achieved in terms of business activities and regional value added. The success factors lie in the institutional support by the Nature Parks Association, an external consultant, and an international research project on the one side, and in the applied bottom-up approach of the consulting service on the other.

4. Discussion and conclusions

4.1. Innovation support

How are innovations in NTFP supported by innovation systems? We learn that – although the products go far beyond the forestry sector – it is still the forestry, agricultural and rural development policies which seem most relevant for non-timber innovations. Their influence, however, is limited as NTFP are not in their specific focus. The precondition for their relevance lies in their innovation-orientation and in their openness across product types and activities. We furthermore see that the relevance of policies strongly goes along with a regional or local level of implementation: it is regional level initiatives within larger level frameworks (e.g., agricultural associations of the Chamber of Agriculture) or locally or regionally implemented (national or EU) policies (e.g., LEADER regions) which have the greatest relevance.

When looking at the relevant actors, their sectoral allocation is confirmed: forestry training schools, agricultural interest groups and LEADER regions' organisations are the most prominent ones. Many other major policies or actors from the forestry or agricultural field, however, do not have NTFP specifically in their focus: The main forestry policies, education curricula or research programmes hardly touch on them and with the exception of the Christmas trees association and the chestnut initiative, the agricultural actors have no specific awareness on products with a forest or wildland origin. Although we have found a number of policy programmes and actors which are relevant for NTFP, for the most part they do not focus on or explicitly include the forest products – these are only implicitly part of their scope. The reported case studies of the LEADER region and the Nature Park Specialities are among the rare exceptional examples.

An interesting issue is the position of the forest land owners' organisations. As they primarily represent larger forest holdings (i.e. property size >200 ha), they find themselves in an ambivalent role. Although a number of forest companies in Austria quite

actively pursue non-traditional non-timber activities such as various tourism, sports or other recreational activities as well as renting out land or buildings, for many land owners non-timber activities rather mean conflicts as these are often done by other users. They are therefore hesitant with promoting such opportunities which are rather used by others than the land owners. NTFP are in fact often collected in forests without specific contracts between the pickers and the land owners. Hunting and game is an exception for hunting being a traditional forestry activity and there are always strict contracts between land-owners and hunters. In fact, many conflicts that are related to tourism or NTFP are with the hunters. Land-owners then support the hunters since they are paying for their contracts.

4.2. Institutional barriers

Besides of the supporting policies, it is difficult to determine institutional barriers because they are not so visible. An indirect barrier is found in the fact that non-timber forest products are a side-activity of any relevant sectors which leads to a “blindness” of the institutional system towards these products: a lack of statistics, specific research, education and training programmes and focussed support structures are the result. The Styrian wood cluster organisation, for instance, does not explicitly include those products into their activities. Together with a general lack of effective innovation support in the forestry sector (Rametsteiner et al. 2005), this neglect of NTFP adds to what can be called a “double blindness” of the institutional system towards the development of NTFP. The cross-sectoral characteristics of many of these products seem to be furthermore the reason for direct barriers because of a competition between the involved sectors – forestry, agriculture and nature conservation (Buttoud et al., 2011). The forestry sector seems to be hesitant in supporting activities which may benefit other groups than the land owners – these products are often for the benefit of processing companies, conservationists or the general public.

4.3. Bottom-up innovations

As a result, it can be said that there is no “one” sectoral innovation system supporting non-timber products but support is given through certain programmes from several sectoral innovation systems, including forestry (Christmas trees), agriculture (LEADER, Farm Holidays, chestnuts and the Regions of Delight) and nature conservation (Nature Park Specialities). For none of them, “non-timber forest products” are a central or significant field of activity as such which implies that no specific knowledge, instruments or promotion activities are developed and that it is not easy for interested innovators to receive support. This is only achieved, once they reach a certain institutionalisation such as with the Christmas tree association, chestnuts initiative or the LEADER region “Zirbenland” which as a whole took the Zirbe (Swiss Mountain Pine) as a trademark symbol. Non-timber innovations are typically generated from bottom-up in small, regional and often cross-sectoral “ad-hoc” networks (Kubeczko et al., 2006).

The range of Styrian examples show that despite of the lack of specific sectoral innovation systems, the institutional system still has certain structures that are able to offer support – if they are open and flexible enough to pick-up emerging demands from practice. They also show that for establishing new products beyond single firms, the innovators often have to institutionalise themselves through which the innovations gain an institutional dimension (Ludvig, Corradini et al., 2016).

The two detailed examples analysed in this paper are show-case examples where the institutional system was able to give substantial and systemic support to local creativity and capacities. Both, the product development in the Nature Park Specialities and the regional strategy development in the Zirbenland LEADER region combined a structured and expert-led process with an active involvement of local actors' needs and views. With this it becomes the ideal regional innovation system as described in Asheim's "regionally networked innovation systems" (Asheim, 1998), or Cooke's "networked regional innovation system" (Cooke, 1998).

4.4. Need for flexibility and openness in innovation support

When actors and support organisations are grouped according to types of organisations, most actors in Styria belong to interest groups, innovation support organisations and to research, education and training organisations. They are mostly regional level organisations. This observation goes along with the fact that the products are often of specific regional relevance. An important policy implication thus is that sectoral support programmes should provide for sufficient leeway to flexibly adapt to local products or other local specific needs, if not specifically focusing on new approaches and innovations as such. In order to gain more ideal type examples in the form of Asheim's "regionally networked innovation systems" as described in the two cases the model for innovation support could be regarded "top-down support for bottom-up innovations". This conclusion is supported by further case studies from other European countries, studied in the same research project (Weiss et al., forthcoming-b).

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ARTICLE 5

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Mapping European and forest related policies supporting social innovation for rural settings

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ABSTRACT

The term “social innovation” (SI) is currently applied to denote a broad range of activities connected to explicit goals and supposedly designed to address inherent societal problems. These problems are rooted in current economic and ecological crises, such as poverty, unemployment, forced migration, brain drain, social inequality or environmental destruction. This article focuses on the EU and national policies that have the potential to support Social Innovation in rural areas and maps possible future policy efforts in this regard. However, many of the policies that we find to have potential for possible effective social innovation support do not have much in common concerning their targets. In consequence, the article outlines a threefold typology for categorizing the different policy targets that have impacts on social innovation in rural areas: (i) policies targeting vulnerable social groups, (ii) policies targeting societal challenges at large and (iii) policies targeting the participatory inclusion of civil society. In addition we outline enabling and hindering policy factors for social innovation and we apply the threefold typology to the example of forest policy. The conceptual framework in combination with the forest policy objectives we identify provides a useful basis for further research in this area.

1. Introduction

In 2009, former US president Barack Obama established two new agencies for social innovation (SI)¹ and the concept has become increasingly popular among political leaders and policy administration. In a speech in March 2011, Manuel Barroso, President of the European Commission at that time, introduced the new “Social Innovation Initiative”. Since then, SI as a promoter of social welfare has been presented as a solution to many kinds of old and new social risks at a time of growing uncertainty and economic pressure on public administration (OECD, 2011; Sinclair and Baglioni, 2014). Scholarly literature has also engaged in the issue of SI in policies, identifying it as “common parlance” but presenting an opportunity for government to support social wellbeing (Pol and Ville, 2009), by regarding it as a general means to tackle marginalisation (Jacobi et al., 2017) and emphasising its transformative potential for research and collective action (Moulaert et al., 2017). Many authors have tried to define the concept (see examples in (Bock, 2012; Cajas-Santana, 2014; European Union, 2014;

Hämäläinen and Heiskala, 2007; Howaldt and Knopp, 2012; Phills et al., 2008; Pol and Ville, 2009; Sinclair and Baglioni, 2014)). Meanwhile, others concluded explicitly that its meaning continues to be “ambiguous and vague” (Grimm et al., 2013). The authors of this paper are part of the SIMRA project² that has developed its own working definition: “SI is the reconfiguring of social practices, in response to societal challenges, which seeks to enhance outcomes on societal well-being and necessarily includes the engagement of civil society actors” (Polman et al., 2017). Overall, the definitions seem idealistic and normative and place a big burden on SI: it is expected not only to embrace a range of new institutional environments and arrangements, new decision making processes (Nijnik et al., 2018), new fields of activity, new actors relationships and interactions and so on. It is also expected to have an output: A social innovation has to meet social needs (Mulgan, 2007; Murray et al., 2010), has to solve a social problem (Phills et al., 2008) or has to enhance societal well-being (Polman et al., 2017).

For us, the high political and societal aspirations for SI call for an examination of the relationship between state policies and SI processes

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¹ The Office of Social Innovation and Civic Partnership and the Social Innovation Fund (SIF).

² Social Innovation in Marginalised Rural Areas (<http://www.simra-h2020.eu/>).

in the forest sector. The concept of SI includes a claim to be able to substitute or complement functions that have usually been considered as responsibilities of the state. It has even been argued that, as neo-liberal policies of today cannot fulfil various social needs, SI functions as a mechanism for civil society actors to find new ways to meet the social needs, and to fill gaps that cannot be fulfilled by state or markets (Murray et al., 2010). Thus, social innovation is sometimes seen as an alternative to policies and as a more bottom-up and flexible way to meet existing social needs. We understand that in times of economic crisis and crisis of public social support systems, concepts like SI are becoming increasingly attractive in light of drastic cuts to public spending, also for the forest sector. However, SI as a part of grassroots and bottom-up constellations in rural areas has neither the functions nor the resources to replace regular social services or rural development policies. We rather see a need for policies to support the emergence of SI processes in rural areas and in forestry.

This article therefore focuses on the policies that have potential to support SI in rural areas and maps the actual and potential policy efforts in this regard. We identify challenges that the policy landscape has in promoting SIs in practice: how do the policies support and hinder SIs? We analyse the challenge of providing concrete benefits to forest-dependent communities. Our findings are based on the qualitative analysis of a combination of existing policy documents and qualitative interviews carried out with key experts in the field. In the following sections, we will first outline the links between policies, SI and forestry in rural areas (2) as well as the methods applied for this research (3). Our subsequent results section introduces a mapping of the European policy landscape on SI, with a focus on rural issues and policy objectives for the forestry sector. It draws a distinction between policy targets according to three key policy dimensions (4). In the discussion section, we deal with the role of the state and public policies in regard to SI and we apply the three policy dimensions to objectives in forest policy (5). First, we show that specific parts of the inherent logic of public policies are not fostering SI (5.1). Second, disregarding such obstacles, we identify examples of forest policy and forest policy objectives along the lines of our threefold typology (5.2). Our conclusion then summarises the findings and suggests that it is important to clearly distinguish between various policy targets when dealing with SI, both in research and in political practice (6).

2. Social innovation in rural areas and forestry

SI in rural areas seeks to enhance outcomes on societal well-being through the provision of societal benefits and services. Thus, its advantage has to be seen in light of creating social value as the outcome as well as throughout the stages of the innovation process. In all stages it includes societal inputs and engagement as well as communication between innovators and other actors. Likewise, SI in forestry seeks to enhance the social, cultural and ecological values of forests, via community projects, social forestry or communication and trust building activities across forestry actors' networks. A forest policy example for such communication policies at a higher decision-making level are official forest dialogue activities such as the "United Nation Forums on Forests" or the German and Austrian "Forest Dialogues" (*Walddialoge*), organized by the respective national ministries in order to promote open discussion, inclusion and conflict resolution across different forest stakeholder groups. A number of authors in the forestry literature are discussing the socio-economic benefits generated by forestry and its importance for regional economic development that goes beyond a production perspective towards also consumer perspectives (Seeland et al., 2011; Slee, 2006). The regional context in combination with socio-economic impacts of forestry is important when it comes to the effects of SI for regional and local development (Blanco et al., 2017). However, many forms of collaboration and partnerships could spin off new arrangements among state and civil actors related to forestry, thus transforming parts of the rather hierarchically organized forest sector

by shifting the traditional understanding of forestry as primary production branch of economy towards the broader benefits of forestry for society (Brukas, 2015; Buttoud et al., 2011; Liubachyna et al., 2017; Rogelja and Shannon, 2017; Secco et al., 2017).

In view of the literature on SI, very little is known about the broader effects of SI and how these *interrelate* to established policy programmes, such as regular social policy support systems. In other words: given the present state of research, we hypothesise that SI can complement present welfare state arrangements and achievements of social equality in rural areas. However, SI also goes far beyond such "social policy" realms, namely when it is dealing with the reconfiguration of social practices and the emergence of new constellations of actors in combination with the engagement of civil society. As a broad term and a new concept, the notion of SI is not immediately or explicitly visible in most of the policy documents. Thus, we were searching not only for documents that directly address the term but also for those that indirectly address issues relevant to enabling social innovation.

Recent research reveals that even technical and R&D-led innovation needs state intervention and subsidies (Mazzucato, 2015). This highlights the importance of identifying key interventions and policies that are relevant for social innovation. The rural settings in question have special social and economic needs determined by problems such as rural emigration, brain drain, youth emigration, lack of employment opportunities, population aging, shortage of health care provision, poor infrastructure and limited education services. In this light, SI can be argued to be a part of the social economy. The term social economy describes a whole range of organisations, such as co-operatives, non-profit organisations, social enterprises, and "charities", the latter being a form of organization very common in the UK. However, and most importantly, for policies to promote SI, it should not be associated with the social economy alone. SI can (and ought to) be understood to also exist in the private sector, the public sector, in new technologies, research institutions and also within other actors and institutions of civil society. As one example, the European Commission's "Guide to Social Innovation" (EC, 2013) can be understood as a policy document aiming to move beyond the focus on enterprise-driven technical innovation to include other sectors, such as health, social services and education. It states explicitly that the European Structural and Investment Funds have the mandate to promote social innovation ((EC, 2013), p. 51) within the EU's entire cohesion policy.

3. Methods

The article uses a qualitative deductive approach with the application of content analysis (Mayring, 2000). In this approach, policy documents are merely primary sources (Siegener et al., 2018) and represent written and negotiated plans of action (Knoepfel et al., 2007; Ludvig et al., 2017). Deducted from the theoretical literature on SI, we considered SI as being at the intersection of the following policy fields:

- Social Policy
- Rural Development Policy
- Regional Development Policy
- Forest Policy
- Environmental Policy
- Innovation Policy (most often embedded in economic/industrial policy and R&D Policy).

These policy fields are embedded and dealt with in numerous, various and often distinct policy domains ((Baldwin and Cave, 1999), p. 58). Examples of such domains are: social welfare, social care, employment, small business development, energy, resource and raw material use, technical infrastructure, agriculture, forestry, food industry, alternative food supply, regional development, technical research and innovation, tourism and education. The sample of policy documents was searched in a step-by-step approach. First all 32 SIMRA partners

from the consortium and stakeholders contributed with their local expertise and knowledge to data collection and named all documents, programmes and actions they deemed relevant for SI. This way, 20 policy programmes, documents and instruments at regional, national and the European level were collected. The research was then further conducted online,³ which enlarged the sample to 16 more documents that were not mentioned by the partners. In parallel 6 qualitative semi-structured face-to-face expert interviews with international policy experts and scientists⁴ were conducted (Denzin and Lincoln, 2017; Patton, 2002). They followed a semi structured guide with questions related to the understanding of what SI is, the content of current regulations, implementation of regulations, enabling and constraining factors for SI, the role of the organization in the policy field and future of SI. We asked additional questions only to stimulate or direct conversation or when clarification was needed. The interviews took approximately 1 h, were all recorded, and subsequently transcribed. One hour of a transcribed interview resulted in approximately 30 typed pages. The role of the interviews was to verify the data obtained from the document search, to increase reliability and validity of the research (Brink, 1993; Flick, 2014) and to prepare the deductive criteria for subsequent qualitative content analysis (Mayring, 2000). In concrete terms, starting from the pre-defined theoretical definition of SI (Polman et al., 2017), our deductive approach enabled the identification of three key themes in the policies for analysis and policy mapping:

- A social dimension with the key target of vulnerable groups
- A societal challenges dimension with the target of regional and rural development
- An institutional change dimension with the target of civil society inclusion.

These key dimensions are elaborated and linked to key examples of policies hereafter and summarized in Tables 1 and 2.

4. Results: mapping European policies that support SI

New institutional arrangements and social configurations often lead to successful social innovations in rural areas. SI also often operates outside regular modes of business, with no directly marketable benefit. This is also the case for many ecosystem services provided by forests, including all cultural and societal values, landscape maintenance, combating air pollution and many recreational benefits. Although some profit might be possible, it is not the principal purpose or characteristic of SI (see (Polman et al., 2017)). The results identify three key types of policies that touch upon SI and/or have at least some potential to support SI:

- Policies that target vulnerable groups in society (including forest-dependent communities, see (Melnykovich et al., 2018)).
- Policies that target societal challenges in integrated regional and rural development
- Policies that target societal participation, institutional change and inclusion of civil society actors

A) Policies that target vulnerable groups: These policies support

³ We used combinations of key words (Innovation, Innov* and synonyms, e.g. invention, entrepreneurs*) in association (by using AND) with “economic”, “social”, “environmental” and “policy” and all the other policy domains listed above. The search was conducted in different data bases such as Scopus, ISI web of science, Google scholar as well as institutional databases regarding policy programmes (EFI –The European Forest Institute, EU – the European Commission, FAO – The Food and Agricultural Organization of the United Nations).

⁴ According to the research organisations ethical clearance procedures these were anonymised.

SI that is directed towards vulnerable groups in society, like youth, migrants, elderly, unemployed, single mothers, socially excluded people and others. These SIs thus respond to social demands and challenges in terms of social support and inclusion. The most relevant example in terms of directly dedicated policy is the main targeted European Social Fund initiative “EU programme for Employment and Social Innovation”. This replaced the former “Progress” programme in January 2014. Especially when policies shall support forest-dependent communities, fostering activities require high levels of stakeholder competence, capacity building, resource management and mobilisation (Melnykovich et al., 2018). As most hindering factors our interview partners identified questions of finances and money in combination with the political will in some marginalised rural areas. Short-term priorities of the local population is often timber production, this has to be balanced with other long-term sustainability considerations as well as the other benefits that forest ecosystem services can provide in the long term.

B) Policies targeting societal challenges through regional and rural development: SI addresses regional and rural development as a response to societal challenges, e.g. land-flight, unemployment or lack of infrastructure. Associations of farmers and forest owners can contribute to regional and rural development and bring income to the region. In case of success, one overall achievement is regional societal and cultural proliferation. Examples for policy support are found in the EU's integrated approaches through the EU Structural Investment Funds. For example, the Rural Development Programme (RDP) is an EU-policy tool and funding mechanism used by Member States for implementing EU rural development policy in specified territories. An RDP territory can cover an entire country or a specific region. There are around 120 RDPs operational in the EU, each of which is designed to provide particular types of rural development support that are needed in the designated territories. Each RDP has a budget from the European Agricultural Fund for Rural Development.⁵ The RDP budget is used to help Member States fund actions associated with the themes/axes of the EU rural development policy for 2014–2020: Improving the competitiveness of agriculture and forestry; improving the rural environment and countryside as well as quality of life in rural areas. In their support of SI we distinguish between (I) *integrated financial policy instruments for development* and (II) *innovation policy initiatives* that directly or potentially support SI.

- Integrated financial policy instruments:* “funding” initiatives within the EU Structural Investment Funds, together with synergies from the largest public research programme Horizon 2020,⁶ that have a focus on SI. We also includes the “EU SME instrument”⁷ because its funding mechanisms have been opened to social enterprises. Beyond such EU initiatives, all subsidies, tax levies or soft loans to social enterprises as well as support among social micro-enterprises counts among such policy instruments.
- Network and upscaling/incubation innovation policy initiatives:* The most relevant example is the virtual “Social Innovation Europe Portal”.⁸ The portal is an informational policy instrument (see (Baldwin and Cave, 1999)), with the dual intention to facilitate networking and to circulate information. One of our results obtained from our interviews for rural areas is that “up-scaling” is not easy because of the contextual features of SI and also the non-incentives for social innovators to upscale – in contrast to profit-

⁵ For more details on funding in the current period, see the very recent report by the Committee of the Regions on EU rural development funding and RDPs. <http://cor.europa.eu/en/documentation/studies/Documents/Evolution-Budget-Dedicated-Rural-Development-Policy.pdf>.

⁶ <https://ec.europa.eu/research/regions/index.cfm?pg=synergies>.

⁷ <https://ec.europa.eu/digital-single-market/en/sme-instrument-0>.

⁸ <https://www.siceurope.eu/>.

Table 1
Typology of European policies that support social innovation.

Policy Target for SI	Definition of the policy	Aspects of SI covered in the policy	Examples for Policies at EU level that could directly or potentially foster SI
A: Support of vulnerable social groups	The policy is directed towards vulnerable groups in society, like youth, migrants, elderly, unemployed, single mothers and otherwise socially excluded.	SI responds to social demands and challenges in terms of social support and inclusion	The European Social Fund (ESF) initiative “EU programme for Employment and Social Innovation”
B: To combat societal challenges in integrated regional and/or rural development	This embraces all integrated approaches, such as integrated financial policy instruments or networking and up-scaling policy initiatives for SI	The Policy integrates social, economic and environmental dimensions of SI and leads to regional and rural development	Regional Development Policies, Rural Development Programmes (RDP) Funding initiatives within the EU Structural Investment Funds, the EU SME instrument (it is open to social enterprises), the EU “Social Business Initiative”, the “Social Innovation Europe Portal” (SIE-initiative), The LEADER/CLLD local development method, ^a Agenda 21, ^b EIPs (European Innovation Partnerships) and their operational groups. ^c For SI within policy-making one notable example is the local “Bilbao Urban Innovation and Leadership Dialogues” where policy formulation is accompanied by interaction processes through larger public forums. Strategic regional and local development plans.
C: To foster participation, institutional change and inclusion of civil society	Policies that target the facilitation of processes of institutional development and promote changes in the relations between stakeholders and also between stakeholders and public institutions.	SI can occur here as a target of the policy but also as SI within policy-making in terms of new forms of inclusion of stakeholders in policy processes	

^a ‘LEADER’ is an EU policy that was initiated in the 1990s and means, ‘Links between activities for the development of rural economy’. The idea was to engage the energy and resources of people and bodies as development actors rather than beneficiaries, empowering them to contribute to the future development of their rural areas by forming area based Local Action Group (LAG) partnerships between the public, private and civil sectors. In the current period (2013–2020) the LEADER method has been extended under the broader term Community-Led Local Development (CLLD) and is now fundable under all Funds of the EU Cohesion policy. (http://enrd.ec.europa.eu/leader-clld_en, last access 2018-02-13).

^b The Local Agenda 21 is a non-binding, voluntarily implemented global action plan originating in the UN-Rio 1992 earth summit; it is administered by the UN Commission on Sustainable Development, but has to be implemented at the local levels.

^c European Innovation Partnerships (EIP) are tools for the development of research and innovation actions, initiated by the EU Commission in 2010. They are accompanied by local operational groups of stakeholders and include also partnerships for rural development.

Table 2
Forest policy objectives in support of SI.

Policy target for SI	Forest policy objectives	Examples in forestry	Main goals and format
A: Support for vulnerable social groups	Access to forests, Economic and cultural benefit for forest owners and enhancement of social value.	Green Care (EU wide), Green Care Forest (AT), Social Farming (EU wide), forest pedagogy and environmental education (EU wide)	Social inclusion through charities and social enterprise
B: To combat societal challenges with integrated regional and/or rural development	Networking and business benefits for forest owners, local empowerment and economic development.	Institutional innovations such as the formation of labels and brands among collectives of forest owners: regional or nature marketing labels; regional development initiatives and bio-energy initiatives [(Nature parks (AT), Charcoal initiatives (SI), chestnut associations (IT), bio-energy (AT))]	Business and economic revenue to the region
C: To foster participation, institutional change and inclusion of civil society	Cooperation and trust-building around common goals with forestry actor networks.	Volunteering [(e.g. volunteer reforestation projects in Austrian Mountain regions (AT)) and voluntary cooperation for joint goals such as Mountain bike trails (CH)], communal engagement for woodland management with social, cultural and economic benefits [Woodland Skills Centre, Coppice Wood College (Wales)]	Collective activities of multiple stakeholders with a common goal via the formation of new organisations and new institutional arrangements, in combination with volunteer engagement

searching business innovators. Consequently, the EU flagship “Innovation Union” strategy has launched some business incubator network projects supporting SI.

c) Policies targeted at institutional change, participation and inclusion of civil society: These policies promote SI by facilitating processes of institutional development and changes in the relations between stakeholders and also between stakeholders and public institutions. We distinguish here between (I) *Policies for SI* and (II) *SI within public policy making*. Both approaches require a great deal of effort from all kinds of stakeholders. Any local development plan following such ideas and proposing effective measures to address them will be fostering SI, in the sense of institutional change, participation and inclusion of civil society in rural areas. Thus, by extension, any regional or national policy promoting the elaboration of strategic local

development plans has the potential to indirectly foster SI.

(I) *Policies for SI*: Policies that facilitate processes of institutional development and bottom-up realisation of innovative ideas. These policies target changes in relations between stakeholders and also between stakeholders and public institutions. The best example is the LEADER “local development method”, in this period (2014–2020) extended under the broader term “Community-Led Local Development” (CLLD)⁹ and co-financed – obligatorily – from

⁹ ‘LEADER’ is an EU policy that was initiated in the 1990s and means, ‘Links between activities for the development of rural economy’. The idea was to engage the energy and resources of people and bodies as development actors rather than beneficiaries, empowering them to contribute to the future development of their rural areas by forming area based Local Action Group (LAG)

the European Agricultural Fund for Rural development. CLLD is explicitly targeted to engage local actors and enables 2600 Local Action Groups to integrate local needs and to reinforce the links between rural, urban and fisheries areas. Civil society actors have to be included in the LEADER steering groups, with a minimum representation of 51%. In terms of policy support, strategic regional and local development plans and among them Local Agenda 21 initiatives,¹⁰ all have the potential to act as SI drivers if they include participatory forums or similar tools.

- (II) *SI within Public Policy making* is an ambitious concept linked to policy change and the opening of established policy systems to direct civil society inclusion and participation. The most often cited example for such as change is the implementation of “the Bilbao Urban and Innovation and Leadership Dialogues”.¹¹ This project encompasses changes in participatory public policy formulation and implementation through intensive interaction processes and public forums.

All three key types of policies (A, B and C) have overlaps in policy efforts. In the current policy landscape, SI is a matter that is clearly cross-sectoral and there can be no singular policy scheme solely addressing it. The threefold typology covers all aspects in the several definitions and intentions of SI that are presented above.

5. Discussion

5.1. The role of public policies in regards to SI

Public policies have considerable potential for fostering innovation through regulations, financial support and the provision of information and training. The actors and innovators involved can be supported by policy measures including: (i) normative, regulatory forms; (ii) monetary (financial subventions, special loans, tax reduction, project funding); (iii) material inputs (in kind, such as land, infrastructure, equipment); (iv) informational (coherence of arguments, publication, training, knowledge transfer, coaching, mentoring); and (v) networking (peer-to-peer-actions, exposure trips, twinning, mentoring). Due to problems of risk and uncertainty, which impede social innovation in marginal rural areas, the public sector can have a major role in supporting social innovation. The public sector can provide a solution to such challenges through public funding and contracting.

However, efforts to mobilise investment and resource needs might be more difficult than in urban social innovations (Asheim et al., 2016; Isaksen and Trippel, 2016; Isaksen and Trippel, 2017). Moreover, by definition, innovations involve taking risks and are prone to failure (Asheim et al., 2016). They also need utmost openness in terms of budget for the whole process of the innovation (Isaksen and Trippel, 2017; Trippel et al., 2015). These attributes of innovation clash with the traditional logic of public policy making. Chapman (Chapman, 2002) identified a set of barriers to openness in the public sector which can be summarized as a strong aversion to failure, exacerbated by the political process which uses failure to score points rather than learn lessons and a pressure of uniformity across public services (see also (Mulgan and

Albury, 2003)).

5.2. Forest policy objectives and SI

Disregarding the obstacles inherent in some public policy mechanisms against openness to innovation (see above), parts of current forest policy objectives include policies that emphasise the extension of forests beyond the traditional forest areas and the singular goal of timber production. This gives impetus to social forestry and agro/farm forestry. This sub section will apply the three-fold typology above to SI examples in forestry: (A) Some SI combine forest management with social needs; (B) other examples of SI link sustainable forest management with integrated regional and rural development; (C) the third type involves civil society in forest management, forest policy processes or participatory decision making and deals with conflicts among forestry stakeholders.

The forest actions and examples described here below were collected in the interviews with forest policy experts and in course of our online desk top research. They were then subsequently ranked according to the mapping framework of SI policies developed and outlined by us in Table 2.

A) Support for vulnerable social groups: The policy supports SI that addresses social needs through forestry services. Prominent examples in forestry for this are “Green Care” (EU wide) and “Green Care Forest” (Austria); both having similar background and overlapping with “Social Farming” (EU wide). Within Europe, many countries have different programmes and examples with specific national characteristics for green care programmes (Elsen and Finuola, 2013; Haubenhofer et al., 2010; Renner and Haubenhofer, 2013). The idea of Green Care includes health services, education and employment on farms, and sometimes certification schemes for participating farm holders and forest owners. “Green Care Forest” provides new ideas for forest-based products and services, including non-timber forest products. In Austria, it is a policy programme that encourages forest owners and managers to emphasise the social aspects of their forests and open them for social initiatives, projects and engagement. Both Green Care and Social Farming initiatives can also include practical training and employment opportunities for marginalised parts of society e.g. under social forest schemes, in support of early-school-leavers, young immigrants, prisoners and the long-term unemployed. Its main goals are social, and in their organizational form they include social enterprises and other social economy businesses.

B) To combat societal challenges with integrated regional and rural development: These policies address regional and/or rural development through forestry services. Economic disadvantages in rural areas lead to difficulties securing welfare and income. SI addresses regional development as a response to societal challenges (Melnykovich et al., 2018), e.g. rural emigration, unemployment or lack of infrastructure. Associations of farmers and forest owners can contribute to regional and rural development and bring income to the region. In case of success, one overall achievement is regional societal and cultural proliferation. In Austria, traditional farm forest owners formed co-operatives to set-up and run biomass-based district heating systems in rural villages. In doing so, they created new business opportunities and created a market for forest residues but also tackled air pollution problems (caused by single house oil and coal heating). The social innovation is located in the bottom-up initiative and collaboration with various local actors including the mayors and public and private customers. Another Austrian example is the association of nature parks that developed a dedicated brand for their products. This way, the biological, recreational and cultural functions of the regional nature parks are complemented and supported by traditional products produced and provided by local farmers living in the nature park regions and utilizing the label. Another example for regional development through such local initiatives is the Italian “Associazione Tutela del Marrone di Castione” where several hundred associated chestnut

(footnote continued)

partnerships between the public, private and civil sectors. In the current period (2013–2020) the LEADER method has been extended under the broader term Community-Led Local Development (CLLD) and is now fundable under all Funds of the EU Cohesion policy. (http://enrd.ec.europa.eu/leader-clld_en, last access 2018-02-13).

¹⁰ The Local Agenda 21 is a non-binding, voluntarily implemented global action plan originating in the UN-Rio 1992 earth summit; it is administered by the UN Commission on Sustainable Development, but has to be implemented at the local levels.

¹¹ <http://www.gmfus.org/forum/bilbao-urban-innovation-and-leadership-dialogues-build>.

growers and supporters from the Brentonico Plateau in a valley near Trentino organized activities, services and gourmet events around their chestnuts. The initiative started with the goal to keep the abandoned cultural tradition of chestnut production alive but eventually led to the creation of jobs around the production, processing and marketing of this fruit and the connected tourism services. (for in-depth analysis of both examples see (Ludvig et al., 2016a)).

C) To foster participation, institutional change and inclusion of civil society: These policies support SI that includes civil society engagement through new constellations of forestry actors. Unlike the examples under regional and rural development above (B), where the engagement was mainly induced by single family farmers, private forest owners and single entrepreneurs (Ludvig et al., 2016b), here, the primary engagement comes from other civil society actors (see e.g. (Moulaert, 2013; Mulgan, 2006; Murray et al., 2010)). Although the term civil society has several meanings (Adloff, 2005), we define it as non profit work in non-governmental organisations (Whitehead et al., 2017). Examples for community engagement are to be found in grass-roots movements that evolve through investment of a considerable amount of continuous volunteer work. Such types can include community forestry activities on communal woodland (see (Ludvig et al., 2018)). Their collective activities have evolved over many years and combine social forestry and communal land management with skills-based training and educational services on woodland management as well as craft making. These examples also embrace strong involvement of many local individuals and groups that support the work, either through cooperation with and investments of external organisations or through direct collaboration in woodland management, craft making and training. Another example of civil society engagement with bottom-up activities is to be found in negotiation processes around two formerly illegal mountain bike instalments in Swiss forests (Wilkes-Allemann and Ludvig, 2018). Here, deliberative social processes with engagement of the maximum number of civil society proved to counterbalance the high costs that forest owners otherwise would have incurred for provisioning and maintaining the forest recreation infrastructures.

6. Conclusions

The general role of policies for SI is to ease innovation through facilitating regulations, financial support, the provision of information and training as well as the facilitation of networking activities among stakeholders and innovators. Forest policy sometimes struggles to regulate the use of forests in sustainable ways and provide support to forest-dependent communities as many forest goods and services are not directly marketable. Thus, forest policies can support SI in all the stages of the innovation process. The support includes the facilitation of societal engagement as well as mutual communication between innovators and a range of other stakeholders. Moreover, public policies also have the task to support education and training. To enable SI, typical social skills, competences and knowledge are important. For the “innovation champions” (Weiss et al., 2011) the ability to encourage people, the ability to get more people involved and convince them that the new activities are worthwhile, in combination with competences to facilitate experiments, reflections and revisions throughout the innovation process, are most necessary. For such processes, innovation-friendly surroundings are of utmost importance and public policies ideally have the task to build creative milieus that facilitate learning in rural areas.

In order to thoroughly understand the relevance of policies for social innovation the article has introduced a threefold typology that distinguishes between policies according to their targets. The division is not entirely sharp and there will always be overlaps, which only mirrors the diversity and societal dynamics inherent in the concept of social innovation. Policies and institutions can impact in both the creation phase as well as in the outcome; and they also play a decisive role in the

organization and support of collective action in many of the examples we discuss above.

The article identified challenges that the policy landscape has in promoting SIs in practice: how do the policies hinder SIs? They hinder because of an inherent “top-down” logic of public subsidies or other supporting initiatives. Public money spent requires strict budgetary accountability, planning and financial control. This is contrary to the stimulation of innovations as risk taking initiatives. Furthermore, civil society participation is uncomfortable for many public administrations, which in some cases prefer no outside interventions into their acts and preferences. Even if there is the political will and instruments to support SI, these often become slowed down because of the diverse and different sectoral responsibilities and a lack of cross-sectoral coordination and policy integration. It will require many more efforts to overcome the obstacles within the inherent logic of funding streams structured under specific labels, whereas SI is rather located in-between as a cross-cutting and multi-sectoral topic. Forest policy objectives get enlarged in this respect and combine with SI examples in terms of the derived key aspects targeting forest dependent groups, regional economic development and civil society participation. The drive for such participation is strongly connected to opportunity structures in rural area and also shaped by policy and governance. Related infrastructural contexts (education, employment opportunities, health care provisions, child care provisions, consumer infrastructure, etc.) are under public responsibility. Hence, weak state infrastructure, weak governance structure and a weakly imposed rule of law influence on SI in negative ways.

Where policies do foster SI, they do it by preparing the ground and “room for manoeuvre” (Neumeier, 2016) as well as with investments into knowledge exchange and capacity-building in rural areas. However, the concept of SI still is under development for the area of regional and rural development. Our findings suggest that innovation action is more difficult in rural regions when they are less well developed. Efforts of investment and resource mobilisation needs might therefore be more demanding than for urban social innovations.

Whilst in some cases, a lack of political economic support for social needs may actually function as a trigger for SIs, it may also lead to weak conditions where SI cannot easily emerge from the local level in a bottom-up manner. In forestry, public sector intervention can help to reduce such problems, as social innovations are not intentionally “for profit” innovations, they need support for maintenance. In other words: It is the collective nature of many of the services and goods that characterise SI in forestry. The benefits often cannot be appropriated as surplus within direct market and business logics. The examples from this paper show how they most often depend on volunteer work and gains become reinvested into the communities involved.

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ARTICLE 6

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Article

Social Innovation, Societal Change, and the Role of Policies

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Abstract: Political frameworks and policies have a strong influence on the institutional ecosystem and on governance patterns, which in turn shape the operational space of civil society initiatives. This article aims to explore the social and institutional conditions and policy initiatives that foster or hinder social innovation and the pathways leading from social innovation to institutional change through to actual impacts on policies and political frameworks, in order to understand how policymakers can encourage and enable social innovation. The article builds on an extensive empirical background to develop a heuristic model to facilitate decision making for a policy environment propitious for the emergence of social innovation. The resulting model sets up a triadic configuration of (i) a committed core of key actors, (ii) the benevolent shadow of hierarchy represented by public actors, and (iii) multifunctional and malleable intermediary support structures for a successful development of social innovation initiatives. The model is discussed and validated by reference to three in-depth case studies from differing institutional settings. We conclude that policy should recognize that social innovation will achieve most when the triadic relationships between the state, intermediary organizations, and local actors are working together synergistically.

Keywords: civil society actors; governance; policy impact; rural areas; Europe

1. Introduction

Social innovation has hitherto been defined in various ways, but there is a common understanding that it connects to social change emanating from people's everyday interactions, ascending, spreading, and gaining traction and visibility from often inconspicuous beginnings, until it reshapes the diverse ways in which social groups and communities deal with social, economic, or environmental challenges. Both social and political aspects resonate in the term "social innovation". It originates from academic discourse rather than from everyday language [1], but the actual relationship between social innovation initiatives on one hand and political frameworks and policies on the other has not been sufficiently investigated so far, particularly not for rural areas where institutional thickness is likely to be less than in urban environments [2]. Social innovation and its drivers have been studied in rural areas far less than in urban environments or in the context of urbanization [3], but there is consensus on the need to support the design and implementation of social innovations as a response to existing complex problems rural communities are facing [4,5]. This research gap has been addressed by the EU research project SIMRA (Social Innovation in

Marginalized Rural Areas) [6], which produced a wealth of empirical material and created the possibility to explore the policy implications of social innovation in rural areas, the results of which can be tested and further developed on the basis of additional empirical findings.

Based on the assumption that social innovation is both a formative influence on policy and social change and a response to it [7], this article focuses on the following specific questions:

(i) What are the social and institutional conditions and policy initiatives that foster or hinder social innovation?

(ii) How can policymakers encourage, enable, and promote social innovation, and utilize social innovation to achieve better results in developing rural areas?

A brief presentation of the methodology (Section 2) is followed by an exploration of the theoretical background and a recall of the main conclusions of the SIMRA project regarding the policy implications of social innovation (Section 3). Building on these conclusions, the authors proceed to present a heuristic model for understanding and analyzing the role of policies and institutional frameworks in social innovation and social change in the context of rural areas in Section 4. The model provides the analysis grid for three case studies, which are presented and summarized in Section 5. The wider applicability of the model is discussed in Section 6, and, finally, the authors draw conclusions on the research questions in Section 7.

2. Methods

Our methodological approach consists of two steps: (i) based on theoretical and empirical knowledge, a conceptual model is developed, by means of which practical examples can be analyzed; and (ii) this model is used for an analysis of three detailed case studies of social innovation in rural areas, and thereby validated.

2.1. Developing a Heuristic Model for Analysing Policies and Social Innovation

The model mainly draws on neo-institutionalist approaches, social systems theory, transition theory, and other sources that have influenced the European interdisciplinary research project SIMRA. In recognition of the seminal role of the SIMRA project in the theoretical framing [8] and the development of analytical tools to evaluate and understand social innovation in rural areas [9–11], exemplified by means of eleven in-depth case studies [12,13], we briefly recall the conclusions on the role of policies regarding social innovation [14,15]. The authors of this article have been responsible for this analysis in the SIMRA project [7,16–18] and for according policy recommendations for the support of social innovation in rural areas [19–21]. In the attempt to give policy makers and advisers practical orientation, in this paper the authors condense these previous conclusions into a heuristic model of three interrelated factors, which they term the “triad of actors”.

2.2. Applying the Heuristic Model in Three In-depth Case Studies of Social Innovation in Rural Areas

In order to test the applicability of the developed model in various types of social innovations and political–institutional settings, the authors analyzed three social innovation initiatives by use of this model. Based on the intimate knowledge of the authors, those examples reflect different European political–institutional and economic settings. One (a) is located in an EU Member State (Austria) with a well-developed social security and welfare system, in which the state is acknowledged as the primary actor; another is (b) in a country more markedly linked with the neoliberal turn towards free markets and a small state, and is more reliant on a charitable and third sector tradition (UK/Scotland); and the third is (c) in a South-Eastern European country (Serbia) with a socialist past, having gone through war and disruptive transformation, with an economy still in transition and a people profoundly mistrusting public institutions (Table 1):

- a. The initiative *Apprentice Worlds* represents a social innovation promoted by a LEADER Local Action Group in a disadvantaged rural area in Austria. LEADER is a European Union structural policy instrument for supporting rural development. The initiative aims at closing the gap between rural youth just about to leave the education system and the local economy desperately

seeking junior staff and skilled workers. This case study was conducted in the course of the Austrian research project SILEA (Social Innovation in LEADER 2014–2020: LAG *Zeitkultur Oststeirisches Kernland* 2020). The SILEA research team analyzed available documents and carried out interviews with eight interlocutors: four current or former project managers, the LAG manager, one participating entrepreneur, one representative from the regional Chamber of Commerce, and one from the State government. Finally, a focus group with representatives from other social innovation initiatives was organized. The comprehensive case study [22] followed a format applied to all the eight in-depth case studies of SILEA, inspired by the innovation biography methodology [23].

- b. *Braemar Community Hydro* was promoted by a Community Development Trust in Scotland/UK. This small-scale hydro-power plant is a community-owned enterprise and community benefit society. This case has been studied as a secondary case study in the frame of SIMRA [24] and was not included in the SIMRA cross-case analysis [14]. For the research, a focus group discussion with the chair of the community enterprise, those responsible for the financial and technical development of the hydro power plant, and a project officer (4 persons) and interviews with the core and network actors of the project were conducted (7 persons), following the methodology for the detailed analysis of social innovations developed for the SIMRA project [9,25].
- c. The *Agricultural Development Fund Fenomena (DAFF)* was established by the Citizens Association *Fenomena*. It operates as a business angel in support of integrated, sustainable agriculture in Serbia. This case study has been conducted as a primary source for this article. Three interviews were conducted, one with the project manager of the *Fenomena* Association, one with the head of a government unit supporting the initiative, and one with the representative of the coalition for the development of the solidarity economy, which is an informal network of organizations that support the development of solidarity entrepreneurship. Parts of the data from these interviews were used in another publication focusing on the analysis of institutional challenges confronting social innovation in Serbia [26].

Table 1. The three case studies used for validating the conceptual model.

Case Study	Promoter	Location	Characterization of the Social Innovation
<i>Apprentice Worlds</i>	LAG Zeitkultur Oststeirisches Kernland, a public–private partnership according to LEADER	Austria (Steiermark)	Local partnership (Local Action Group according to the LEADER approach) acting as a social entrepreneur in the career orientation of school-leavers.
<i>Braemar Community Hydro</i>	Braemar Community Limited, a Local Development Trust	UK (Scotland)	Local renewable energy project incubated by a community development enterprise.
<i>Agricultural Development Fund Fenomena</i>	<i>Fenomena</i> Association, a non-governmental association.	Serbia (Kraljevo area)	Revolving fund run by a civic association acting as a business angel.

Source: Own design.

The three case studies, presented in Section 5, were analyzed by use of the heuristic model set out under Section 4.

3. Theoretical Background: Social Innovation and Policies—a Delicate Relationship

3.1. Social Innovation in the Sustainability Debate

Social innovation is an idea with many roots, in the fuzzy zone where notions of “social change” [27,28] and “innovation” [29,30] intersect. It occupies an expanding niche, especially where weak

markets and declining public services meet growing citizen interest in place-based development. In reference to the research project SIMRA, the authors consider social innovation as:

“the reconfiguring of social practices, in response to societal challenges, which seeks to enhance outcomes on societal well-being and necessarily includes the engagement of civil society actors”. [31] (p. 4)

In contrast to *social change* or *innovation* without an adjectival descriptor, there is a normative reverberation in the notion of *social innovation*, just as is the case with *sustainability*, which implies the continued existence of humankind as an intrinsic value. The definition of social innovation cited above explicitly includes an “outcome on societal well-being”. Thus, social innovation implies that either the intent, the process, the practice, or the factual results feature a desire for some betterment compared to the previous state or to the outcome of the (in most cases imagined) counterfactual, which would be the absence of such change. “Societal well-being” points toward betterment for the *many*, which implies that the improvement of life conditions, especially of vulnerable groups, is supposed to positively affect society at large. Consequently, the orientation of social innovation towards common well-being reflects a point of convergence with sustainability:

“Social innovation has been the anonymous bedrock of global sustainable development for many years, but mainly disguised by a plethora of other labels”. [32] (p. 40)

Obviously, the notion of social innovation blurs into what is epitomized as social change, or more precisely societal change [33]. The difference between “social” and “societal” may lie in the purpose and granularity of perception. *Social innovation* is perceptible as a variation, a difference, a local response to a wake-up jolt, while adopting a close-up look on social phenomena occurring over a relatively short period of time. *Societal change* is perceptible from a more distant vantage point, as a cumulation of social change phenomena on an aggregated scale. As stated above, the notion of societal change is a value-neutral term, whereas social innovation is value laden. Social innovation initiatives can therefore be considered as molecular processes coalescing into societal change towards more sustainable societies. As the social innovation discourse is rife with expectations towards more sustainable and cohesive societies through inclusive practices, coproduction and pro-active grassroots initiatives [34], we argue that more theoretical and empirical work is needed to help social innovation develop into an effective policy tool in order to become a useful concept for policy makers.

3.2. Policies and Political Frameworks

Although the term *policy* can be used in public, corporate, and other societal spheres, in this article it is used as a synonym for public policies. Any policy can be considered as a *plan of action* [16]. *Policy programs* are needed to turn plans into reality, using *policy instruments* for delivery and implementation. There are three kinds of policy instruments: (i) legal policy instruments, e.g., laws and regulations; (ii) monetary policy instruments, e.g., subventions, funding, access to cheap loans, or tax reduction; (iii) informational policy instruments, e.g., information campaigns, support through education and training, or awareness rising and understanding [16] (p. 3). A similar triad distinguishes policies as “sticks, carrots, and sermons” [35]. “Sticks” are limiting the scope of actions by imposing sanctions on undesirable behaviors. “Sticks” mostly come along as laws and regulations. Other laws and regulations, but rather in the form of monetary and other incentives, are of the “carrot” type. Their aim is to reward and thereby reinforce behavioral patterns that appear to go in the direction wanted by the legislator. “Sermons” are explanatory and essentially exhortatory and motivating, such as the UN Agenda 2030, bestowing the ethical fundamentals and logical coherence on the other two instruments, but “sermons” can also be delivered locally by advisers and change agents, such as local zero carbon or food sovereignty strategies.

3.3. Structure and Agency: The SIMRA model of Social Innovation

Since policies are plans of actions, they only flesh out as implementation processes. *Processes* derive from, unfold within and through, and feed back into *structures*. We call these structures “political frameworks”. Thus, policies and political frameworks relate to one another like processes and structures, interlinked by the notion of “organization” or “configuration of relationships” [36–

38]. This view is also shared by Anthony Giddens, who considers “institutionalized action” and “routinization” as foundational in the establishment of social order and the reproduction of social systems [39] (p. 2). Agents, by their practical activities, and structures (basically appearing as rules and resources), by their regulative effect, mutually enact social systems, which are reproduced over time through continued interaction. The SIMRA model of social innovation [9] is a practical application of this perspective (see Figure 1) for the purpose of evaluation; it puts the “reconfiguring” of social practices as the central mechanism of change.

According to this model, the social innovation process occurs in phases: (1–2) the need for change is perceived by a group of people, maybe as an uneasiness that becomes manifest in the course of events that trigger agency (3–4), leading to *reconfiguring* social practices (5), eventually routinizing into *reconfigured* practices, which in turn result in new activities, outputs, outcomes, impacts, learning, and multiplier effects, albeit not always and at different scales (6–9) (Figure 1).

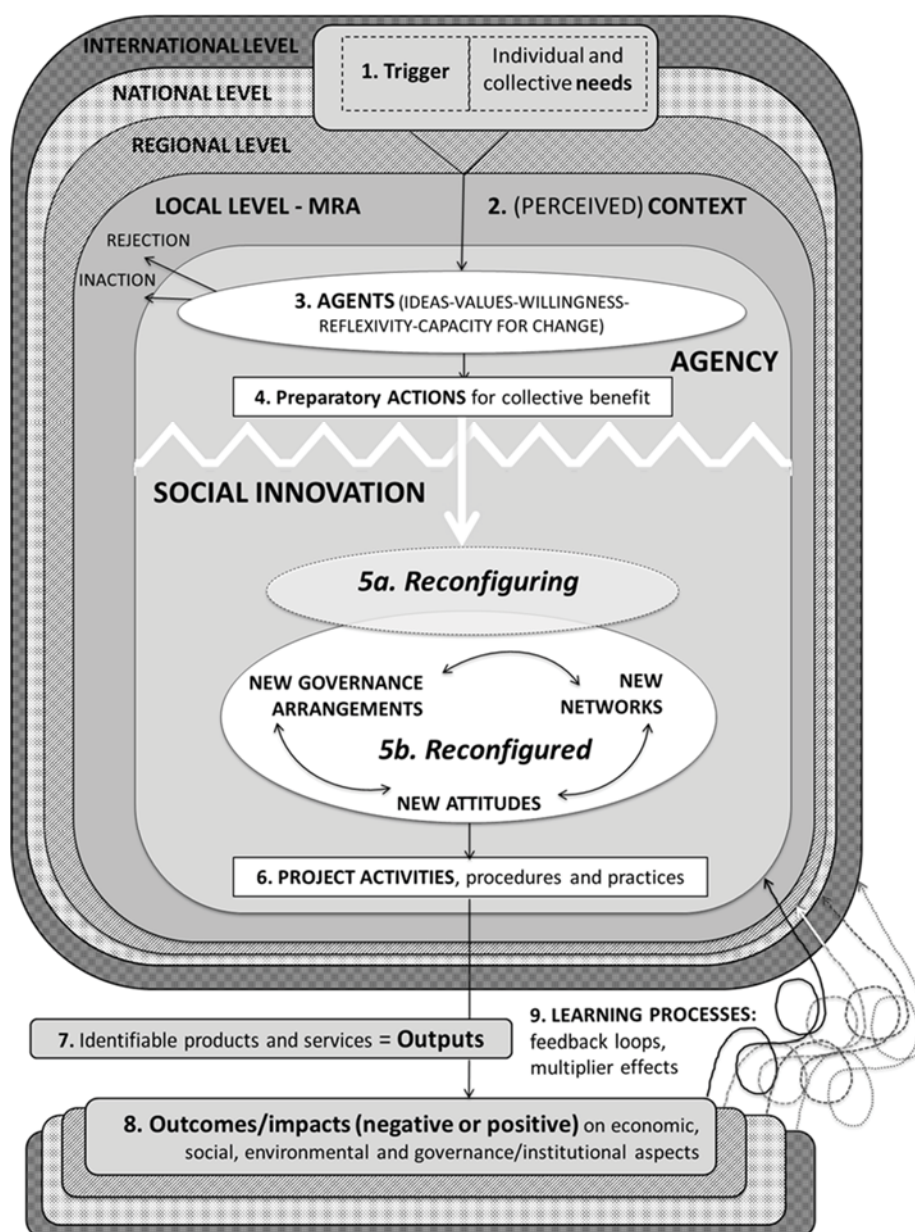


Figure 1. SIMRA evaluation framework proposed to evaluate social innovation and its impacts in marginalized rural areas (MRA) (source: adapted from Secco et al. 2017 [9] (p. 36)).

3.4. Institutions, Trust and Governance

Following Giddens' line of thinking, the "reconfiguration of social practices" results in "stable, valued, recurring patterns of behavior" called "institutions" [40,41]. Ostrom and Walker highlight the importance of reciprocity in the process of homogenization of behavior through learning how to build reputation for being trustworthy over a time frame that extends beyond the immediate present [42] (p. 40). Luhmann (1984) sees trust as a means to reduce complexity in social interactions [43], and Putnam (1993) considers "social capital" essentially as the available "amount of trust", comprising "features of social organizations, such as networks, norms and trust that facilitate action and cooperation for mutual benefit" [44] (p. 35).

Lasting changes in social practices imply the replacement or "creative destruction" of previous practices. Consequently, the dialectic between innovation and institutionalization means that the mere idea of a political framework that fosters innovation—nothing less than the (at least piecemeal) creative destruction of institutions—appears paradoxical [45] (p. 139). Considering social innovation and institutional change as indivisible, there has to be, in addition to *renewal from bottom-up* (social innovation), something like *renewal from above* (institutional innovation). This can be observed in an inclusive societal context where political reforms, strategies, and programs aim to promote self-organization, self-determination, and empowerment of less favored groups, thereby practicing "controlled loss of control" [46].

Consequently, the institutional fabric of a society is the realm in which policies and political frameworks (from top-down or from the outside to the inside) intertwine or collide with social innovation (from bottom-up or from the inside to the outside). Social innovation initiatives may either challenge the political-institutional fabric or act on invitation, bringing forth the pilot projects and practice examples—called "niches" in transition theory—that policy makers need to put forward and expand their agendas [47]. These patterns seem to be generalizable, notwithstanding the differences between political-institutional environments in different geo-political regions, manifesting themselves, among others, in the varying role of the state regarding social cohesion and the division of roles attributed to the public, private, and civil society sphere, as well in the level of trust [42] in modern-day institutions and modes of governance in particular.

3.5. Public Governance and Social Innovation

Governance is a synonym for steering functions and structures. It may entail the involvement of public, private, and civil society actors. We speak about *public* governance when we address the specific efforts public entities (from the EU and the state down to local self-governing bodies) undertake to accomplish public duties and improve common well-being. Hence, policies and political frameworks are part of public governance. Institutional change induced by social innovation manifests itself in changing patterns of governance, e.g., in the cooperative movement, in the health sector, in the financial sector, and in rural policies. However, the actual degree of involvement of public actors in fulfilling societal functions varies. Households, civil society organizations, and even local businesses can also be important providers of societal services.

While examining how social innovations and policies interact, we discover mutual relationships and interdependencies that vary across cases and change over time in relation to the evolution of policies and in relation to the stages of social innovations [7,15]. The main hindering and furthering influences from policies and political frameworks on social innovation have been analyzed by the SIMRA project but have already been mentioned in earlier works [15,17,18,48,49].

3.5.1. Factors Hampering Social Innovation

Any innovation or change challenges established routines, ways of thinking, and power structures and may therefore meet resistance from established actors when they perceive criticism or a threat of losing influence [50,51] (p. 13). Depending on the inclusiveness of the political-institutional environment [52,53], and on the field of activity, the existing political frameworks and policies may actively welcome or suppress, or passively favor or hinder it. Hindering political frameworks may

also entail specific regulations that fit to existing practices but ignore or do not allow other forms of delivery of products or services. Divisions between policy departments, sector policies, and silo thinking [18,54–56] limit the effectiveness of policies supporting social innovation. Sector silos emerge from a lack of openness and willingness towards risk-taking of public officials operating in clear-cut administrative hierarchies [54,57]. The coordination or integration of policy goals and political measures across departmental divisions has proven to be a major challenge [50], particularly for cross-sectoral policy goals such as innovation, sustainable development, or social innovation.

Social innovation initiatives and societal processes inevitably follow unpredictable pathways over the longer term [8,58]. Their trajectories include latent phases and loops of trial and error. The long-term character of social innovation is often disregarded by policy makers who tend to follow short-term political priorities and signals. Further, impacts may not become visible very fast, which makes impact evaluations difficult [59]. In effect, major institutional change may remain under the radar of the polity for some time: when changes gain ground over a longer period of time, they are not yet perceived as new or innovations. The absence of political goodwill is often paired with the lack of financial resources and access to relevant knowledge.

3.5.2. Furthering Factors

Appropriate institutional policies and political frameworks provide an enabling environment and create room for manoeuvre for social innovators to generate and realize their ideas [4] (p.38). Support of this kind may be generic, such as constitutional provisions, legislation on co-operatives and non-profit associations, regulations on Environmental Impact Assessment, rural proofing, or on the delegation of powers to local communities. They may also be quite specific, particularly within the frameworks of federal constitutions, such as state regulations and supportive policies on decentralized and community-based energy provision [19] and other policy niches, such as communal land ownership and resource management [60], natural disaster prevention and management [61], and new forms of social care combined with agricultural diversification [62]—virtually any collective task taken over by local communities or groups of actors on the basis of formalized shared responsibilities.

To break vicious circles, improvements in the basic infrastructure as well as specific support activities for knowledge exchange, capacity building, participatory regional development, and social initiatives can wield considerable leverage. Investments into opportunity structures like physical and virtual education facilities, third sector employment opportunities, regional and local development hubs and agencies, IT connectivity, technology centers, business incubators, co-working spaces, and advisory and information services improve the milieu in which social innovation can emerge and grow. Community-based development bodies such as a local development association or trust provide a useful instrument to design and implement these needs-based investments [60] (p. 2).

Innovative solutions often emerge in response to cross-cutting problems, overcoming the blindness of established sectoral structures and routines. However, social innovation initiatives often originate in specific sectors and are therefore studied mostly from the sectoral point of view, but structural policies favoring cross-sectoral cooperation play a crucial role. Support of this kind comes from both national and European Cohesion Policy instruments. These include community-led programs for the support of civil engagement, the third sector, and social entrepreneurship, in particular, the EU CLLD/LEADER instrument for integrated rural and regional development. CLLD is an acronym for Community-Led Local Development, the generalized version of LEADER (acronym for “Liaison entre actions de développement de l’économie rurale”). In line with Dargan and Shucksmith [63] (p. 282), social innovation arguably “belongs to the core tasks of LEADER” [21] (p. 95), although the actual expression of the CLLD/LEADER approach in certain national and regional administrative contexts can be “hideously complicated”, as Slee exemplified on the basis of LEADER implementation in Scotland/UK 2014–2020 [64].

Policies that offer participation opportunities for stakeholder and citizen engagement can foster social innovation by enabling and encouraging people to share their concerns and ideas and co-create solutions meeting the development needs of their communities. The participation of civil society

groups and organizations is also a driving force in the reconfiguration of social practices [61,65,66]. This is also emphasized in the open innovation discourse, which sees human capital creation and knowledge diffusion as main levers to foster business innovation networks [14].

Policies fostering social innovations need to be flexible and embrace failure as an acceptable outcome. Ring-fenced and untagged seed money can have a big impact on the viability of social innovation projects, even with small amounts [20,21]. This acceptance and flexibility requires a broader understanding of social innovation, as compared to a merely technological–economic perspective.

4. A Heuristic Model: The Triad of Actors

The list of hindering and furthering factors that has been shortly recalled in the previous section appears, time and again, in relevant studies, and provides the substance for relevant policy recommendations. To make this list of policy recommendations more consistent and easier to grasp, we need a tool that highlights the main elements in their connectedness and mutual relationships. Such an instrument would enable innovation promoters, policy makers, and advisers to concentrate on the essentials and to provide situation-specific advice for action. After detailed analysis of numerous case studies from SIMRA and other sources, the authors decided to make a step in that direction.

As was already hypothesized in the analysis of policy impacts in the SIMRA project [14] (p. 96) we focus on three important groups of actors that have central roles and interrelations in the social innovation process. Their individual strength and the appropriate cooperation between those groups of actors appears to be a major determinant of the success of social innovations, which means that the resilience and dynamism of cooperation systems [67]—in which social innovators and policy makers come together to co-create something new—benefit from a concurrent “triad of actors” (Figure 2):

- (i) a trusted core of key actors;
- (ii) an intermediary support structure;
- (iii) public actors providing the shadow of hierarchy.

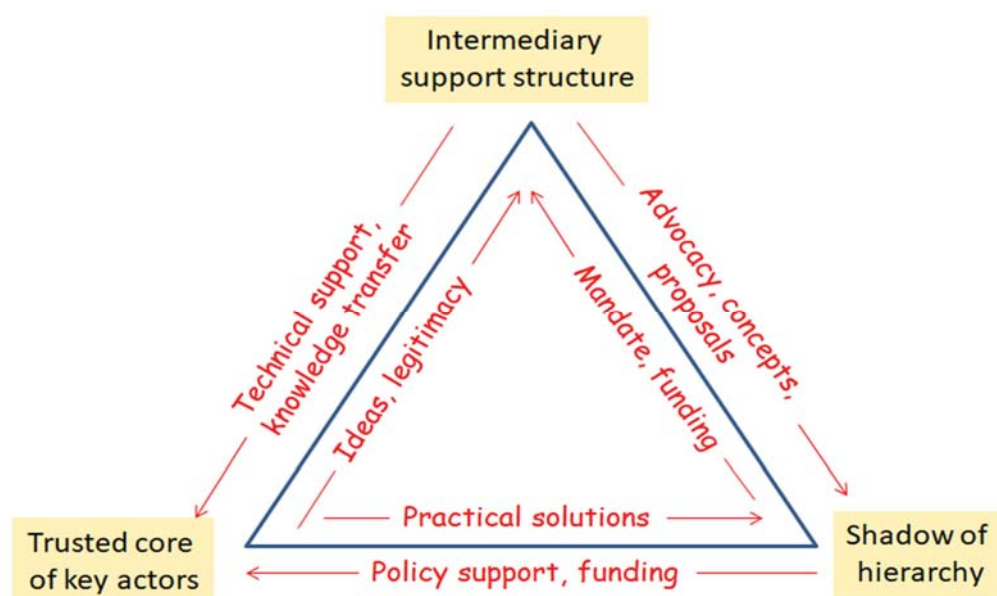


Figure 2. The triad of actors in social innovation (Source: Own design).

4.1. A Trusted Core of Key Actors

The most visible part of social innovation initiatives are their individual promoters. Apart from their capabilities and motivational strengths, much depends on the trust they have in each other and the degree to which they are trusted by the wider network of actors—especially of the community

with which they work [4,14] (p. 39, p. 41). Consequently, any evaluation framework for social innovation should include indicators on social capital [11,68].

4.2. Intermediary Support Structures

Referring to the binary interactions between the “top-down” and the “bottom-up”, there needs to be a “third figure” [69], a “hinge”, which stabilizes and at the same time dynamizes these interactions: this role is played by intermediary support structures embedded in the ambient institutional fabric. They are often highlighted as “third sector agencies or structures” [24,70] that provide support to the social innovation initiatives in their remit, which may be defined in terms of thematic, functional, or territorial responsibilities. Such support may consist in acquisition and transfer of funding, trainings and other forms of knowledge provision, coaching and mentoring, networking, and lobbying. Some of these intermediary support structures aim to cover all these aspects [65], others are monofunctional, which requires that there may be more than one intermediary body working alongside in order to cover all relevant support needs. Social innovation initiatives on a growth path tend to spawn higher-level intermediary bodies, which serve both as protective shells towards the outside and as service providers supporting single initiatives [61]. They may serve as first responders [71] or deliver professional services to target groups. In the context of international cooperation, intermediary support structures are often hatched by donor-funded development projects [72]; in some cases, education, research, and training centers play a crucial role in facilitating dialogue and transferring knowledge. Intermediary support structures may take shape as dialogue platforms and event spaces gradually emerging from virtual communities and networks of like-minded supporters, institutionalizing over time [73]. Ludvig et al. [74] and Weiss et al. [75] analyze the important and complex roles of intermediary support organizations that may provide external support but can also be part of the innovations themselves. Existing organizations may grow into this role, but they may also emerge spontaneously, most likely in fields where “wicked problems” [76] persist, where neither market forces nor public intervention seem to provide acceptable solutions. In those complex problem situations, standard approaches for solutions are bound to fail [77], and intermediary structures provide capacities for developing new ways for problem solving. They may be initiated from the “bottom-up” as umbrella or lobbying organizations [61] or “top-down” as implementing bodies for state support structures in certain sectors, such as communal forest management [60], cultural innovation [78], or nature preservation [79]. Their specific characteristic as intermediary bodies lies in their linking and translating functions between the local initiatives and the polity. They inform in both directions on the basis of their knowledge of problem situations but also structures, rules, and values on both sides.

4.3. The Shadow of Hierarchy

The benevolent “shadow of hierarchy” [80] appears to be propitious for the emergence and growth of social innovation initiatives. This means that relevant public actors, at least tolerating if not actively encouraging social innovation initiatives, are important drivers of success. The shadow of hierarchy is two-edged: It involves a mixture of legislative inducements and sanctions, encouragement and control. In one way or another, the presence and active inclusion of public partners within or close to the social innovation initiative conveys the benediction of the society as a whole. Their involvement endows the initiative, but also intermediary support structures acting on behalf of several similar initiatives with the necessary legal backing, trust, and creditworthiness. In return, the public sector is relieved of certain tasks that seem to fare better when delegated to civil society actors or mixed partnerships. The degree of public influence may range from passive involvement in long-term contractual relationships to legally binding public–private–civic governance arrangements. Trust in institutions and trust among the people involved plays a crucial role for the social innovation to grow and thrive. Marini Govigli et al. [73] show the relevance of encouragement by the local polity, even in the absence of substantial institutional support. In his study on tailored polities in the framework of the European CLLD/LEADER rural development measure (2014–2020), Servillo [81] has shown how diverse program delivery can be in different

political–institutional settings and due to previous experiences with the measure across European states and regions.

5. A Closer Look on Three Social Innovation Initiatives

5.1. *Apprentice Worlds, Promoted by the Local Action Group “Zeitkultur Oststeirisches Kernland” in Styria, Austria*

The promoter of the initiative is the LEADER Local Action Group named *Zeitkultur Oststeirisches Kernland*. The LAG operates in an economically lagging rural area with attractive landscapes shaped by small farms, villages, and towns, and a well-founded tradition in a broad range of crafts, from construction to creative and culinary businesses. The social innovation we speak about here emerges from a string of projects titled *Creative Apprentice Worlds*, which the LAG initiated and implemented on its own account from 2012. The main mission of *Apprentice Worlds* is to contribute to solving a most pressing problem, the shortage of apprentices and skilled labor in all Styrian regions and economic sectors [22].

Apprentice Worlds are based on the concept of so-called “work boxes” originating in a building trade initiative called *Werkraum (Factory Space) Vorarlberg* dating back to the turn of the century, which had also benefitted from LEADER at that time. With the help of one of the *Werkraum* architects, the LAG developed the original, more illustrative, and therefore static concept of *work boxes* further into interactive and mobile ones, under the assiduous and not always easily manageable participation of local entrepreneurs, vocational trainers, and students/apprentices. A work box can be described as a wooden cubicle, containing modular elements, which, once unpacked and unfurled, not only illustrate the main features of a particular craft (from hairdresser to carpenter, cook to pastry baker, including crafts falsely stigmatized as without hope of success, such as book printers). The workboxes also serve as workbenches on which small artefacts can be crafted. To date, 25 work boxes have been designed, built and utilized during practical job orientation events in secondary and primary schools around the State of Styria. In these events, pupils and students work on the workbenches, supported by local entrepreneurs who participate voluntarily and benefit from the enhanced probability that one or the other student would one day sign in as their apprentice after leaving school.

The workboxes are transportable and shipped for free to the schools hosting the job orientation event, mostly for one full day in their sports halls. Starting in 2014, the *Work Box Road Shows* have already reached more than 100 schools and involved more than 6000 students and pupils in Styria, let alone the many local entrepreneurs who contributed to these exciting events, which resemble a big party rather than an ordinary day in school.

The social innovation initiative stretches over ten single projects, which were artfully engineered by the LAG and project management staff. Two projects were carried out in the framework of transnational cooperation; one funded from the Territorial Cooperation Fund (called INTERREG, being a part of the European Regional Development Fund) together with Hungary and another one from the LEADER transnational cooperation sub-measure of the European Agricultural Fund for Rural Development. Stakeholders from other Austrian regions, Luxemburg, Germany, and Italy have shown interest in methodological transfer.

Triggered by the arrival of many refugees via the Balkan route in the year 2015, the LAG combined the job orientation concept with integration measures in a project called *Future-oriented Apprentice Worlds*, whose main beneficiaries were supposed to be juvenile asylum seekers. The Austrian government found this approach commendable and even awarded it an innovation prize. After the 2017 elections, the newly formed government banned asylum seekers from apprentice jobs and the concomitant vocational training as long as their asylum status was not confirmed, which meant an indefinite time of idleness and uncertainty for young people who eagerly wanted to learn and integrate themselves into the society. This was the apparent death knell for the *Future-oriented Apprentice Worlds*, but the LAG, in collaboration with a regional non-profit organization working in the social care sector, managed to redraft the operational plan through shifting the focus to the long-term unemployed youth.

The weak point of the social innovation initiative *Apprentice Worlds* may lie in the uncertain mainstreaming transition. Although the approach has been praised by all relevant stakeholders (e.g., the Chamber of Commerce, many entrepreneurs, and the State government), and although the resonance and demand from schools remains unabated, it seems to be difficult to insert the innovation into the prevailing job orientation practices and structures. Neither the Chamber of Commerce, nor vocational training schools, nor labor market services take the lead and latch onto this initiative. It appears that the branding of the initiative by the LAG has caused some reticence among stakeholder groups against stepping in as a vehicle for institutional insertion and mainstreaming.

What lessons can be drawn in terms of policy implications from this social innovation initiative?

- The initiative emerged at the interface between specific policy fields, in this case education and labor market policies. It literally straddles these two, with remarkable implications on a wider spectrum of policies regarding youth, social inclusion, and the regional economy marked by tradition-rich craft businesses. Inconsistencies and gaps in the institutional fabric at the fringes of policy fields have helped trigger the initiative, but these gaps continue to pose problems when it comes to the question of scaling up and mainstreaming.
- The creative use of diverse funding options from structural (LEADER and INTERREG) and sectoral funding sources (from the State government education department), orchestrated in an uninterrupted row of projects over eight years, would not have been possible without the visionary force and negotiating power of the Local Action Group and its management, based on the independent mandate from bottom-up.
- The LEADER approach allows for a double role of the local partnership: first as a financial enabler and supporter of social innovation, and second as a promoter and spearhead of social innovation. The LAG in its dual role as an *innovative core actor* and as a prototypical *intermediary support structure* has spawned this social innovation initiative, but still not achieved the stage of cord clamping the former from the latter. Thus, the LAG is more and more perceived as a main actor in the respective policy fields, to the detriment of its position as a cross-sectoral, cross-thematic, and impartial enabler, which makes it vulnerable to getting tied up with the ups and downs of local politics and jealousies between different stakeholder groups. However, the original intention of the LAG was not to become a major actor in this field. It would rather like to hand over the activities to incumbent operators, but the historically grown delimitation of competences seems to hamper the integration of the reconfigured practice.
- The case provides a vivid example of how institutional frameworks can have both reinforcing and debilitating effects concurrently. On the one hand, the combination of the hands-on approach to job orientation with the integration of asylum seekers was singled out as being exemplary in a nation-wide competition by the national government; on the other hand, the same initiative got shattered by the work ban for asylum seekers, which was put in place by the ensuing government. The result of antithetic political tendencies was not neutrality, but blockade.
- Figure 3 provides some salient features of the triad of actors appearing in the Styrian case example. These are also described in Table 2 in the discussion section where the three cases are compared. The LAG has succeeded in spawning an initiative that meets an urgent societal need that has not been properly met by existing institutional arrangements. What has not been achieved so far is an impact on the institutional frameworks in a way that guarantees the insertion of the innovation without any longer depending on the LAG, which, as an intermediary support structure, understands its role as social entrepreneur to generate local innovation rather than to become a permanent service provider in a specific sector or thematic field.

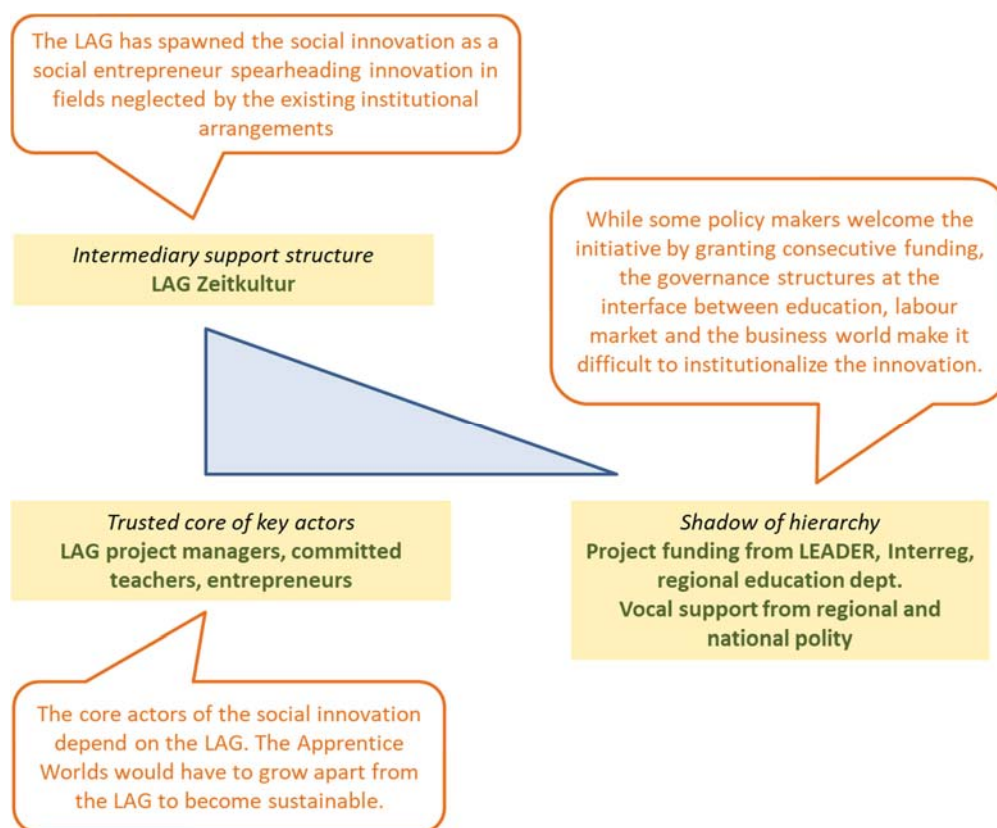


Figure 3. The triad of actors in the *Apprentice Worlds* (Source: Own design).

5.2. Braemar Community Hydro in Scotland/UK

Over the last decade the mountain village of Braemar in the center of the Cairngorms National Park has been the setting for a number of social innovations [24]. The driving force of innovation has come from a Community Development Trust, which comprises a legal entity that aims to help their neighborhoods flourish through community-led activity, partnership working and enterprise. It was established in Braemar in 2004 by the community of around 400 people, just after the designation of the national park, and was self-consciously promoted by its early leaders as an agency to bring decision making relating to local development back into the community in order “to pursue opportunities for economic growth through the sensitive development of the natural environment” (Article 3e of its charitable incorporation document), to improve local services, and to consider community heating. Since its establishment, it has been responsible for a number of significant projects relating to the built heritage, promoted a community hydro-power scheme, and had a major role in initiating a social enterprise dealing with domiciliary social care for local people.

Although *Braemar Community Hydro* is now a free-standing community benefit society—essentially a cooperative entity that exists not only to support its members but also with a financial commitment to a place-based community in which it is located—its origins lie in the strategic thinking of the Community Development Trust. It had promoted the idea of developing a former private hydro-power plant that had existed to supply a large landowner with electricity prior to the establishment of a publicly owned electricity grid in Scotland in the period after the Second World War. The primary rationale for re-developing the hydropower site as a community-owned enterprise was to provide a revenue stream for the recently established Community Development Trust. The re-development of the site required extensive engagement with engineering consultants, regulatory authorities, including the national park and the Scottish Environmental Protection Agency, the landowner of the site, as well as active participation of a core group of unpaid local citizens. Semi-public agencies such as Community Energy Scotland also provided support as the project developed. The development group, which had received funding from the development trust to support their project development efforts, decided to use the community benefit society as the legal entity to

support the development. This was seen as necessary because of the economic marginality of the project, the high cost of achieving due diligence with commercial lenders, and the relatively high interest costs they would be confronted by.

There were numerous obstacles that this pioneering community energy development encountered. These included the high costs of due diligence on any commercial loans, the self-interested behavior of the landowner, and the unreliability of an engineering consultant's report. Without a strong repository of human capital from retired engineering professionals and what one board member described as "sheer bloody-minded persistence", this development could easily have foundered. Those currently running the project noted in a focus group how this kind of cooperative local venture would have been inconceivable twenty years previously. Third sector agencies had emerged as a viable institutional form in the renewable energy field, but also more widely through other activities of the Community Development Trust.

The project was completed in 2017 at a time when high levels of public support for renewable energy through feed-in-tariffs guaranteed support over a 20-year period. To date, there have been two disbursements of support to a wide range of community groups in Braemar who bid for funding to a panel comprising Braemar Community Hydro and local community representatives, and in addition, investors have received a steady return on their investment. As the investors are paid back, so the amount available for community benefit rather than private reward will increase.

The success of this project raises some questions. How could such a project emerge and succeed, despite encountering a number of crisis points as it evolved? First, there had been a culture shift towards recognizing that place-making in remote rural Scotland required collaborative effort and third sector involvement rather than merely patriarchal landownership and/or public agency. Braemar had already begun to develop strong social capital, which to a degree replaced the paternalistic power of the large landed estates with a new order of lifestyle migrants and early retired professionals, who had strong bridging capital and whose collaboration was vital to the project's success. Second, two types of policy change had enabled the development. Firstly, legislation had created the possibility of community benefit societies, which were selected as the appropriate institutional vehicle for the project. Secondly, in a rapidly evolving energy policy arena, decarbonization imperatives were leading to significant incentives for small scale renewables projects, and the Scottish Government was supporting an arm's length agency that gave advice and financial support to community projects.

Since this project, Braemar has developed a social care initiative to deal with domiciliary social care of elderly residents, which is based in the community and comprises a social enterprise. It too was established, initially in conflict with established systems of provision, with support of the development trust and has become a free-standing third sector entity. Currently, the Community Trust is involved in developing social housing through yet another third sector agency, as house prices have risen beyond the reach of lower paid rural workers.

The co-existence of so many third sector agencies contributing to economic and social life in a small community reflects the extent to which public sector austerity has weakened public provision, but it also reflects the communitarian turn in Scottish policy making, which has empowered communities through generic legislation such as the Community Empowerment (Scotland) Act 2015 and sector-specific support for community energy through agency support and specific financing schemes. Whether Braemar's capacity can be replicated elsewhere is questionable. The high levels of bonding, bridging, and linking capital have almost certainly created opportunities for Braemar that are not available everywhere, but without an enabling architecture of Scottish rather than European policy, little could have been achieved.

Which lessons in terms of policy implications can be drawn from this social innovation initiative?

- An enabling policy environment is essential in community energy policy, in renewable energy commitments, and in supporting development trusts. The policy is only partially enabling. It still demands a huge community effort to bid into the public and third sector funds that support community-based development.

- Strong social capital in the community and the willingness to engage with policy and a capacity to surmount difficulties are key. The case shows the importance of highly motivated and capable incomers combined with locals to produce solidarity and a capacity to act. Many communities lack these skills, and therefore the social innovation may well not be replicated everywhere.
- A set of challenges to the long-term viability of the community existed that demanded a local rather than a generic public sector response. The existing architecture of housing policy and of social care policy was not working. In the case of the energy project, this was opportunistic engagement, based on a desire to finance community development, breaking the reliance on funds from LEADER or the municipality.
- Figure 4 characterizes the triad of actors for the Scottish case example, and further explanations are included in the comparative Table 2. The Community Trust has come into being and thrives in response to receding public agency, in areas of community interests where individualist approaches provide even less answers. This development is certainly favored by the Scottish constitution and the public provision of intermediary support structures in various sectoral and thematic areas. This publicly driven effort is not always successful, as the rather bureaucratic handling of LEADER shows. However, the burgeoning of similar community initiatives all over Scotland led to the formation of an Association of Community Trusts (DTAS 2020), which enables the single community trusts to bundle forces and to get involved at national level of scale. Further down toward the micro level, the Scottish example shows the fractalness of the triad model, as the Braemar Community Trust is increasingly growing into the role of an intermediary support structure for local initiatives, which are supposed to run independently to the benefit of the people of Braemar.

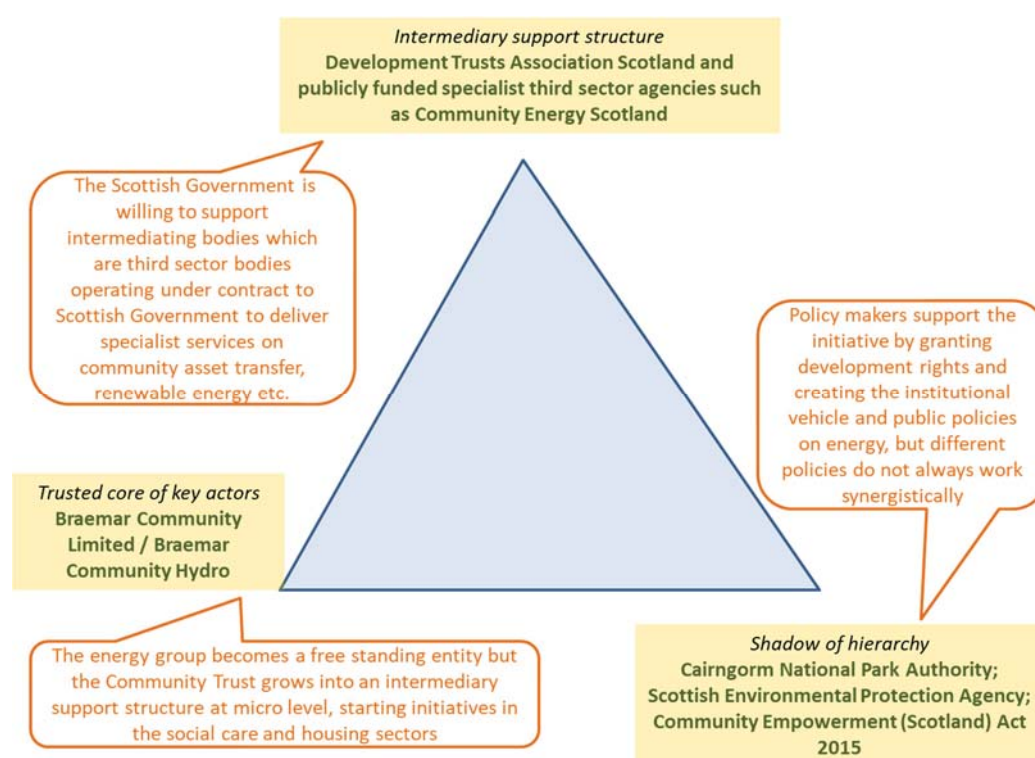


Figure 4. The triad of actors in *Braemar Community Hydro* (Source: Own design).

5.3. Agricultural Development Fund Fenomena in Serbia

The *Development Agriculture Fund Fenomena* (DAFF) has been established by the Citizens Association *Fenomena* and operates as a business angel in support of integrated, sustainable agriculture in Serbia. The *Fenomena* Association works in the municipality of Kraljevo in central Serbia, where 45% of people live in rural areas. Agricultural production and processing have a high

potential to support local economic development, as there are favorable environmental conditions and a significant proportion of the area comprises agricultural land (47%).

In 2006, *Fenomena* started by getting involved in the topics of gender equality, the issue of domestic violence, and the position of women in society. Their work is centered around three initiatives: (i) a center for nonviolence—combating domestic violence and running an SOS phone—which has already operated for ten years; (ii) gender mainstreaming—advocacy for gender equality in public policies at national and local level; and (iii) social entrepreneurship, which started in 2011, as a way to achieve economic independence, because until that point the association worked on a project basis. As part of its social entrepreneurship focus, in 2015 *Fenomena* initiated DAFF, a fund that operates as an independent business angel providing capital for the development of small rural business promoters. The fund is the first of this kind in Serbia.

Fenomena acquired an initial budget of USD 30.000 from the Rockefeller Brothers Fund, which allowed the starting, piloting, and testing of the DAFF idea. The DAFF fund is strongly socially oriented and is used to invest in agricultural start-ups, benefitting young people or smallholders in the region who usually do not qualify for state subsidies, but want to stay in the village, create, and/or expand their businesses. Thus, DAFF supports local development. The principle is that *Fenomena* concludes loan contracts with micro and small agricultural producers or households on the basis of a business idea. The beneficiary is obliged to return the sum to the DAFF increased by interests ranging from 2.5 or 10%, depending on the type of business and the expected benefits, from which the next business ideas will be financed. The duration of contracts depends on the business idea and the amount of money invested. The smallest contracts are for one year—amounts of about 600 to 650 EUR, for example, for an organic certificate and the purchase of some raw materials. The largest loans have a payback time of five years with sums of about 10,000 EUR. It is foreseen that part of the DAFF earnings (3–4%) are invested into other activities of *Fenomena*, i.e., the SOS phone and support to the victims of domestic violence. Still, they cannot fully cross-finance these activities. At the moment, the main aim is to keep DAFF functioning and to gradually increase the volume of funding.

Since its early years, *Fenomena* got support from the Social Inclusion and Poverty Reduction Unit (SIPRU) formed by the Serbian government in 2009 and operating within the Office of the Prime Minister since 2018. The mandate of SIPRU is to strengthen government capacities to develop and implement social inclusion policies based on good practices in Europe. However, this body is financed by the Swiss Confederation as international donor only for a limited time. One of the major successes of the SIPRU team was to mobilize direct financial support to social enterprises through the EU IPA (Instrument for Pre-Accession Assistance) 2013 program [26]. *Fenomena* was one of the rare rural social enterprises to be financed through this instrument, namely, to create a curriculum for a training program for hard-to-employ groups of young people that aimed to start agricultural businesses. Its beneficiaries include young people without parental care, social allowance recipients, young women, and youth of Roma and other minority communities. The training curriculum was developed using existing practice examples from the DAFF fund. The IPA-funded action actually served to promote the DAFF and to attract more users. For the training purposes, *Fenomena* cooperates with the Regional Development Agency (RDA) Zlatibor, which now co-manages the training program and provides certificates for business plan writing, issued by the umbrella organization *Regional Development Agency Serbia*. This provides additional motivation for the beneficiaries to join the trainings.

Fenomena also conducted trainings in cooperation with other Serbian municipalities (Arilje, Užice), supporting the most promising participants with DAFF funding. Further cooperation has included other Serbian NGOs, like the Slow Food Network or SOS Children Villages. More recently, *Fenomena* acquired support from the German and Swiss International Cooperation (GIZ and SDC) and UN Women.

Fenomena operates under the Law on Association, which allows economic activities in order to provide additional resources necessary for carrying out their basic non-profit activities. According to the representative of the *Fenomena* Association, there are no specific policies supporting social innovations or enterprises in Serbia. DAFF was refused support from the funds of Ministry of

Agriculture. This underlines the rather weak role that public actors take in supporting social innovations. The *Fenomena* representative stressed the need for supporting policies and financial instruments, especially for locally run social innovations, but also better cross-sectoral policies to foster innovative and organic agricultural practices. This would reduce dependence on international programs and donors. Moreover, the concept of social entrepreneurship and innovation is very narrowly understood in Serbia, as a means to employ vulnerable groups such as people with mental or physical disorders or handicaps. There is no common understanding that activities in agriculture can be innovative and socially oriented businesses. Many of the DAFF activities are unpaid and carried out on a voluntary basis by association members, which poses a sustainability challenge.

What lessons in terms of policy implications can be drawn from this social innovation initiative?

- This case shows that there is a high interest from civil society to become active in social issues and to contribute to solving local problems, experimenting new activities and new modes of cooperation with the local population, thus filling the gaps that now exist in the institutional system. However, the weak institutional environment barely provides appropriate political support for social innovation initiatives or enterprises. There is a need for specific policies and programs in recognition of social innovation as a broad concept spanning across and relevant to different sectors.
- The absence of specific supportive policies entails pronounced financial dependencies. *Fenomena* got support from international funds and is currently grappling with the challenge to secure further funding and to broaden its financial base. There is a need to diversify financial resources for social innovation, with public funds playing a key role in it.
- The triad of actors in the Serbian case example is illustrated in Figure 5 and summarized in Table 2. The weakest part of the triad is the shadow of hierarchy. There is no option for *Fenomena* to get funded from rural development budgets, but it has access to some funds for social activities from the government unit SIPRU directly attached to the Prime Minister's office. However, this office lives on support from international donors. For the sake of sustainability, the Association *Fenomena* created DAFF, a micro-finance instrument by which it supports activities of vulnerable groups in rural areas. As in the Scottish case, the fractalness of the triad model reveals itself to the extent as *Fenomena* becomes an intermediary support structure for local initiatives.

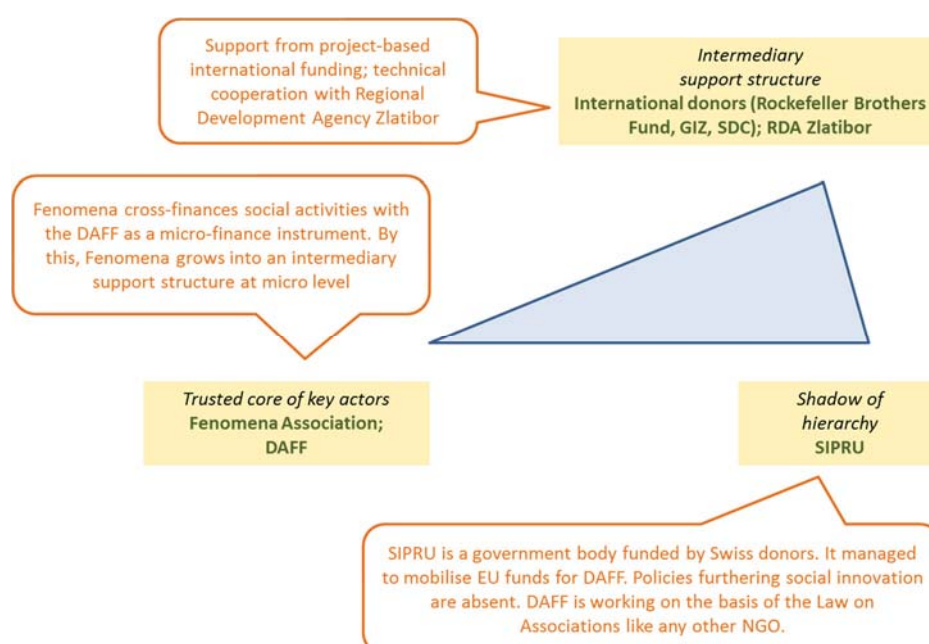


Figure 5. The triad of actors with regard to DAFF (Source: Own design).

6. Discussion

In this section, we bring together our insights from the case study analyses on the core elements (the nodes) of the heuristic model and the relations between the three actor groups (Table 2). On this basis, we discuss further detailed observations about, for instance, the implications of more or less balanced triads and development paths over time and how far recommendations for a better political support of social innovation can be derived.

Table 2. Lessons from the analyzed cases (Synthesis).

Triad Elements		Triad Features		
		Austria (Apprentice Worlds)	UK/Scotland (Braemar Community Trust and Hydro)	Serbia (Fenomena Association)
The nodes	Trusted core of key actors	Strong: Enduring management of more than ten different projects under the strategic guidance of the LAG management. Different projects have been seamlessly customized to promote the initiative.	Strong: <i>Braemar Community Limited</i> with <i>Braemar Community Hydro</i> as the economic mainstay. Broad, locally anchored ownership with a high potential for internal diversification.	Strong: Persevering dedication and social commitment of core actors.
	Intermediary support structure	Strong: Over the years, <i>Apprentice Worlds</i> have been a flagship initiative of the LAG with strong backing by the chairman and active leadership by the LAG manager. The LAG not only provided the appropriate structure for funding, but also knowledge transfer and regional, national, and European networking.	Strong and two-pronged: The Scottish Development Trusts Association represents the interests of a large number of similar initiatives at the national scale of decision making, whereas top-down support is effectively delivered by sectoral state agencies.	Intermittent and delicate in terms of political contingencies: Full reliance on international donors and development projects.
	Shadow of hierarchy	Obtainable, but dispersed: There is widespread recognition among the regional and national polity, but not sufficient political will to institutionalize the initiative due to the perseverance of sectoral divisions and role attributions.	Strong, but still improvable: The constitution of the nation state provides the matrix for a broad political consensus on community empowerment. Some friction losses through sectoral silos and a weak territorial cross-sectoral coordination (LEADER) dominated by municipal interests.	Weak: Encouragement by an internationally funded unit at the Prime Minister's office.
Edges linking the nodes	Core actors <-> support structure	The key actors (<i>Apprentice Worlds</i>) still fully depend on the intermediary support structure (LAG <i>Zeitkultur</i>). Independent ownership would be necessary to make the initiative sustainable.	Strong ties: Technical top-down support complemented by bottom-up representation of interests.	Strong ties based on longstanding experience in international fund raising and project acquisition, but overall dependency on project cycles.
	Support structure <-> shadow of hierarchy	It has cost the LAG some time to become acknowledged as a social entrepreneur in this field, but it has succeeded in it. This has, however, not led to regime change, which would allow the <i>Apprentice Worlds</i> to get mainstreamed.	Strong and consistent: The structures are built upon the consensus on decentralization and community empowerment. Sector silos and municipal power claims constitute challenges.	Strong link between the two nodes through international donors, with only weak embedding in the Serbian domestic policy context.

	Shadow of hierarchy <=> core actors	There is an ongoing dialogue between project promoters and local and regional polity, fostered by the LAG, which, as a well-established public-private partnership, provides the institutional space for continuous concertation across all sectors.	The local initiative, like many similar ones in Scotland, responded to an open invitation, which was based on the political consensus on decentralization and community empowerment.	There is no political provision (funding, advice) for social innovation support, and core actors operate under conditions of permanent uncertainty in an overall unstable political-institutional environment.
General appreciation		<ul style="list-style-type: none"> • Strong ownership and management capacity of the core of actors and the LAG (support structure). • The shadow of hierarchy is dispersed and therefore weaker than it could be when weighed against the vocal support from political and institutional representatives. The triad is out of balance, because the nodes of actors and support structure collapse into one another (Figure 3). 	<ul style="list-style-type: none"> • Strong ownership and increasing sustainability of the local initiative (core actors) underpinned by internal diversification and the transformation of the Braemar Community Trust into a second-tier intermediary support structure fostering smaller initiatives (housing, social care) within the community. • Shadow of hierarchy and intermediary support structure follow a consistent governance pattern. • As the nodes are independent and strong and the links intact, the triad appears well-balanced (Figure 4). 	<ul style="list-style-type: none"> • The initiative shows strong ownership and the will to survive by generating its own revenues, thus morphing into a second-tier support structure for local initiatives. • Dominance of international donors in both intermediary support structures (project funding) and in providing the shadow of hierarchy (donor-funded SIPRU). • The collapsing nodes (intermediary support structure and shadow of hierarchy) tilt the triad out of balance. The trusted core actors keep relying on their own commitment with limited growth perspectives.

6.1. *The Benevolent Shadow of Hierarchy*

The three cases illustrate the multifarious capacity of the benevolent hand of public policy—the shadow of hierarchy—in supporting social innovation to address persistent problems of socio-economic decline. In both the Austrian and the Serbian cases, new forms of support were established to nurture small businesses in rural villages and towns. In the Serbian example, the national government passively encouraged the activities of the DAFF through a donor-funded governmental entity (SIPRU). Institutional policies, basically the Law on Association, provided the backdrop for civil society activity. The political frameworks leave some options to citizens' initiatives as to how they can legally organize themselves if they want to pursue socially innovative activities. However, it does not have concrete specific policies or programs to foster social innovations as such. In the Austrian case, structural policies have had much better effects on the social innovation initiative than sectoral governance arrangements, which rather appeared as impediments to flexible handling. The Local Action Group was instrumental in generating the innovative action, striving to acquire an uninterrupted funding stream from various European (LEADER, INTERREG) and State-based support schemes. The situation in Scotland was different. Apart from the institutional policy background, which strongly encourages community-based enterprise, the Community Trust (Braemar Community Limited) was much better served by specific sectoral support schemes and structures (e.g., the Scottish agency supporting Community Energy, the National Park Authority, etc.) than by territorially defined policies (e.g., LEADER), with the municipality in a rather unsupportive role.

6.2. *The Importance of Intermediary Structures*

The types of organizations that take over the role of intermediary support structures are quite different in the three case studies, with the distant SIPRU as a donor-sponsored government entity in Serbia, whereas the Austrian LAG as a formalized partnership has the explicit mandate to instigate area-based innovative actions using a multi-sectoral, participative, and inclusive approach. The Development Trusts Association for Scotland purposefully connects top-down and bottom-up in a “down-up” structure [82], benefitting from an overall political-institutional environment in which local initiatives can expect policy support [75].

6.3. *The Trusted Core of Key Actors*

In all three cases, we see the indispensable role of civic action as a key driver, not only in generating the social innovation, but also in all consecutive phases, through carrying it through difficult times, to growing, and eventually scaling up and out. Whether long-term viability is sought through proper economic revenues (as in the Scottish case and also on a much smaller scale in the Serbian case), or through new institutional arrangements in the relevant field (in the Austrian case), there needs to be not only continued dedication in the heart of the initiative as such, but also the capacity to build trust and motivate key actors of the other two nodes, the intermediary support structures and the shadow of hierarchy, at best leading to the formation of a personal network that inspires the reconfigured fabric of institutional actors from within.

6.4. *Bottom-Up and Top-Down*

The relationship between public policy and social innovation is shaped by two momentums. The first comes from top-down, when policy makers identify and frame a problem area and design supportive policies including the promotion of social innovation as a means to deliver desired outcomes. The minimum variant of this happens when public actors, plagued by political “hot potatoes” or wicked problems, slough off responsibilities to third sector institutions or donor-funded projects and let them work with public benediction at best or passive tolerance at least. The second momentum occurs when social innovation initiatives emerge in defiance of hindering or denialist policies and political frameworks and become so successful that the state finally endorses them and

eventually designs policies to support new adopters. The degree of political encouragement has an impact on the presumed sustainability of the initiative, which seems to be weakest in the Serbian and strongest in the Scottish case. The Austrian case is peculiar in the sense that the social innovation is well received and praised by all relevant stakeholders, who at the same time act somewhat reluctantly when it comes to inserting the innovation into the existing institutional fabric.

6.5. The Path Toward Long-Term Viability

As for the viability of the described initiatives, the Austrian *Apprentice Worlds* are still resting on the shoulders of the LAG, the Scottish *Braemar Hydro* guarantees a constant stream of revenues for the independent community benefit society, while in Serbia, the revolving micro finance fund called DAFF still grapples with covering the running cost, let alone with cross-financing the social and gender-related solidarity work of the association. Both use the earnings to broaden and diversify the spectrum of activities and to nurture innovation on the ground, which, again in both cases, leads to a replication of the triad of success at the next lower level, with the trusted core of key actors (the social innovation initiative) morphing into an intermediary support structure at the next lower level.

The third sector agency delivers viability and independence in the Scottish case, but the business sector is more important in the Serbian case and to a degree in the Austrian case. Nowhere do local businesses appear as dominant players. In the Scottish case, the devolutionary stance of the state and the non-viability of private enterprise in lagging rural areas have left the field for third sector community engagement and new forms of social enterprise. In the Austrian case, local entrepreneurs contribute most actively to the job orientation events, but the professional associations of trades have not sufficiently translated this commitment into institutional support. In Serbia, we face a general weakness of rural businesses. The lack of public support mechanisms assisting social innovations and enterprises constitutes an institutional void, which so far is filled by active financial support provided by foreign donors, the domestic banking sector, as well as financial support by private domestic foundations [26]. The case of the *Fenomena* Association shows how the establishment of a social innovation, i.e., the establishment of the DAFF fund based on foreign funding, aims to overcome the lack of institutionalized support by operating as a “business angel” for small rural businesses. It also demonstrates that in a context of dire financial needs and weak human capacities, even small amounts of money along with vocational training can already make a difference if civic action steps into the breach.

6.6. The Triad of Actors May be More or Less Balanced

The Austrian LAG *Zeitkultur* acts as both the key intermediary support structure and the creator and promoter of the social innovation initiative *Apprentice Worlds*. The triad has not found its balance, because the trusted core of key actors and the LAG as the intermediary support structure are actually the same group of people. This imbalance is visualized by the shortness of the edge connecting the two nodes in Figure 3. In Serbia, the absence of relevant intermediary structures in the country is noted. International donors fill that gap, but the benevolent shadow of hierarchy (the SIPRU government unit) depends on them as well [26]. This imbalance is visualized by the shortness of the edge between the two nodes in Figure 5. The triad of actors unfolds itself most evenly in the Scottish initiative, which works in line with the intentions of the Scottish polity. The Community Trust also takes advantage of complementary intermediary support structures, both bottom-up (Association of Community Trusts) and top-down (government agencies, LAG).

6.7. The Triad is Fractal

Growth and sustainability of social innovations arguably depend on reliable intermediary support structures. We have seen that intermediary structures are fractal in principle, which means that they may develop additional tiers further down or up: Braemar Community Limited, which nurtures a number of social innovation initiatives locally, is one of 250 members of the Development

Trusts Association in Scotland, which represents its interests on a wider scale. The LAG *Zeitkultur* is member of the Austrian LEADER Forum, a voluntary association that acts as a stakeholder for rural development in Austria. The bottom-up representation of social innovation initiatives in intermediary structures seems to favor fruitful policy dialogue and policy integration. According to the basic tenets of neo-institutionalism [83], organizations depending on dominant supply or support structures tend to assimilate themselves over time, increasingly mirroring their features. This process becomes less damning if the intermediary structures are at least in substantial part delegated from bottom-up, facilitating multi-stakeholder participation and maintaining lively links not only with the public domain but also with global networks of like-minded initiatives, as well as a wider range of stakeholders in the society at large. Partnerships involving civic actors are the beating hearts not only of social innovation initiatives themselves, but also of their institutionalized second or third layers of representation and support. These layers feature “trusted cores of key actors” and polity providing the “shadow of hierarchy” at different scales.

6.8. Social Capital and Trust are Depletable Resources

Where there is less trust and weaker social capital within civil society and between third sector actors and public agency, social innovation is likely to be suppressed [44]. A lack of trust in society for various reasons is often observable as informal institutional voids when it comes to starting businesses [84]. This may be especially the case in post-socialist countries, and in the shadow of the former fifty year-long collectivist organization, may lead to more individualistic responses. Even though the socialist regime in Serbia was softer compared to Soviet socialism, it led to the loss of trust in local, collective self-organization, which just lately has partly been overcome [26,85]. Furthermore, the emergence of nationalist–populist regimes in post socialist and western states may further stifle collaborative efforts of citizens and third sector agency to promote alternative ways of doing, particularly if they depend on support structures (international donors) from abroad. Thus, in Serbia we can observe the weak position or stigmatization of civil society organizations, which are often distrusted by the state [26]. The interests of civil society organizations are not highly regarded in public policy discussions, both nationally and locally [86], which makes the political–institutional environment in Serbia the least supportive for “bottom-up” initiatives among our three cases.

7. Conclusions on the Research Questions

(i) What are the social and institutional conditions and policy initiatives that foster or hinder social innovation?

The role of a heuristic model is to provide orientation and facilitate the understanding of complex realities in order to become effective for action. The triad of actors reduces real complexity to three groups of relevant actors, their respective strengths, and their mutual connections. The triad captures the relevant factors in the relationships between the trusted core of key actors, the shadow of hierarchy, and intermediary support structures.

(ii) How can policymakers encourage, enable, and promote social innovation, and utilize social innovation to achieve better results in developing rural areas?

Trust in institutions and a societal climate in which individual self-expression, civic action, and community empowerment are considered as intrinsic values are paramount for social innovation to thrive. Thus, institutional policies provide the matrix for civic action, entrepreneurship, and public interventions, such as constitutional laws on basic rights, or legislation on cooperatives, public–private partnerships, and governance arrangements in general.

Sectoral policies regulate a particular thematic field (childcare, elderly care, environmental or heritage site protection, energy provision, etc.) Structural policies are cross-sectoral and oriented towards cohesion objectives (such as local and regional development, employment and income distribution, and the provision of basic infrastructures and services). At first sight, structural policies appear most propitious as flexible entry points for providing need-specific and flexible funding and advisory instruments, such as Local Action Groups, local helpdesks, or one-stop-shops for social

innovation initiatives. However, due to various reasons, structural policies sometimes do not live up to these expectations, whereas sectoral policies may provide specialized support that can be integrated and customized by the local initiative. The most successful social innovations seem to be those feeding off all three policy dimensions: the sectoral, the structural, and the institutional dimension.

Even if structural and sectoral policy provisions ensure need-based and flexible support, meeting a broad variety of challenges in various types of territories, the over-determination of policies may constitute a hindrance to supporting local social innovation. Provision for ring-fenced funds for social innovation in sectoral and structural policies can create the possibility space for anything that was not imagined, maybe not even imaginable in the times when a policy, a political strategy, or program had been designed. These ring-fenced funding opportunities should be made known and accessible for anyone interested and in search of support.

Social innovation will achieve most when the triadic relationships between the state, intermediary organizations, and local actors are working together synergistically. On occasion, this may happen fortuitously. Where it is designed into policies at multiple scales, it is more likely to deliver positive societal outcomes.

The increasing recognition of the idea and factual role of social innovation should be translated into the design and promotion of political goals. Global policy objectives, such as the Sustainable Development Goals of the UN Agenda 2030, but also the European Green Deal stipulating carbon-neutrality until 2050, will have to lay strong emphasis on social innovation, which means nurturing an innovative ecosystem with inclusive institutions and empowered local communities. Starting at the local level will help generate momentum, which leads to growing public awareness of novel solutions, bringing forth new forms of organization in response to policy gaps and market failure, eventually leading to regime shifts at society level.

Our triad model has been shown to be useful for analyzing the role of policies and political frameworks for social innovation initiatives. It not only appears to be a helpful frame to describe the relevant actors and their relations, it also provides an analytical model for the assessment of how well the political system supports social innovations and how the political support may be improved.

The authors consider the first validation of the heuristic model as promising. It allows for an analysis of weaknesses and gaps in the political support of social innovations and provides entrance points for improvements. As a next step, further refinement of the model and its operationalization into an integrated assessment grid serving policy makers and advisers are recommended. As the model is agent-based and potentially applicable in all types of territories, the authors think that it should also be applied and tested in case studies on social innovation in urban areas.

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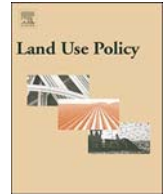
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ARTICLE 7

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Experiencing forest products – An innovation trend by rural entrepreneurs

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ABSTRACT

There is increasing emphasis on innovation as a driver of continued prosperity in the rural economy. Globalisation poses challenges to rural areas given technological advances and intensified competition in agricultural markets, ageing rural populations and expansion of urban areas. However, in recent years, the conception of rural areas has shifted from places of production to places of consumption. In line with an increasing urban demand for consumption of products and services close to nature within the rural landscape, we observe the emergence of experiential offers based around non-wood forest products (NWFP) where the consumer is closely connected to the harvesting and use of the products. In this paper, we examine how such intersecting demands have created new forms of market for NWFP, by analysing in-depth four innovative examples in Austria and the United Kingdom. Semi-structured interviews were conducted with the managers of these businesses, and cases were analysed through application of both the experience economy and the innovation systems approach. We found that all four businesses were on the one hand derived from traditional, regional cultural skills and values and, on the other hand, directly connected to new consumers' demands. The apparent success of these emerging business models lies in the accretion of new social values onto traditional products. Thus creative approaches blending offers designed to enhance consumers' experiences into traditional sectors, such as forestry, would have potential in the future. However, our results indicate that there is a lack of institutional support for the development of such businesses in both countries. Better suited innovation policies and support structures would be important for mainstreaming or encouraging the development of similar businesses, innovations and knowledge.

1. Introduction

1.1. Innovation, rural entrepreneurship and rural change

Approaches to the study of innovations have gone through a radical shift in the last decade. Innovations are no longer seen as being developed solely within the boundaries of the organization or the firm (Lusch and Nambisan, 2015). From the idea of a linear value chain (Porter, 1985) there has been a shift to systemic models of dealing with innovations (Edquist, 2001). The innovation systems (IS) approach conceptualises innovation as a complex process arising from interactions between actors and institutions (Edquist, 2001; Lundvall et al., 2002; Moolaert and Sekia, 2003) and represents collaboration within a network of actors ranging from suppliers and partners, to the customers themselves (Chesbrough, 2003; Nambisan and Sawhney, 2007). In this

context innovations are assumed to be composed of complex value constellations (Michel et al., 2008). Furthermore, many market innovations no longer deal only with tangible goods, but can also incorporate intangible offerings (Glazer, 1991). Thus the focus has shifted from the features and attributes of the innovation output to the value, that the producer co-creates with the consumer (Vargo and Lusch, 2008). Applying a service-dominant logic approach means the conventional conceptualization of the relationship between supply and demand is transformed and value is always co-created jointly by producer and consumer (Vargo and Lusch, 2004). It is the combination of a transaction involving services and goods which differentiates the emerging experiential sector from recreational experiences e.g. wildlife photography. In a similar way, Pine and Gilmore (1999) introduced the concept of the “experience economy” to denote the emergence of customer experience as a new paradigm for added value and

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differentiation between providers (Alcantra et al., 2014). Experience is more than simply delivering a service, and relates to creating a memorable and unique occasion where the buyer is also a guest and the seller is the host and the purchased experience is co-created (Pine and Gilmore, 1999). Thus, focus has shifted from supply chain to demand chains, in which the customization of offerings becomes relevant. Innovation towards creation of high-quality experiences that customers will pay for, has increased in importance, because “experience” is itself a distinct economic offering which can provide new sources of competitive advantage (Pine and Gilmore, 2014).

Land assigned to primary sectors (e.g. agriculture or forestry) is contested by other land use interests such as nature conservation, environmental protection or recreation as rural areas becoming places of consumption and viewed as providers of environmental goods and services (Murdoch et al., 2003). Consumptive changes trigger revalorization processes which seek to link property negotiation to values, such as beautiful countryside, clean water, healthy food etc., and increasingly recognise property rights in these resources (Laschewski and Penker, 2009). Revalorization of rural properties reflects the shift from material goods to intangible values, and serves to reshape the relationship between non-rural and rural actors (Laschewski and Penker, 2009) in a way which is driven by the needs of urban population for natural or wild products and the desire to experience nature (Kilchling et al., 2009). The search for the rural idyll and growing appreciation of the aesthetic values of the countryside are also impacting property rights, which Aznar and Perrier-Cornet (2004) frame as the “publicization of rural areas” and this in turn can impose restrictions on landowners. Together these changes result in the reinvention of the role and offer of post-productivist rural areas in the global economy (McCarthy, 2006; OECD, 2018). This trend not only means pressure on traditional uses but also creates new opportunities for rural incomes and enterprise development (Slee, 2005). This is emphasised in the neo-endogenous development theory that postulates that in endogenous-based development extra-local factors are recognised and regarded as essential but local areas are nevertheless believed to retain the potential to shape their own future (Ray, 2001). This marks a move away from the earlier mainstream hegemony of external interventions to overcome inherent disadvantages towards a process of rural development where actions are based on local conditions and local needs (Van der Ploeg and Van Dijk, 1995). Currently, we can observe variety of new opportunities taken up in rural businesses. Besides the opportunities coming from agriculture (Morris et al., 2017), food (OECD, 2018) and tourism sectors (Loureiro, 2014), more and more opportunities are emerging from the forestry sector (Li and Lai, 2011; Weiss et al., 2011; Mavsar et al., 2008), nature based recreation goods and services (Mantau et al., 2001) and non-wood forest products (Wolfslehner et al., 2019; Vacik et al., 2020; Pettenella et al., 2007).

The observed phenomena of economic crises and population decline in rural areas of Europe have focused attention on the role of rural innovation and entrepreneurship to foster rural economies (Pato and Teixeira, 2014; Lafuente et al., 2007; McElwee and Atherton, 2011) and has influenced the political agendas of governments and international institutions (Rametsteiner et al., 2010). Looking through the prism of rural entrepreneurship, we assume that innovative entrepreneurs can contribute to meeting the many challenges inherent in the transitions facing rural areas. Experiential services have been identified as one of the routes that can increase the profitability of forestry (SNS-Nordic, 2008; Wong and Prokofieva, 2014). Moreover, in the forest industry's strategic research agenda for Europe, the commercialisation of “soft” forest values has been identified as an opportunity (Forest Based Sector Technology Platform, 2006). So-called soft forest values include non-wood goods and services that are often difficult to market but can – to some extent – be transformed into marketable products (Mantau et al., 2001; Mavsar et al., 2008). As shown above there are several approaches to innovation which will be relevant to NWFPs. The market economy perspective proposes two types of processes that may increase

marketability: “product development” (e.g. provision of complementary/additional goods and services) and “transformation” of institutional properties (e.g. property rights) (Mantau et al., 2001). Systemic innovation research looks beyond the marketplace and formal property rights dimensions and includes public and private actors that have a role in the innovation process, such as authorities, research institutes, training organisations and civil society actors (Rametsteiner et al., 2005). The experience economy approach goes even further and rethinks producer-consumer relationships and in particular changing urban-rural relationships in the co-creation of experiential offers connected with forest products. In our analysis, we explore new market opportunities through the accretion of experiences onto non-wood forest products (NWFP). Thus, we contribute to the body of scholarly research on NWFP, delivery of social services by forests and rural entrepreneurship by exploring new markets related to forestry and by applying a new scientific approach.

1.2. Role of forest products from a diversified forestry perspective

The forestry sector is a traditional and mature sector with rather low innovation activity which focuses mainly on timber production and gives little attention to new business opportunities aside of timber (Rametsteiner et al., 2005; Weiss, 2013). Nevertheless, despite limited institutional support some forest holdings have diversified their portfolio of goods and services, with the latest innovation being the addition of experiences to the offer to customers (Helles and Vedel, 2006), examples being the combination of consumption of NWFPs (e.g. mushrooms, berries, herbs, etc.) with associated experiences (e.g. education, adventure, hiking, etc.). An interesting feature of these offers is the active engagement of customers in the production of a memorable experience and not just the skill of the teacher or beauty of the venue. We have also observed that many of the forest-based experiential offers are often cross-sectoral (between tourism, rural development, nature conservation, food and forest sector), and rarely initiated exclusively within the traditional forest sector (Weiss, et al. 2011). There is also a marked diversity in proprietors and enterprises who may not themselves own forest land (Weiss et al., 2007). Small companies have a significant role here, as they are better able to respond to users' most specific needs and interests (Novelli et al., 2006). These innovative businesses are important for rural development because they foster regional development and uniqueness (Erkkila, 2004) and provide income opportunities for non-landowning people in rural communities.

The use of NWFPs in many European countries represents a traditional, cultural and very well-known activity (Mantau et al., 2007; Lawrence, 2003). From historical trade commodities many NWFPs became commercially neglected after WWII, when their share in international trade decreased (Sills et al., 2011). Since the 1980s there has been a revival of interest in non-wood goods, alongside forest services (Janse and Ottitsch, 2005). Since then, opinions on the potential of non-wood forest products and services to alleviate poverty, contribute to rural development or encourage conservation have fluctuated from optimism to pessimism (Belcher and Schreckenberger, 2007). The early optimism was especially related to the role of these products as a tool for rural development in developing countries. However, it was realized later that positive outcomes were difficult to replicate and generic conclusions were unwarranted and likely to be untenable (Mok, 1991). The importance and value of NWFPs were often associated with commercialisation and export (Masó et al., 2011), which rather neglected the social and cultural aspects of harvesting, use and marketing (Sills et al., 2011). These social aspects are various, from those that relate to the sociability of gathering products and knowledge transfer, to norms ensuring long-term sustainability of supply, market demand and volatility, to aspects related to health, well-being and cultural values, such as keeping traditions and identities of regions (Emery et al., 2006). With new economic situations and societal values, these traditional or customary subsistence uses can be fundamentally transformed when a

desire for health, nature or tradition in the consumer supercedes the sellers' need for income or basic provisioning (e.g. food supply) (Weiss et al., 2019). NWFPs are embedded in complex social, institutional and economic contexts which may make their commercialisation difficult (Mantau et al., 2001). For instance, property rights are not always clearly defined or the formal definition differs from informal practice (Wolfslehner et al., 2019; Bouriaud, 2007). Furthermore, the products fall between established sectors and are thus neither supported by forest policies nor by other sectors (Živojinović et al., 2017; Weiss et al., 2019). Innovations and business development around NWFPs not only receive limited support but also even face institutional barriers from established, powerful groups or inadequate or mixed jurisdictions (Buttoud et al., 2001; Živojinović et al., 2017; Weiss et al., 2019). As a consequence, innovations in NWFPs are usually developed outside formal support frameworks by enthusiastic entrepreneurs who find opportunities to innovate without much institutional support (Ludvig et al., 2016a; Živojinović et al., 2017).

Nowadays, we face the emergence of a wide variety of products and services that are derived from forests (Janse and Ottitsch, 2005; Vedel, 2010; Wolfslehner et al., 2019). It is recognised that integration of NWFP into new cultural lifestyles is becoming more important than their pure economic value, and commercial profit plays just one part in this complex picture of NWFP use (Emery et al., 2006; Dyke, 2003). Success of these products is defined by their users and the intangible added value that these products make to their well-being and relationship to nature and the landscape (Emery et al., 2006). Thus, applying the experience economy approach seems purposeful to highlight the value of NWFPs and to bring new insights from this special business field of forestry.

1.3. Aims of the paper

We hypothesise that experiential offers are distinct and linked to local culture and tradition and can contribute to the social, environmental and economic sustainability of the rural areas. With this in mind, this paper will investigate how experiential services add value to NWFPs. We examine four rural business innovations, which combine the provision of experiences together with (specific) NWFPs in two European countries, Austria and the United Kingdom. In these case studies, we analyse: 1) how experiences added value to the NWFPs, and 2) how these innovations arose and 3) the factors which influenced their success (Fig. 1). We utilised two approaches, the experience economy (EE) (Pine and Gilmore, 1999) and the innovation systems (IS) approach (Edquist, 2001).

Before examining the case studies, we present the key elements of the EE and IS approaches (conceptual framework, Section 2) and the research methodology (Section 3). The subsequent results Section 4 outlines the specific innovations and innovation processes in the case studies, including the experiential services and relevant actors, policies and support and hindering factors in the individual cases. This is followed by a discussion of the elements of EE and IS in these innovations

(Section 5). Section 6 summarises the main conclusions on the value of the EE approach for studying innovations in new forest products.

2. Conceptual framework

The EE approach is used to understand and describe the experience in our innovations case studies, and the IS approach to understand and explain the innovation process from which they arose. This is an extension of previous studies of NWFP-related innovation which have been framed as product, process or organizational innovations (Ludvig et al., 2016a, b; Ludvig et al., 2018; Weiss et al., 2011; Živojinović et al., 2017). Our combined approach is used to analyse NWFP-based experiential offers and to show how these innovations are supported or hindered in current institutional environments (Fig. 1). Such an analysis can then inform policy and practice to better support businesses for the benefit of local (rural) communities.

2.1. Experience economy

The shift from selling products or offering services to offering experiences, Pine and Gilmore (1998) call this a “progression of economic value” (p. 98). Experience is not an amorphous construct, but is a real offering, as any service, good or commodity (Pine and Gilmore, 1998). Very often, these are combined, and companies use goods as props and services as stage, in order to engage customers in a way that create a memorable experience (Pine and Gilmore, 1998). This makes such offerings segmented, specialised and sophisticated with unique and interactive activities provided at the place of ‘consumption’ (Li and Lai, 2011; Novelli et al., 2006; Weiss et al., 2007).

The idea of the experience economy is derived from the theory of experienced utility in behavioural economics (Kahneman, 2003). This focuses on hedonic quality that individuals enjoy and their willingness to pay different amounts of money to obtain higher value or longer duration of experience utility (Chang, 2018).

For provision of these experiences, emotional factors are of great importance and they are very often embedded in local cultural context and traditions where they are provided. Sundbo et al. (2013) introduce the “total concept” as one of the characteristics of the experience sector. This assumes a combined product composed of several elements, with production and delivery process and marketing as parts of the total concept. Literature on service innovation enlarges scope and stresses the importance of value creation, which is mainly derived from the value to the customer of their experience (Vargo and Lusch, 2004). Durst et al. (2015) point out that companies can achieve a competitive advantage only by bundling novelties in terms of goods, with added value services, to increase customer loyalty and retention.

Experiences are inherently personal, contrary to goods and services, which are external to the buyer (Pine and Gilmore, 1998), and because of that no two people will have the same experience, even with the same offering (Pine and Gilmore, 2014). Cupchik and Hilscher (2008) define experience as something that leaves an imprint on the person, something memorable and unique. Many authors emphasise a user-centred approach in which experiences are co-created between businesses and customers in a way that end users lead value creation (Snyder et al., 2016; Pine and Gilmore, 1999). Experiences should lead to transformation, and personal enrichment, thus they need to be customized and can thereby avoid the commoditization trap (Pine and Gilmore, 2014).

Pine and Gilmore (1999) propose a framework for assessing the richness of an experience for the customer. Their approach consists of four realms given by customer participation (active or passive) and the connection (or environmental relationship) of the customer to the event (absorption or immersion). Based on these two dimensions, experiences can be divided in four different realms: entertainment, educational, escapist and aesthetic (Fig. 1). The entertainment domain assumes a desire to enjoy, the educational a desire to learn, the escapist a desire to

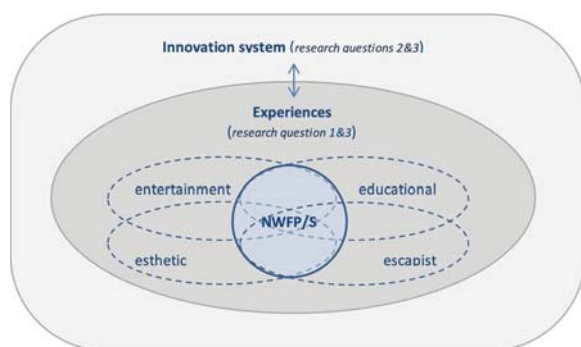


Fig. 1. Conceptual framework of the paper.

go and do something different, and the aesthetic a desire to be in and enjoy in a certain place (Pine and Gilmore, 1999). Entertainment experiences are produced when customers passively observe the event/performance and their attention is fully occupied with the experience. Educational experience assumes the active engagement of customers in the event who fully concentrate on the experience. Escapist experience occurs when customers are actively involved in an event and are immersed in an actual or virtual environment. Aesthetic experience assumes a passive role of the customers, being physically or virtually a part of what is being experienced (Chang, 2018).

Studies have so far used the four experiential domains mainly to analyse quantitatively different tourist experiences from various perspectives such as bed-and-breakfast (Oh et al., 2007), lodging (Loureiro, 2014), wellbeing (Hosany and Witham, 2009), the food sector (Sidali et al., 2013), agriculture (Swinnen et al., 2012) and (development potential) of forest parks (Li and Lai, 2011). We aim to fill in the gap in relation to forestry in current research and emphasise its potential in adding value to the rural economy.

2.2. Innovation systems

Systemic models for studying innovation include the innovation systems (IS) approach (Edquist, 1997; Rogers, 1995) which places innovation as an institutional process in a system comprising a variety of actors (Edquist, 2001; Lundvall et al., 2002; Moulaert and Sekia, 2003). In IS, a network of commercial and non-commercial actors is involved in innovation and it is not only the entrepreneur that is responsible for the innovativeness of the enterprise (Rogers, 1995; Cooke and Morgan, 2000). The main elements of ISs are actors, institutions and their interactions (Rametsteiner and Weiss, 2006). Institutions represent the rules by which the relationships between different types of actors (public, semi-public or private organizations) from different social systems (economy, research, state) are maintained (Edquist, 1997; Küppers and Pyka, 2002). Under institutions we understand “a set of habits, routines, rules, laws or regulations that regulate the relations and interactions among individuals, groups and organizations” (North, 1991). Institutions have a threefold role in the innovation process: the reduction of uncertainty by providing information, the management of conflict and cooperation, and the provision of pecuniary and non-pecuniary incentives (Edquist and Johnson, 1997; Rametsteiner and Weiss, 2006).

For any enterprise and innovation development, the institution of property rights is relevant, as secure property rights guarantee the right to gain income from the assets owned or used. Well-defined rights define the way limited resources are used (Salka et al., 2006) and reduce possible conflicts arising from multiple users of the same piece of land (Bouriaud, 2007). The forest owners' rights in many countries do not contain exclusive rights to NWFP. Mushroom and berry picking is subject to open access in many countries, and in others the quantities and methods of picking are defined (Prokofieva et al., 2019). Hunting and fishing is exclusive to the owner in some countries, while some forest attributes, such as its contribution to beauty of the landscape are not in the content of ownership (Bouriaud, 2007). These rights are different depending on the product and the enforcement of property rights in the legal and institutional domain (Bouriaud, 2007; Nichiforel et al., 2018). Informal institutions such as customary rights and traditions play a particularly important role for NWFPs, when, for instance, formal ownership rights cannot be enforced against traditional harvesting practices (Prokofieva et al., 2019). Although the specific formation of property rights is important for any realistic specification of a business model, this does not preclude whether a business may develop. Recreational services in forests, for instance, have developed in quite variable institutional settings, including public and private land ownership and business forms (Weiss et al., 2007). Also in the field of NWFP, various forms of businesses have developed within very different institutional frameworks (e.g., Ludvig et al., 2016a; Živojinović

et al., 2017).

In forestry, innovations are often not the result of established IS, at a national, sectoral or regional level (Rametsteiner and Weiss, 2006), but can be regarded an outcome of ‘ad hoc’ IS or one-off arrangements (Weiss and Rametsteiner, 2005). Furthermore, innovations often occur between sectors (e.g. tourism, agriculture, food) and thus, they exist between sectoral innovation systems (Kubeczko et al., 2006) with NWFPs and services as typical examples (Weiss and Rametsteiner, 2005; Živojinović et al., 2017; Weiss et al., 2019). Such ad-hoc IS have also been termed territorially embedded regional innovation systems (RIS) (Asheim, 1998) or grassroots RIS (Cooke and Morgan, 2000) and these authors have argued that these bottom-up innovations would benefit from tailored institutional support measures. A similar approach which considers innovation processes within firms coined the term “innovation ecosystem” to emphasize the dynamic and interrelated character of the networks of actors involved in the innovation process (Annanperä et al., 2015; Valkokari, 2015). In this IS framework, NWFPs are classic cross-sector products and companies most often find themselves without much institutional support such as information, networking and financial means. Better support would not only help the companies but would also push diffusion of the innovations and thus increase their impact on the rural economy (Ludvig et al., 2016a, b; Weiss et al., 2017; Živojinović et al., 2017). Although as outlined above, the economic significance of NWFP decreased with modernization after WWII but new opportunities are emerging from the shift to rural economies of consumption it seems that this modernisation development at the same time creates new, but different, economic opportunities. Some traditional services are of continuous importance (e.g. hunting), while many traditional NWFP are not competitive any more in high cost countries (berries or mushrooms on commodity markets), however in both new opportunities with growing markets arising through new types of services such as guided nature, wildlife or foraging tours, bush craft workshops, survival training, courses in traditional skills, sport hunting etc. (Pettenella et al., 2019, forthcoming; Weiss et al., 2019).

3. Research material and methods

This study applies an in-depth analysis of four cases of innovative NWFP-based experiential offers. These data were collected in the frame of the StarTree¹ FP7 European research project. The cases were selected from the project database² for this analysis to a) represent different types of NWFP, b) include pronounced features of experience economy, and c) are from different institutional settings (Table 1).

The selected cases include two foragers, one in UK, one in Austria, and two that offer activities centred on NWFPs, willow weaving courses in UK, and Christmas tree adventures in Austria. The experiences are either in situ based around walks in the forest or activities associated with the harvesting or use of NWFP. All cases are micro enterprises.

The empirical research applied a qualitative approach involving semi-structured interviews with the owners/managers of the case enterprises. The interviews were carried out in September 2014 and lasted approximately 90 min. The interviews focused on the innovative aspects of the businesses and the innovation processes from which they arose. The interviewees were asked to relate how the innovations occurred, to highlight the key actors and institutional conditions that contributed to the innovations, to name fostering and hindering factors and to specify relevant support structures and measures that influenced these innovations, including the provision of information, the role of cooperation and monetary or non-monetary incentives. The interviews were recorded, transcribed and analyzed according to the IS

¹ StarTree: Multipurpose trees and non-wood forest products: a challenge and opportunity (<http://www.star-tree.eu/>)

² <http://policydatabase.boku.ac.at/>

Table 1
Case studies.

Name	NWFP offer	Aspect of experience economy	Institutional setting
Out to Learn Willow	Willow crafts	Willow weaving courses	UK – small company
Wild Pickings	Wild food products	Foraging walks and workshops	UK – one person company
Cooking from the Meadow	Wild food walks	Foraging walks and workshops	AT – Nature Park; free-lance entrepreneur
Christmas Tree Adventure	Christmas trees	Choose and cut your own Christmas tree	AT – family farm

perspective. The four dimensions of user involvement as described in the experience economy approach were identified from the descriptions of the innovations. From the experience analysis we aimed to describe how value is created in these innovative NWFP businesses and what makes them successful final offers for the customers.

Understanding of country and case-related background were taken from secondary data collected by the StarTree project.

4. Results

4.1. Description of the selected cases

4.1.1. Out to learn willow, UK

Out to Learn Willow is a small company based in South Wales, in the Vale of Glamorgan. The company provides a wide range of willow weaving courses and workshops offering pedagogic experiences in traditional basketry and creation of living willow structures, they also make and install bespoke living willow structures, sculptures and baskets under contract and sell living willow kits.

4.1.1.1. Experiences. The most innovative part of the business is the workshops which bring together traditional and new concepts of willow work and are constantly re-invented with additions to the range of courses and the mix of services they offer. For example a two-day course to design and make your own willow coffin proved to be very popular as was the offer around willow wedding decorations. In the past, the production of basketry was utilitarian and focussed on provision of commodities. Now we see a shift towards provision of pedagogic experiences with the skills learnt being the basis for continuing hobbies. Alongside the weaving techniques, customers learn about growing, harvesting and preparing the material for willow weaving.

4.1.1.2. Innovation process. Out to Learn Willow started its work almost a decade ago when one of the two owners won £3,000 in a competition and decided to invest the money in providing willow weaving courses, as there were no companies offering such services in South Wales at that time.

Out to Learn Willow works closely with the local council principally through participation in regional cultural activities for promoting the coastal heritage of the Vale of Glamorgan. Promotion of these events is through the Council website, social media, brochures and leaflets. The company also participates in numerous festivals and exhibitions, with the objective of connecting with people and promoting their company and work.

Through time, Out to Learn Willow has cooperated with many different institutions and organisations. Courses and workshops have been held in primary and secondary schools, and with various marginalised community groups (e.g. therapeutic groups with mental disorders, sight and hearing difficulties, homeless people). The company also runs courses in the National Botanic Gardens of Wales where their work can be seen in the willow playground. It is a member and the main initiator of the Welsh Basketmakers' Association South Wales Group, and has been involved in research initiatives such as the "Willows in Powys" LEADER project, which undertook promotion and marketing activities, trying out new initiatives and willow varieties.

Out to Learn Willow is instrumental in building up a supply chain for locally grown willow and works with local garden centers and growers to ensure a stock of high quality Welsh willow is available to weavers. They have also founded community-owned willow beds which are sources of material for their business and the local community. In this way the company is contributing to establishment of small scale working woodlands in the Vale of Glamorgan. The willow is coppiced and production is sustainable. Out to Learn Willow also offers the opportunity to people who live nearby to help them with planting, and in return they are allowed to harvest branches for their own use.

4.1.2. Wild Pickings, UK

Wild Pickings is a one-person business in mid-Wales that sells foraged products from woodlands and the coastal areas of Ceredigion.

4.1.2.1. Experiences. The business model of Wild Pickings combines the manufacture and sale of food products from 'wild pickings'. In addition to the prepared jams and pickles, the company also offers foraging walks and courses, cookery demonstrations and small scale catering for events for local people, school groups and young people, as well as visiting tourists. These courses provide consumers a tangible product to take home or eat and an immersive aesthetic experience. Each programme is tailored to the location and style of the organisation contracting Wild Pickings. The courses and programmes are advertised by the contracting organisations, as well as through Wild Pickings own website and social media.

4.1.2.2. Innovation process. The company owner is a young woman who was intrigued by the taste and flavours of wild food and with growing enthusiasm, began gathering, producing and developing products for her own use. During this period of her own learning she noted that people enjoying dishes containing wild ingredients in restaurants have little or no knowledge or understanding of where they had come from. She wished to address this 'disconnect' between producer and consumer by bringing foraged products directly to consumers at her local farmer's market along with messages about natural cycles from which they were derived. In 2009, she began to trade foraged products at farmer's markets made in her own kitchen. In time, with an increase in demand for her products, she invested in building a more permanent kitchen compliant with food regulations.

Wild Pickings products naturally vary through the seasons and between years. The changes to each seasons' batch of produce and introduction of new recipes and flavours, add a 'twist' to traditional recipes which keep existing customers returning to try new tastes and enticing new customers in.

Wild Pickings is typical of small NWFP companies in Wales and creates a full-time living from NWFPs by combining production and sale of goods with provision of experiences and services. An important element to Wild Pickings is the collaboration with other small businesses and organisations, whether selling the produce in the market, at food festivals or events, online or in the local shop. Working alongside other grassroots level sole traders ensures new audiences are introduced to the products, and helps all the businesses involved remain sustainable. This is vital in a rural area with a low population, and a heavy reliance on a seasonal influx of tourists.

Future plans are to develop Foraging Feasts in collaboration with

professional chefs and to expand on the Wild Food Café that have been a great success at local events, while continuing to use the shop as a base for making and selling products, and as a ‘window to the world’.

4.1.3. *Cooking from the meadow, AT*

Cooking from the Meadow is a service offered by one female nature park guide in the Nature Park Mürzer Oberland in the Austrian province of Styria. Austrian Nature Parks represent “cultural landscapes” that fulfil four functions: nature protection, recreation, education and local development.

4.1.3.1. Experiences. The foraging courses comprise guided walks in the nature park, during which participants are introduced to the richness of wild herb species and their morphological characteristics as well as health and medical uses. What makes this service unique is that participants pick wild plants and in the follow-up workshop session learn how to make various products out of them, such as smoothies, rice-dishes, preserved wild bulbs or a herb salt mix, which they can take home. Thus, knowledge of the plants along with ways they have been traditionally used and modern processing techniques is conveyed to the participants.

4.1.3.2. Innovation process. The guide is self-employed and has started offering foraging-courses in the Nature Park in 2000. Her first motivation is, in her own words, that she is a grandmother of two and always wanted her grandchildren to learn to enjoy the richness and quality of food that nature offers “by itself”. Her second reason is that her parents’ generation lived in war-torn Austria and her family had to learn to survive hunger periods by eating wild plants. Thus for her, it is important to transfer this knowledge to future generations, as she stated that it is unknown if “they might not need it in case there are future catastrophes and food shortages”. She is an expert on wild herbs and vegetables that grow in the pastures and forests of the Nature Park. Cooperation with the Nature Park was important for starting the business and reaching customers, and nowadays the foraging- courses are provided to a wide variety of customer groups (from school children to elderly groups). Those activities for children or elderly are also promoted by the Styrian government as part of promoting public health and rural businesses.

4.1.4. *Christmas tree adventure, AT*

Christmas tree production is an important part of the farm-forest economy in the Austrian region of Styria. The family farm Reisinger owns a property of 188 ha of which 16 ha are agricultural land with forestry as the main source of income. In addition to the traditional forestry and agriculture, the farm grows Christmas trees (mainly native spruce and fir). While these are usually marketed at stalls in the cities or by the farm houses, the young owner of the Reisinger farm developed a new model where the customers are invited to cut the trees themselves.

4.1.4.1. Experiences. “It is not the perfectly shaped, standard mass product (e.g. Caucasian fir) we offer. We, therefore, market them rather as a ‘Christmas tree adventure’. Our customers come to experience our farm”, the owner points out.

In this business model, the visitors come to the growing site and choose the trees they like and, if they want, they can cut them by themselves. The trees become “personalised” and the fact that the plantation holds mostly not-perfectly shaped trees is turned from a negative to a positive advantage for the business. The farm also offers summer visits, when customers can choose the tree which is then labelled and collected closer to Christmas. This provides an additional summer attraction to the area with concomitant benefits e.g. accommodation. The fact that the farm is located in impressive mountain scenery also contributes to the aesthetic nature of the experience. According to the owner, such an offering represents a unique possibility for customers who make it an activity for the whole family to spend

time in nature and pick their own tree. Thus the conventional custom of buying the Christmas trees is transformed to a fun, memorable activity.

4.1.4.2. Innovation process. The concept originated from the junior farm owner who got the idea during his studies in Vienna, where he discovered a desire amongst people living in cities to “get to know nature” and to have “unique” individual experiences in nature. He also found that “nature” to many of his fellow students was something different to his experiences of growing up and living in a rather remote area in Styria. He supposed that people living in the city might even be willing to pay for the experience of cutting their own Christmas tree. The farm is a member of the Styrian forest association “Waldverband”, and the trees are marketed via the association of Styrian Christmas tree producers “ARGE Christbaum Steiermark” “that offers a marketing label for certified domestic Christmas trees. All trees are sold directly from the farm.

5. Discussion

5.1. *Combined goods and services for new value creation through redefined utility*

Although a broad range of innovation types have previously been described - including product, process as well as institutional innovations (Weiss, 2013), the cases presented here with their combinations of product and connected experiential offer, form a specific innovation type and provide new insights into business potential in rural areas.

As described above innovative businesses often utilise combinations of different innovation types, for instance, the provision of a biomass-based district heating service stimulates the creation of a cooperative (product plus service plus organisational innovation) (Weiss et al., 2011) or when territorial labels are used for the marketing of NWFP (Belletti et al., 2007; Mantau et al., 2001; Vacik et al., 2020). In our cases the combined goods and experiences together make up the innovative product and this combination fundamentally changes the character of the offer. The NWFP in the case studies are not sold for their utility but as carriers for an experience which is demanded by the customers. Thus food products are transformed into an experience of nature, the willow baskets into transfer of traditional skills, and the Christmas trees into a family adventure. In all four examples, rural knowledge and skills have been connected with urban sensibilities, traditional products have been put into new market contexts and their value has been redefined through invoking intangible aspects of use. The core innovation aspect in the analysed cases is the conscious use of the cultural qualities of the traditional products in the marketing. In all described cases, the specific value of the NWFP lies in its embeddedness in tradition, social practices, customs and rely on local knowledge. Their unique “taste”, “spirit” or “experience” are the factors that make them distinct products. Preserving tradition and recognising cultural values of the region are important aspects that are valued and requested from customers (Ludvig et al., 2016a; Weiss et al., 2019). While Sidali et al. (2013) contend that traditional skills and expertise are part of the entrepreneurs’ offer (Sidali et al., 2013) and make an important part of the products’ value. These are peculiarities that respond to the perceived sense of “territorial identity” by customers and contribute to historical and cultural continuity. In our cases the process of co-creation by the provider and customers around the specific products and activities is profound and moves beyond a simple accretion of traditional stories to a product. This aspect is especially increasingly important with recognition that the weakening link between people and nature is prompting a search for practices or activities that reaffirm connections to place and nature (Sidali et al., 2013). The desire to go “back to the roots” is a prominent feature in rural tourism (Sidali et al., 2013) and provides connections to cultural traditions, local identity and nature (Weiss et al., 2019). Local production is also increasingly seen as a quality attribute (Kneafsey, 2010; Ray, 2001). Vedel (2010) emphasises

too that a large part of the value of recreational offers is based on something intangible and can be consumed directly i.e. you can ride a mountain bike trail by yourself but you cannot teach yourself something. Through the active involvement of the users, the offers in our cases become more similar to recreational activities, hunting/sport shooting or mountain biking, where experience aspects are more obvious and linked to a specific product e.g. carcass of the target of the hunt (Fischer et al., 2013; Mantau et al., 2001; Weiss et al., 2007). Even though it is apparent that the analysed activities in this paper are not themselves new (such as foraging to the people of Ceredigion or collection of wild herbs to the people in Styria), but the way they are offered in a new pedagogic and social context is new. These businesses succeed by riding the wave of new interest in personal interaction in the use of NWFPs and reveal new opportunities and ways of using goods coming from the forest. In the following, we analyse in more depth the experiential elements that make the new quality of the products, and the innovation processes behind them.

5.2. Four type of experiences in combination

Each of our four analysed businesses have at their center a material NWFP (willow, herbs, wild plants, Christmas trees), however, none would be successful without the accompanying experience and direct involvement of the customers in their “consumption”. When looking into the four types of experiences (Pine and Gilmore, 1999) it can be seen that in each case all four types of experience are, to a greater or lesser extent, involved (Fig. 2).

Entertainment plays an important role in all four cases as people spend time being active in nature and crafts. The educational experience is also prominent since most of the offered activities are courses, workshops or educational tours. Out to Learn Willow even reflects this aspect in its name. Foraging tours teach plants and their use while, more subtly, the Christmas tree farm reveals traditional farming to people from the city. Aesthetic aspects are introduced when customers enjoy being in sensory-rich, natural environments, such as forests or traditional farming landscapes. Customers' senses are particularly engaged in the collection of wild food and herbs and their preparation. Escapism is reflected in people's desire to spend time in nature, away from home,

and get actively involved in the activities that are offered - picking, cooking, willow weaving, or cutting the Christmas tree.

Although all four categories are mixed in all cases, the different businesses have their specific foci. Helles and Vedel (2006) explain that aesthetic and escapism aspects are hard to market and they are mostly an indirect part of an offering, compared to education and entertainment, which hold the greater attraction for marketing. This is supported in our cases as the marketed attraction is entertainment in the case of the foraging walks and education for the willow weaving workshops. For the escapist Christmas tree adventure, the experience is paid for through the product itself (i.e. sale of the Christmas tree) with the benefit for the farmer being the more intangible benefit of early and full order books which enhances income security. In all four cases, the aesthetic element is the immersive background giving added value to the services and education is implicit. An exception is the demand-led market for the educational aspects of the foraging and willow weaving offers in classes for schools, marginalized groups and other organised groups.

One generic disadvantage of NWFPs businesses, is the seasonality of the products. This is overcome in some of these businesses, by combining different types of activity, some seasonal with some which are not or shifting focus through the seasons. So Out to Learn Willow does living willow structures in the winter and basketry courses in other seasons. Wild Pickings and Cooking from the Meadow use a range of seasonal products, thus recipes and flavours change during the year. The tradition and customs related to Christmas trees is related to a specific season of the year, but the farm has extended this to a year-round business by offering summer visits to the farm. Furthermore, the work of producing the trees, requires activities at different times of the year and are easily coordinated with the other duties on the mixed farm. This all adds to distinctiveness which together with small passionate local producers are aspects that create territorial identity which is favoured by customers (Sidali et al., 2013).

5.3. Personal involvement and customization

All four innovations are micro-scale businesses and are developed by highly interested and motivated owners and this is an important factor contributing to the success of all these businesses. All the owners invest great passion into their work, as they all like their profession and strive to convey their knowledge to others. All of them recognised the potential in providing experience to people, compared to providing just a product, which according to them also represents a “sustainability

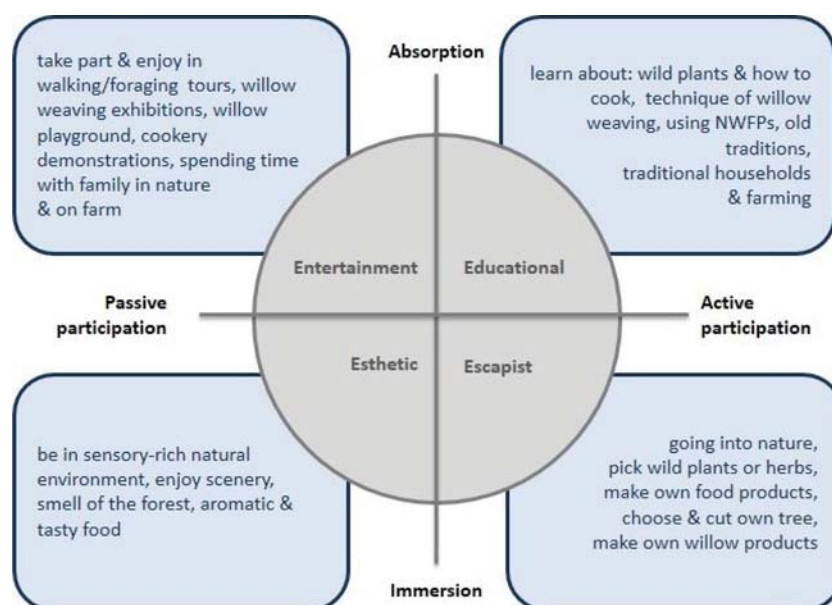


Fig. 2. Identification of experiences from analysed cases, using the categories devised by Pine and Gilmore (1998) and Chang (2018).

pathway for their business". Such enthusiasm on the part of owners has been shown to be important in several studies (Belletti et al., 2007; Ludvig et al., 2016a). This underlines that the environment-related resources that underpin such offers are not just material (e.g. herbs, plants, trees), but are also of an immaterial and collective nature (Sidali et al., 2013; Vedel, 2010), such as learning about handicrafts or oral knowledge-transfer on traditional practices of cooking or use of herbs in our cases.

All these businesses work across generations and sectors of society. Each of the businesses is developing a variety of offers tailored to different target groups. This creates a close connection between business owners and customers, and between customers, which reinforces the "sense of belonging" (Sidali et al., 2013) and contributes to creating memorable experiences. The home-made character of many of these products (e.g. food specialties, artisanal products) and their relation to the regional and cultural traditions create memories which are difficult to forget (Pine and Gilmore, 1999) and there is a personal intimacy attached to these products (Ananieva and Holm, 2006).

Belletti et al. (2007) explain that rural tourists show higher willingness to pay for embedded food specialties in experiences because the maximum satisfaction of such products can be gained in situ. Sometimes customers are willing to drive many kilometres to participate in such activities (Murray, 2011). In the Austrian examples, a significant share of the customers of the Cooking from the meadow and the Christmas tree farm come from the larger cities, even for one day. Creating authenticity is exactly what the experience economy approach is promoting (Pine and Gilmore, 2014). Marketing of experiences therefore, needs to become place making, where firms simultaneously showcase authenticity and generate demand. Authenticity is also created through customization, which also helps firms to escape the commoditization trap. Customization transforms an experience to make them individual and personal to the customer (Pine and Gilmore, 2014). In each of the analysed businesses, we see that the owners are aiming to respond to demands and provide a specific offer to every user group, thus no two courses or workshops or visits to Christmas tree stands is the same. The content is created through the joint contribution from users and providers of the experience.

Most of the attributes of the analysed businesses which are innovative remain outside ownership rights and can be considered as an open access regime. Use of herbs for cooking or the practice of foraging are public goods, and the workshops themselves take place on public access land. Christmas tree and willow plantations are excluded from public use, as they are established on the private or community ground which thus makes these businesses exclusive to their owners. The level of excludability therefore, depends on the nature of the goods upon which the experience is based, as well as the tenure and rights to access land. Public access to private forests varies across Europe and determines national levels of excludability (Vedel, 2010). As Bouriaud (2007) wrote, the current system found in small-scale forest holdings in Europe is dominated by the weak partition of property rights, which is not always favourable for creating businesses, as it does not provide security (e.g. for generating income). However, stricter formalisation of property rights of wild NWFPs and their use would also include a creation of institutional structures that may lead to commercialization and commodification of some of these resources, which is not always favourable and could be highly contested (Martin-Ortega et al., 2019). Therefore, moving the focus to personal enrichment and creation of experiences through NWFP seems to be more favourable than commodifying the products.

The creation of the specific experiential offer is to a higher or lesser degree achieved by using public goods. The traditional knowledge in willow weaving or foraging and the Christmas tradition and mountain forest scenery are public goods and are transformed into marketed personal experiences but without privatizing the public good as a whole. It is the customization that creates private value from public goods while keeping them public. This works as long as the carrying

capacities of all others involved are not exceeded, for instance, when more plants are picked than reproduced, when the attracted visitors would compete with local pickers, or when the places become so crowded that the experience of nature deteriorates.

5.4. Innovating in local ad-hoc networks

Looking from the innovation system perspective, cooperation with various types of institutional stakeholders in the region (such as regional or local authorities, nature conservation agencies, schools, tourism organisations, branding agencies, etc.) was important in all cases. Support from regional organisations plays an important role in the innovation and perhaps even more in the promotion of the businesses. Regional actors such as tourism organisations, educational organisations, forest associations and nature parks most often willingly support local innovative activities and promote them as part of regional offerings, or provide a market for the business (e.g. schools). Most of the support to the companies came from a range of local sources for specific purposes, depending on the business, rather than through the formal innovation or business support programmes or institutional networks, a pattern which has also been observed for other small rural businesses (McKitterick et al., 2016). Although Out to Learn Willow, the business was supported by regional funding programmes, such as the EU LEADER³ instrument, specific sectoral support for the development of NWFP-based experiential products was notably lacking. This is not surprising given previous observations no support was available for NWFPs altogether (McKitterick et al., 2016; Rametsteiner et al., 2005; Weiss, 2013). Christmas tree production in Austria which is supported by forestry institutional actors is an exception since this product is regarded a genuine "forestry" product. The specific innovation in all our cases, arose as the sole idea of the owner in response to their own experiences. Our results generally support the finding that NWFP innovations are occurring in regional-level and cross-sectoral ad-hoc networks and are hardly supported by established innovation systems (Kubeczko et al., 2006; Weiss et al., 2019). Usually the development of these enterprises is driven by the proprietor who actively looks for necessary knowledge and information, utilise or create networks on their own initiative and self-fund their activities (Ludvig et al., 2016a; Živojinović et al., 2017). Our cases fit in the picture in that the institutional support is rather erratic but that even the small amount of support received by these enterprises had important impact on their success. The strengthening of regionally focused, cross-sectoral support tools would help the development of this kind of innovation. Appropriate tools include flexible, enduring, regional innovation or business support or empowerment structures such as the EU LEADER instrument or the Nature Park Association in Austria (Weiss et al., 2017, 2019).

6. Conclusions

In this paper, we analysed the success factors behind four innovative business cases in rural areas that combine the provision of NWFPs with particular experiences, through which they create unique and memorable experiential offers for their clients. The most significant success factors are mostly found in the entrepreneurial spirit, enthusiasm and creativity of the business proprietors, and less on institutional support. This is the essence of successful entrepreneurship (Nybak, 2009b; Ludvig et al., 2016a). Our cases also identify strategies which will limit

³ The term 'LEADER' originally came from the French acronym for "Liaison Entre Actions de Développement de l'Économie Rurale", meaning 'Links between the rural economy and development actions'. LEADER is a local development method which has been used for 20 years to engage local actors in the design and delivery of strategies, decision-making and resource allocation for the development of their rural areas (https://enrd.ec.europa.eu/leader-clld_en#_edn1).

risks such as slow growth within the means of the company i.e. without loans. The owners creatively developed their products, as an adaptation to natural conditions (local availability and seasonality of species) with close attention to their clients' demands and fine tuned recognition of customer segmentation (e.g., varying offer for specific customer groups). A specific success factor is the connection between the producers and the clients in the co-creation of the experience. Our case examples indicate that such businesses may develop in quite varying economic, social and institutional settings but further research into the roles of socio-economic framework conditions and property rights may contribute to a better understanding of factors for success and options for transporting successful examples across regions or sectors.

The specific innovative quality of the products lies in their redefined utility as traditional goods are put into a new context. The entrepreneurs were able to recognise and commercialise experiences accrete onto traditional NWFPs. Although educational and entertainment were the marketed experiences, all four types of experiences described in the literature (Pine and Gilmore, 1998) could be identified in each of our cases.

Although we make our case based on these four examples there are numerous additional examples of experiential NWFP products from the StarTree project (e.g., Ludvig et al., 2016a, b; Ludvig et al., 2018; Živojinović et al., 2017; Weiss et al., 2017). This form of marketing appears to be pervasive and we see the marketing of NWFPs through their experiential qualities to be a basic factor in the resurgence of interest in NWFPs in Europe. Along side potential growth of such activities, we come to two issues: the extent of their potential contribution to rural development, and their possible growth limits. For us, connecting traditional products to new societal values represents a counter trend to the decreasing competitiveness of NWFP commodities. We interpret the presented examples not as niche activities but as examples of a larger trend with future potential. This runs alongside other trends of re-defined values and utility of traditional products, for instance, under the concepts of territorial goods and services (Slee 2011) or territorial marketing (Pettenella et al., 2007). Although our presented examples are micro businesses, the same principle also lies behind industrial-level activities (e.g., renewed pine resin production in Spain by Resinas Naturales S.L.) or regional marketing activities around products such as chestnuts or mushrooms with sometimes enormous regional impact (Wolfslehner et al., 2019; Vacik et al., 2020). We do not argue that a few new business models should be upscaled for greater impact but that the presented examples illustrate a principle which drives many new rural entrepreneurship activities and which is effective on a larger scale. The impact is generated by the sum of numerous businesses around different products and less by the replication of the same activity. Limitations arise when rural-based supply and urban-based demand do not meet. This is found in remote rural areas when urban markets (including tourist streams) are too far or in peri-urban areas or touristic centers where demand may be overwhelming and put a strain on natural production limits. However, we have not yet found any examples of experiential NWFPs that go beyond ecological carrying capacity. This market trend offers important synergies in rural development. Even though some of these businesses have been recognised and supported to some extent by local authorities or semi-public organisations, there is an evident lack of institutional support for the development of similar businesses. Networks are an important feature of each business but these are self-generated and maintained and there are few examples of support from policy programmes, formal innovation systems or the sponsored networks associated with them. Innovation policies and support structures would, however, be important for mainstreaming or diffusing the businesses, innovations and knowledge (Ludvig et al., 2016b; McKitterick et al., 2016; Weiss et al., 2011). To facilitate development of the sector, companies may benefit from various types of measures, including information services, training and advice, networking and financial support (Rametsteiner et al., 2005; Ludvig et al., 2016b; McKitterick et al., 2016; Weiss et al., 2017).

Regional, cross-sectoral support structures that are flexible enough to pick up local, bottom-up initiatives and provide tailor-made support for the specific needs of the companies would be ideal model for supporting those innovations (Weiss et al., 2017). This can be seen in the example of Out to Learn Willow which was one of the successes of the 'Willow in Powys' Leader programme in Powys, UK.

Besides contributing to the users' satisfaction and experience as well as the business owner's prosperity and success, our four businesses also contribute to the wider community. They all contribute to the local communities' visibility and recognition, and play a key role in preserving cultural and traditional values of their regions. The bond between business owners offering such experiences, with consumers and society, as well as with traditional, regional and cultural values is a crucial part of their success. Thus they can be classified as social innovations (Neumeier, 2012; Ludvig et al., 2018), because they affect the process of social interactions and inadvertently improve well-being of specific rural communities (Hubert, 2010).

In this paper we show that creative approaches in traditional sectors, such as forestry, can have future potential. For forest owners, NWFP businesses may increase profitability through diversification or in collaboration with rural entrepreneurs. In this light, cross-sectoral exchange would be an important element in rural or forestry innovation strategies (Rametsteiner et al., 2005). Furthermore, the role of consumers must be given a more prominent place, as co-creators of the value added to the products. Consumer or user-oriented innovation approaches seem promising as innovation strategies. Detailed analyses of societal drivers affecting the supply and demand sides are also needed. In-depth analytical studies on the role of potential factors (demographic changes, changes of lifestyles, changes in purchasing power, etc.) to the creation of experiences could help in understanding better this topic. Further research would also benefit from the analysis of user perspectives regarding such businesses. A well-being approach may also help shed light on value of the multiple benefits to consumers arising from participation in NWFP experiences.

The cases used in this paper are not unique to rural areas, neither for NWFPs, nor for these two selected countries which represent quite different forestry and institutional settings. New uses and new marketing strategies for NWFP and services have been observed from many European regions (Mantau et al., 2001; Rametsteiner et al., 2005; Weiss et al., 2007; Ludvig et al., 2016a, b; Nybakk et al., 2009a; Živojinović et al., 2017). They could thus be relevant to many countries in Europe where traditional forestry, as well as rural development is facing challenges and increased unprofitability of so far traditional products. The cross-sectoral nature of experiential offers also points to the need for their recognition by various sectoral policies, such as forestry, nature conservation, tourism, or food. Strengthening of support systems, such as the creation of specific financial instruments, marketing or

branding schemes, vocational education and training and information exchange tools, could contribute to mobilise the largely untapped potential of these NWFPs experiences.

Authors statement

I.Ž. undertook the work in overall research design and conceptual framing, case selection, data analysis, writing the paper and lead the work on the revision of the paper. A.L. and W.G. contributed in conceptual framing and design. M.W., J.W., A.L. contributed to the collection of data in single countries, and writing up specific parts on the country contexts. All authors contributed to overall paper writing and improving the paper based on external reviews. J.W. did final proof-reading of the paper and English corrections.

Declaration of Competing Interest

Authors of this paper declare no conflict of interest.

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Appendix A. Supplementary data

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ARTICLE 8

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New Values of Non-Wood Forest Products

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Abstract: The role of non-wood forest products (NWFPs) in industrialised country economies has declined in the past, but they are generating renewed interest as business opportunities. In a forest-based bio-economy frame, NWFPs can contribute to human nutrition, renewable materials, and cultural and experiential services, as well as create job and income opportunities in rural areas. Applying a service-dominant logic (SDL) approach to analysis of NWFPs, this article aimed to understand how new goods and services are co-created through networks of public and private actors in specific institutional, social, and cultural contexts. This focus sheds light on the experiences associated with NWFP harvest and use, revealing a fulsome suite of values and economic opportunities that include but are greater than the physical goods themselves. Turning the SDL lens on in-depth case studies from Europe and North America, we show dimensions of forest products that go beyond commercial values but are, at the same time, constituent of commercial activities. SDL provides a new view on customer relations, service provision to businesses, and policy measures for innovation support for non-wood forest products.

Keywords: non-wood forest products (NWFPs); non-timber forest products (NTFPs); service-dominant logic (SDL); value creation; innovation; actor networks; case studies; industrialised countries

1. Introduction

Modern forest management systems prioritize market-oriented timber production and tend to neglect other forest goods and services, including non-wood forest products (NWFP) [1–3]. NWFPs, such as pine resin, mushrooms, and herbs, among others, retained some importance when there was an industrial demand of national importance [4,5]. They also kept a role in informal collection for local subsistence uses and supplementary household income [6–8]. Forests have been used by rural communities for various purposes, in which timber has been only one among a range of other commercial and non-commercial goods or services [9]. With increasingly globalised economies, production of NWFPs often declined in industrialised countries when they were not competitive with products from countries with cheaper labour costs, intensified production in agricultural systems, and substitution products of petrochemical origin [10,11]. The very terms “non-wood” or “non-timber” (in non-wood forest products or non-timber forest products, respectively) indicate their secondary role in forest management and policy [12,13], as do other expressions applied to them including “secondary”, “side-products”, or “niche markets” [14]).

In contrast, the trend towards bio-economy suggests a potential for an increasing role for NWFPs in future forest-based value chains. In a forest bio-economy context, the role of forests is broadened from timber production to the use of various wood and non-wood materials and provisioning of

forest ecosystem services, as well as energy production and materials used in recycling processes [15]. Although the future role of forests in a bio-economy is often primarily envisioned as resulting from cultivated species, industrial uses, and intensive production systems, we argue that NWFPs have and will retain broader commercial and non-commercial roles and deserve greater attention.

There are indications of a revival of NWFPs as a result of various social trends that are creating new demands for wild and natural products, traditional skills and production methods, retro styles, experiential products, and healthy and sustainable lifestyles [11,16,17]. In this context, NWFPs are often specialised custom-made products and are increasingly marketed as well-being products embedded in recreation or educational services or as products that include experiential services such as guided tours, fairs, or events [10,11,16].

Managing for such values would be a significant departure from the prevailing practices of the professional forestry sector. That NWFPs have long and continuous histories of use notwithstanding, marketing in the modern context transforms them into new types of products, even as it may retain and reinforce some of their traditional values. As such they represent innovations in forest bio-economies that, we propose, can be studied from the perspective of value co-creation and service-dominant logic (SDL; [18]) to reveal their full value and characteristics [16,19]. Doing so enables equal consideration of all benefits from forests, including strong connection to consumers [20], bringing into focus important values of forest products that are missed in more conventional analyses of marketing and innovation.

In this article, we used service-dominant logic and a value-based approach to analyse NWFPs. Through in-depth case studies from Europe and North America, we examined networks of actors that co-create value in distinct institutional, social, and cultural settings. We aimed to better understand the full value of NWFPs and how they are developed. We also derived conclusions and recommendations for better support of innovations in NWFPs.

2. Value Creation and Innovation in Non-Wood Forest Products

2.1. Innovation Potentials for Non-Wood Forest Products

NWFPs comprise a wide range of materials for various kinds of uses. Value chains differ between products and may be organised very differently in different countries [17]. In addition, business models for their commercial utilization vary greatly, depending on the type of product and depending on the type and size of land ownership. In spite of these variations, we can identify some common features that characterise their value and that are relevant for business opportunities and innovation. For NWFPs that are collected from the wild or from forests managed for timber, the share of non-commercial picking and the share of small or micro-businesses is larger than for those from plantations or specialised management systems. Picking may be done by land owners or non-land owners, on the basis of licences or everypersons' rights. Collecting, processing, and marketing is often done by small- or medium-sized enterprises. There may be limited incentives for innovation or targeted management because the harvested products do not always contribute to the income of the land owners, for example, when consumers pick for their own consumption or when enterprises pick on the basis of everypersons' rights. Land owners do benefit when they are paid licence fees for picking permits or when they engage in harvesting themselves. They achieve a higher value added when they not only sell the raw product but also process them or even market the final product [17].

A range of standards and certification schemes, such as organic certification, wild products certification (e.g., FairWild), sustainable forest management certification (e.g., FSC - Forest Stewardship Council and PEFC - Programme for the Endorsement of Forest Certification), or certification of socio-economic aspects (e.g., FairTrade) are applicable to these products, and may increase their value. Some schemes are developed by public entities, such as the European Union "origin, geographical indications and traditional specialties schemes". The European labels Protected Designation of Origin (PDO), Protected Geographical Indication (PGI), and Traditional Speciality Guaranteed (TSG), which protect the name of products that come from a specific region and follow a particular traditional production process. Several NWFPs, such as chestnuts, nuts, mushrooms, and

berries have been labelled with these schemes, attesting the EU effort in promoting these products [17].

NWFPs often have the characteristics of territorial goods [21]. Their production is bound to certain areas or places, and they carry strong material of symbolic regional associations, such as a special regional flavour. Although this may limit their production volume, it also provides special marketing opportunities [17,21–23]. When a product is embedded in offers with other goods or services (e.g., in territorial marketing models), targeted governance or marketing strategies such as regional picking licences or marketing labels may be useful or necessary [14,17]. Involvement of consumers in production processes is also gaining importance. Consumer engagement may range from no involvement (i.e., commodity mass markets), to indirect involvement (i.e., territorial and niche products), direct involvement (i.e., experiential products), and personal collection (i.e., for gifts or personal consumption) [11]. An important innovation trend in NWFP is in non-commodity, personalized products [10,17,22]. Examples include high-quality, high-priced, small-scale, and/or manufactured food and drinks; handicraft items; and one-of-a-kind artisanal products. Often, marketing of these products emphasizes non-material symbolic qualities connected with green, healthy, and sustainable standards; local or regional traditions; and hand-made or artisanal production. They have experiential qualities in and of themselves or are marketed together with experiential services such as foraging or mushroom collection tours, wild fruits cooking courses, or handicraft workshops [16]. Marketing, these products and experiences requires largely rural producers' to understand predominantly urban consumers' preferences and value systems.

There are manifold challenges connected with NWFPs. Seasonal availability of the products and interannual fluctuations make systematic development of a business and the development of stable market channels difficult. Property rights are not always clear and can present challenges for business development where the public have the right to collect on public and private land for personal use or commercial purposes [24]. Doing business in the agro-food sector may be difficult for small enterprises faced with increasing sanitary regulations and traceability standards, as well as business and tax rules. In addition, there is limited attention from existing (agricultural or forestry) innovation systems to this business field [2,25,26]. Innovation systems for primary sectors such as forestry typically direct efforts towards rationalisation rather than diversification or higher value products [27–29]. They may even create barriers when established actors direct the means of support towards their own activities or business fields and pursue defensive strategies in the face of other interests or products [30]. Because NWFPs have largely not developed into a major sector, support structures for them such as the provision of statistical data, research, education, training, and advisory services are limited. Exceptions are chestnuts, cork, and truffles, for which interest organizations with significant institutional capacity exist beyond regional levels. In some cases, however, regional entities do provide support [12,19,22]. Interest groups for NWFPs or wild harvesting are rare. As a result, enterprises in the field of NWFPs often develop their businesses with little or no support from institutional actors [31]. These businesses often stay small and diffusion of new market ideas is poor or slow [12,31]. Business development and diffusion could benefit a lot from advisory support, networking, or financial grants [3,12,31–34].

NWFPs have diverse values, derived from both non-commercial and commercial uses, and dependent on geographical and historical contexts. To more fully understand their value, we need to examine their cultural and experiential dimensions. For such an analysis, we employed the value creation [35,36] and service-dominant logic approaches [18].

2.2. Applying SDL to Non-Wood Forest Products

Conventional goods-dominant logic posits the exchange of products (goods or services) as the primate factor in understanding of economic activities. In contrast, service-dominant logic (SDL) suggests seeing the exchange of service as the common denominator in the analysis of markets [18]. In this value-based analytical approach, service is understood as the process of using one's competences (knowledge and skills) for the benefit of another party [20]. Services (in plural) are a product just like goods, but service (as used here, in singular) is a different concept. In goods-

dominant logic, value is a property of goods and services, and is created by the producer. SDL value manifests itself only in use. Value is collaboratively co-created with the beneficiary and the beneficiary is, therefore, always an agent in value creation [37]. Value is personal and experiential. That is, it emerges from the activities of market exchange and encompasses both lived and imaginary experiences. It is, thus, socially co-constructed through direct and indirect interactions [35]. The beneficiary (the customer or user) needs to integrate the good or service from one provider with other resources obtained through the market or by other private or public sources [18]. This is a ubiquitous phenomenon that does not require direct interaction between the producer and the beneficiary [37]. Value is always defined in specific social contexts that are constituted by complex, reciprocal links between unique sets of actors [38]. On the micro level, two active participants serve each other directly in the service-for-service exchange. This direct exchange process may take place within complex networks and contexts at meso and macro scales that may include multiple indirect exchange processes. In addition to a firm and its customers, a range of private and public actors are part of wider actor networks that contribute to value creation processes [39]. The value co-creation approach of SDL proves useful in the analysis of services and innovations in the forestry sector [16,40–42]. Here, we applied it to analysis of NWFPs [22].

Applying SDL brings the experiences associated with NWFP harvest and use into focus, together with the material goods, and reveals a more fulsome suite of values and economic opportunities. This systemic view has implications not only for better analytical understanding of the roles of actors but also for managing value creation in practice and providing services for NWFP businesses [43]. In addition, innovations in service provision may come through new self-understanding entrepreneurs see themselves as operating within a system of actors and in evolving institutional contexts.

3. Methodical Approach for Studying Value Creation in Wild Forest Products

This article developed a conceptual model for analysis of NWFPs from an SDL perspective (Section 4.1) and applied it to three case studies in their regional and social contexts (Sections 4.2–4.4). The analyses drew on our expert knowledge of business practices and innovations in wild harvests and foraging in Europe and North America (e.g., [3,7,12,16,17,34,44]), as well as the literature on NWFPs, SDL, and value co-creation.

The case of maple (*Acer saccharum*) syrup production in the USA illustrates the diversity of values and actor networks that may develop around a single NWFP. Case studies from Austria (various wild species) and Italy (chestnuts, *Castanea sativa*) focus on the role of institutional structures that support utilisation of forest products. The latter two cases involve not only producer associations, but also associations that integrate different types of actors, including producers and consumers (in the Austrian Nature Parks, with its origins in the consumer sector), as well as public and private actors (in the Italian regional chestnuts association).

The analytical model and empirical analyses include the following elements: (i) actor networks, including human and nonhuman, direct and indirect, commercial and non-commercial, public and private network participants; (ii) cultural, social, economic, and institutional contexts; and (iii) micro, meso, and macro levels.

Data for the case studies in Austria and Italy were collected in the frame of a European Union research project (StarTree; <https://star-tree.eu/>), which conducted in-depth case studies and action research on NWFPs. The Italian chestnut case was based on the analysis of five semi-structured interviews with innovators and representatives from producers associations, as well as literature and document reviews. The analysis focused on the roles of companies, actor networks, innovation processes, institutional frameworks, policy means, and fostering and impeding factors within historic and regional economic and social contexts. The Austrian Nature Park case also was part of the StarTree action research project and focused on the sale of wild forest products to enhance farm incomes through the Nature Parks labelling scheme. The action research included a producers' survey, two initial scoping workshops, and business development processes in three different Nature Parks [45]. The U.S. case study drew upon two decades of research on maple syrup [46–49].

4. Co-Creation of Value in Non-Wood Forest Products

4.1. Service-Dominant Analytical Model for Non-Wood Forest Products

Economic analysis using the value co-creation and SDL approach places primary attention on the service created for the customer, rather than the goods that are produced and marketed. Thus, the focus of analysis shifts from production and distribution of material goods to the creation of value through interactions between individuals and institutions in specific contexts and on various scales [18,20,38]. In the case of NWFPs, this includes a look at biological materials, practices and experiences associated with their harvest, processing, and use, and the values emerging from these. It places emphasis on foragers (also sometimes referred to as collectors, gatherers, harvesters, and pickers), chains of connection, and networks of exchange flowing from them.

Seen through the SDL lens, gathering NWFPs is a knowledge-intensive practice through which networks of human and nonhuman actors co-create value from forests. The basic network of actors includes (Figure 1): (a) forests, forest plants, and fungi; (b) family forest owners; (c) forest managers (who may or may not be the owners); (d) foragers; and (e) foragers' personal, professional, and business social networks. Where foraged items or products made with them are monetized and distributed beyond the forager's personal social network, additional actors (also referred to as beneficiaries) will include individuals who might be thought of as consumers and any individuals in a market chain between the forager and the consumer. These intermediaries may include producer associations, equipment or service suppliers, wholesalers, and retail outlets (micro-scale).

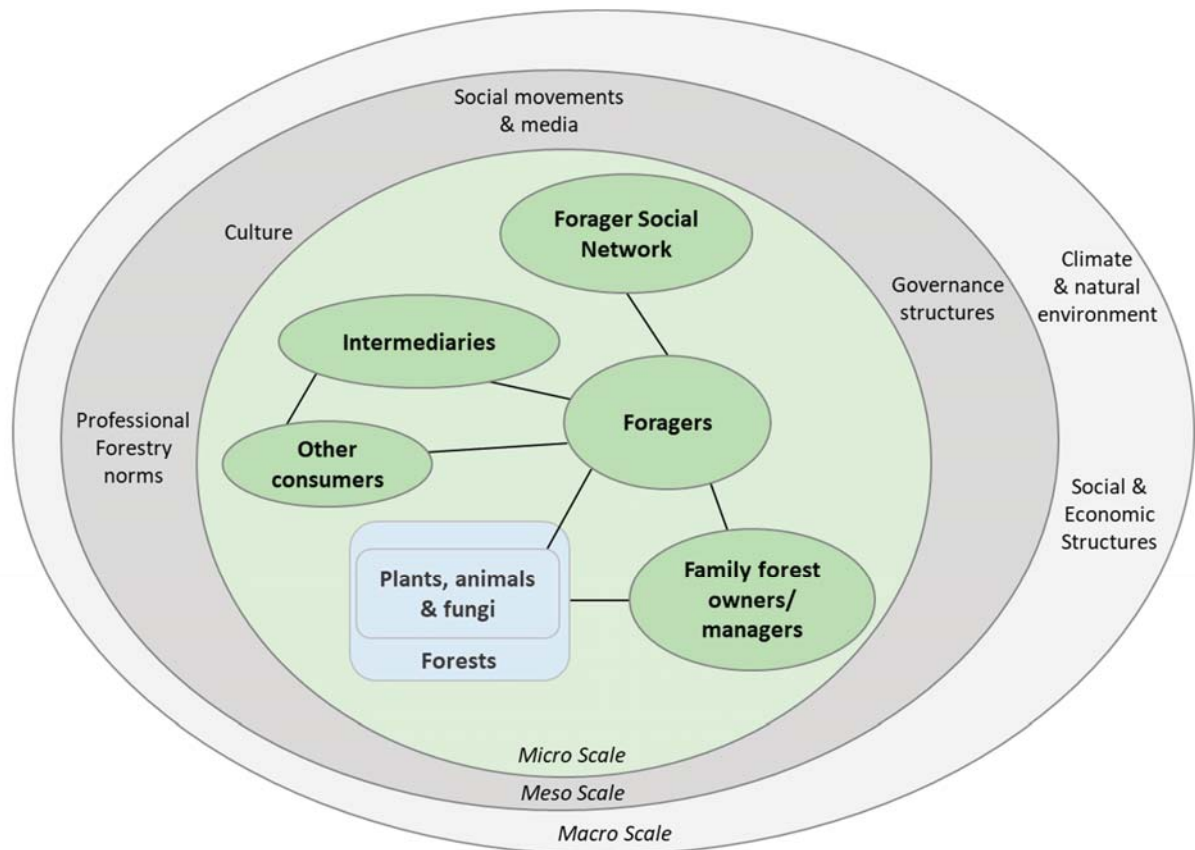


Figure 1. Non-wood forest product collection through a service-dominant logic lens.

We include forests, forest plants, and fungi in our analysis of actors. Scholarship in the tradition of actor network theory has highlighted the agency of nonhuman entities by analysing the ways in which, rather than serving as passive backgrounds or solely as things to be acted upon, the

characteristics of plants, fungi, and animals interact with humans (and other nonhuman actors) to produce particular outcomes. Without anthropomorphizing them by attributing intent, this conceptual approach recognizes that the behaviours and properties of plants, fungi, and animals influence the outcome of human interactions with them. According to Jepson, et al. 2011 their characteristics have the “capacity to produce a phenomenon or modify a state of affairs” [50]. While noting they are important actors as consumers and distributors of forest plants and fungi, wildlife are outside the scope of this analysis.

The material of plants and fungi are essential but insufficient to the production of value from NWFPs. Rather, SDL brings into view the value derived from interactions between foragers and plants and fungi, as well as between foragers and other people with whom the practices of foraging bring them into direct or indirect connection. The meso- and macro-scale contexts of these interactions also play a key role in the co-production of value by actors by, inter alia, contributing to the creation of meaning from foraging and use of foraged materials and by serving to facilitate or create barriers to these experiences. The meso scale includes important institutional elements such as governance structures, advisory services and professional organisations, cultural and professional norms, or social actors or movements. The macro scale includes the ecological, institutional, social, and economic environments that condition populations and distributions of foraged plants and fungi, terms of access to them, and their commercial and non-commercial use and value in society.

Research in locations around the world shows that among the values produced by interactions characteristic of human foraging for NWFPs are food and other material uses, connections to nature, health and well-being, and economic benefits, including non-monetized economic benefits [51]. In other words, foragers integrate (or mobilize) plant materials and fungi with their competences (knowledge and skills), time, and labour to produce value. The values that emerge are both material (e.g., food, medicine, artisanal materials, etc.) and experiential (e.g., time spent in nature, further competence development), with the experiential values also offering tangible material benefits in the form of health and well-being [52,53].

4.2. Maple Syrup Production in North-America in Four Contexts

Maple syrup is an iconic forest product of north-eastern North America [47,54], produced by collecting and boiling down the sap of sugar maple (*Acer saccharum* Marshall). Sap collection and boiling occur when freezing nights and above freezing day-time temperatures result in transport of carbohydrate-rich fluids from the roots to the branches of sugar maple trees. Sap is collected by tapping into the bole of the tree and allowing the liquid to accumulate using technologies as varied as open buckets and vacuum tubing. Processing technologies have a similar range of labour and capital intensities from boiling in an open pan over a wood fire to use of reverse osmosis equipment to remove water and concentrate sugars in the sap prior to further processing in an evaporator.

Often referred to as sugaring, the micro-scale contexts of this practice include cultural maintenance, hobby, supplemental income, and commercial production (Figure 2). SDL applied to sugaring reveals networks of actors whose interactions create meaning and value, as sap is converted to syrup and makes its way through chains of connection to people both geographically close to and far from the forests where it originates.

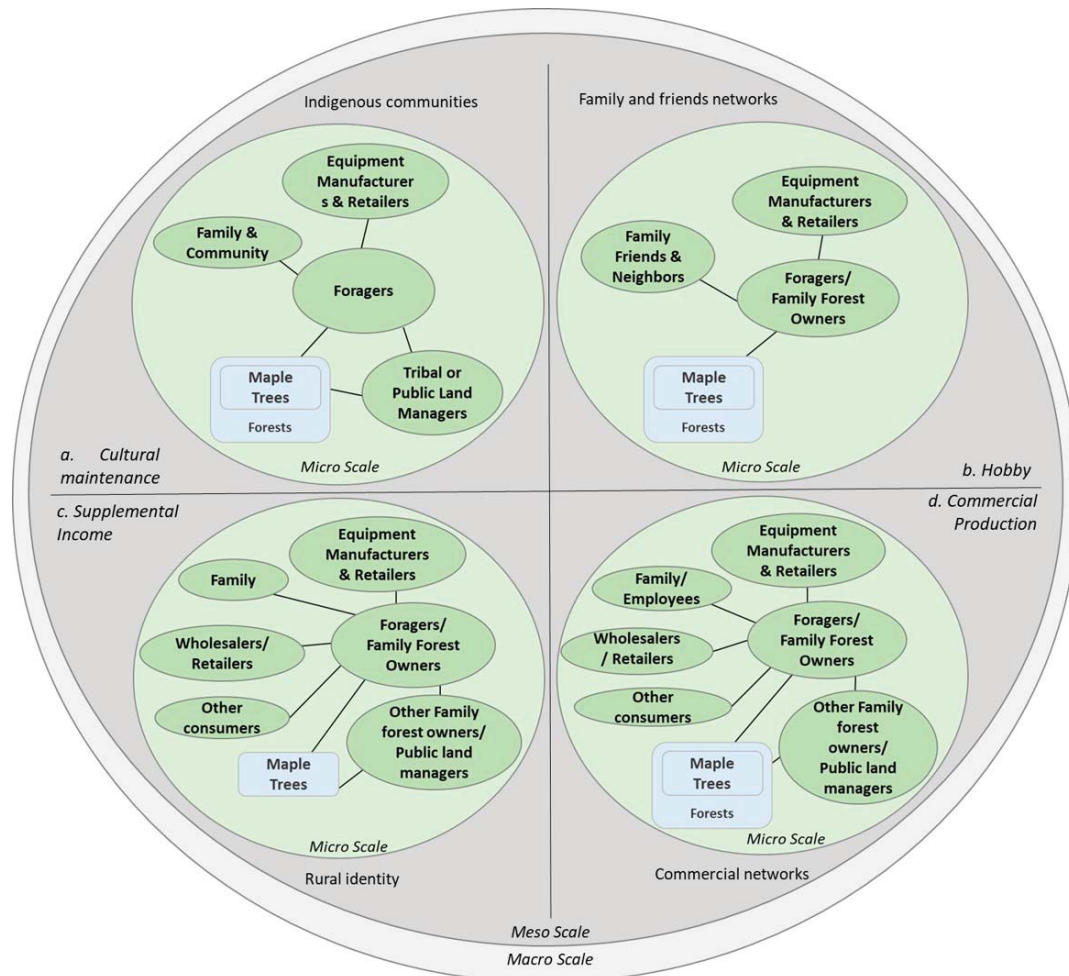


Figure 2. Maple syrup collection in four contexts: actor networks in sugaring as (a) cultural maintenance, (b) hobby, (c) supplemental income, and (d) commercial production.

Cultural maintenance: Maple trees are a cultural keystone species [55] for north-eastern North American indigenous peoples, and sugaring continues to be an important practice for many Native families (46). Sugaring brings together multiple generations to mark a key moment in the seasonal cycle that provides fundamental grounding for many aspects of indigenous culture (Figure 2a) [56]. Through tapping maple trees and processing maple sap, older family members help youth learn to read weather and forests. This time also is an opportunity to impart traditional teachings about what it means to be a member of the community and how to live in a good way. The beneficiaries extend beyond those who participate in the process itself, as older members of the community and others who may not be able to get out in the woods will be provided with maple syrup or sugar. Among the many values resulting from sugaring in this context, indigenous identity is sustained through production of a culturally significant food, which is part of observing rituals and other traditions. Likewise caring for and maintaining extended social networks through sharing syrup supports the fabric of indigenous communities.

Hobby: Many people who engage in maple sugaring do so as a leisure or recreational activity. More than 20% of respondents to a survey of members of a maple sugar producers' association reported their sugaring operations are for hobby purposes [49]. A majority indicated bringing together family, friends, and neighbours is a key benefit of their sugaring operation. In addition to being fun, maple sugaring motivates these people to get out in the woods and experience the transition from winter to spring. Social cohesion, a sense of emotional wellbeing, and connections to

nature also are important values for them. Reported uses of the syrup produced in this context include self-provisioning, gifts, and charitable donations, indicating that beneficiaries of hobby sugaring extend beyond those who participate in collecting and boiling maple sap to the larger social networks of hobby maple sugarers.

Supplemental income: For many sugarers, producing and selling maple syrup is a strategy for managing economic risk and coping with seasonal income flows and labour demands [47] (Figure 2d). Thus, for example, someone who has access to forests with a high concentration of maple trees and has regular but seasonal employment in construction or tourism can use sugaring to help fill out the work year. Sugaring also plays a role in defining rural identity in the region where sugar maples are an important forest species. As such, sugaring both emerges from and creates community culture, connecting people to place and each other as sap is harvested, processed into syrup, and sold by people who gather year after year to do so. For some, the social relationships thus developed and maintained may have value regarded as commensurate with the income.

Commercial production: Owners of large sugaring operations stress their economic purpose but also note social and cultural values from them [49] (Figure 2d). Large producers generally own significant forested lands (average of 117 acres in the survey cited above) and are more likely to have invested in high technology equipment. In many cases, they lease the right to tap maple trees in woodlands owned by others and may purchase sap from additional sugarers to augment their own production. Thus, their operations may involve chains of connection to multiple forest owners and forested areas. The distribution of syrup produced by these large commercial producers frequently connects to geographically extensive networks of exchange, as they may sell through wholesalers and retail stores. Although income is the central goal, it is not the sole benefit. These producers also place a high value on bringing together family and friends, as well as maintaining a family and/or cultural tradition. Other factors that are important to them include getting outdoors, preserving the craft of sugaring, and connecting to land. Thus, commercial production of maple syrup produces important relational values in concert with economic benefits.

Although our emphasis here is on the network of actors at the micro scale, each of these cases is embedded within meso- and macro-scale contexts. Although some specific elements in these scales may vary between case studies, general patterns and processes are similar. At the meso scale, professional forestry norms are a factor in shaping forest composition, including the presence, age, and health of sugar maple. Land tenure systems and governance structures affect who has access to those maples for sugaring. Social movements and media extolling the virtues of natural products can affect perceptions of the qualities of maple syrup by individuals far from the forests and processes that produce it, creating both meaning and markets for it. Likewise, culture may imbue maple syrup with special meaning for those who make or consume it. As the case study descriptions suggest, (re)production of identity is salient at both micro and meso scales. Whether Indigenous or European-American, many sugarers are self-consciously enacting their identity through maple syrup production (micro-scale), drawing on knowledge with strong identity or cultural associations (meso-scale) to do so. At the macro scale, sugaring depends upon climate, requiring diurnal freeze-thaw cycles. As with all forest products, larger social and economic structures influence the distribution and exchange systems available to harvesters who produce maple syrup. Thus, for example, national policies may influence the conditions of international commerce in sap and finished syrup.

4.3. Nature Park Specialities—A Label for Integrated Landscape Management and Marketing

Austrian Nature Parks are a specific legal category of protected areas, which are usually managed by associations of local stakeholders such as municipalities, tourism boards, and land owners (Figure 3). They aim to preserve cultural landscapes through an integrated development approach that combines nature conservation with sustainable use of natural resources. For this purpose, they promote traditional, environmentally friendly forms of land use and offer various forms of support for land owners which include information, awareness raising, and training, as well as regional marketing of the Nature Parks, tourism, and educational activities. Environmental education includes, among other activities, guided tours, and workshops such as “Cooking from the

meadows” where a nature guide takes the participants out to collect edible plants and shows them how they can be used for preparing natural drinks or foods (example originates from the Styrian Nature Park “Mürzer Oberland”). In all business activities in the frame of the Nature Parks, the micro and meso scales are closely intertwined, as the micro-level exchange depends on the meso-level institutional context, particularly with a newly developed marketing label for Nature Park Specialities.

The Nature Parks offer support for marketing regional and environmentally friendly farm products under the label “Nature Park Specialities” [12]. The choice of traditional agricultural products was extended to NWFPs. Because some Nature Parks are strongly shaped by woodland, the idea arose to develop wild forest products in the frame of the label. Examples are cowberries (*Vaccinium vitis-idaea*), rowanberries (*Sorbus aucuparia*), and blackthorn (*Prunus spinosa*), which are made into jams, chutneys, or liquor. Other examples include wild honey; oils with herbal extracts; essential oils (Swiss pine (*Pinus cembra*); spruce (*Picea* spp.)); and various *bouquets garnis* (partly of wild harvested material) used as teas, bath additives, and other purposes. In most cases, the producers are farmers with small holdings, who process and merchandise directly on their farms, at farmers’ markets, to regional food retailers, and through service points at the Nature Parks. In the framework of a European research project (StarTree), and with the help of a regional development consultant, three parks developed their own activities. In the Styrian project “Colourful hedges and edges of woods”, located in the Nature Park “Almenland”, trees with colourful fruits and autumn leaves are planted at forest edges or hedges and along roads so that the fruits can be used by farmers and small processors of the region. At the same time, the trees contribute biodiversity conservation and make the landscape (even more) attractive and promote tourism development. A consultant reports on a workshop with farmers [45].

“There existed already an initiative to promote the planting of certain local trees and shrubs such as rowanberry and blackthorn in private gardens in order to replace exotic species. This idea was now expanded to planting the colourful trees also at forest edges as the fruits can be used for producing rowanberry *liquor* and other products.”

In another Styrian Nature Park (“Südsteiermark”), a business plan was developed for joint merchandising and business promotion, in which local farmers might establish their own shop with an assortment of products with a long shelf life (jams, syrups, liquors, herbal teas, etc.), or supply local shops, hotels, restaurants, and wineries with a variety of durable products on special shelves. In the Tyrolean mountain Nature Park “Kaunergrat”, farmers realised that they mostly offer liquor, but that hard liquor does not fit their customer base, which consists mostly of families that come to hike. They discovered further that for better marketing they need to invest in attractive packaging with a common design and stable product supply throughout the year. As a result, they developed a broader portfolio of products, established a common design, and set up new common processing facilities.

Nature Park Specialities can be seen as experiential products [57], to various extents. In guided tours and production workshops for drinks, foods, and soap, among others, service is the primary product, whereas the self-made goods are more an add-on. When consumers buy Nature Park specialities with the specific label from the shelves in a supermarket or Nature Park shop, the good is the primary purchase but they pay a higher price for the label that indicates its origin from the Nature Park. The added value is the knowledge they are consuming something from the beautiful nature they have visited or are imagining in their minds.

On the meso scale, we find both hindering and supporting context factors. The agricultural sector as “resource users” and nature conservation as “preservers” have often conflicting views on land management goals, an opposition which is broken up in the regional and cross-sectoral structure of the Nature Park. Decentralised governance structures can be capable of creating integrated solutions across sectoral boundaries [2], here with the concept of integrated nature conservation. The Nature Park specialities are embedded in larger macro scale structures such as the multi-level democratic governance system of the European Union and national, provincial, and municipal

governments, as well as economic trends of declining competitiveness of NWFP commodities in a high labour cost country but increasing demand for experiential products.

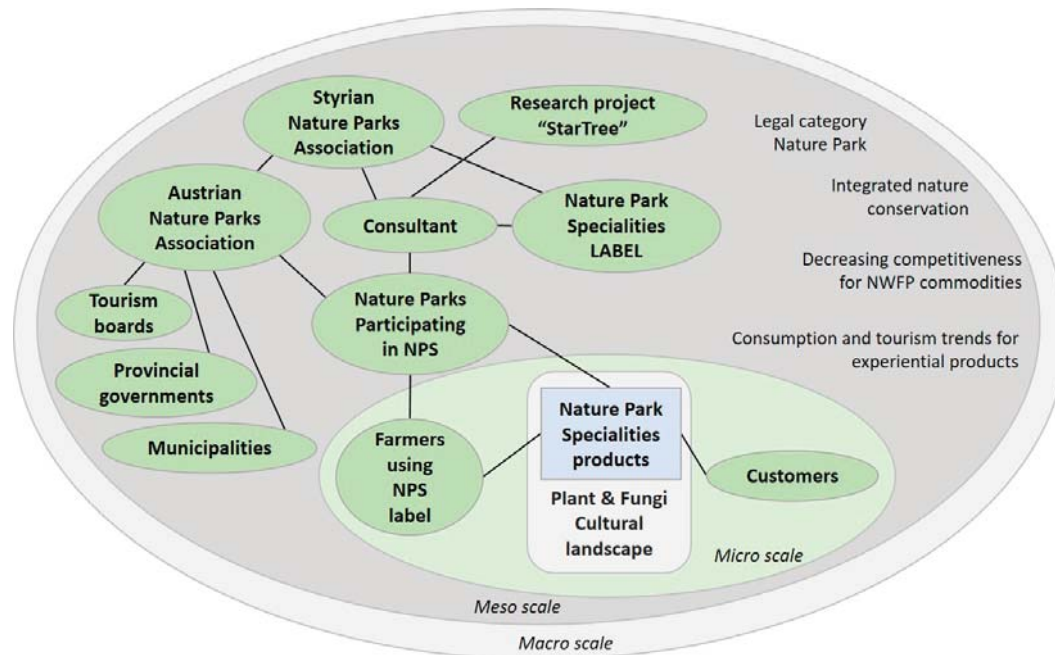


Figure 3. Actor network and context of the “Nature Park Specialities” (NPS) label. NWFP: non-wood forest products.

This case study stands out in that the initiative comes from outside the farm and forest sector, namely, from nature conservation. With this external impulse and the accompanying support, local resources, traditions, and creativity are bundled into innovative activities. Factors in its success include institutional support from the Nature Parks Association, a consultant, and a research project, in addition to the bottom-up approach through which it was applied. From an SDL viewpoint, value creation goes beyond a customer-oriented product development process. Rather, it must be seen as the result of a complex interaction of natural landscapes, traditional culture and land uses, modern urban values, and current legal and institutional frameworks, which include the existence of nature parks, international research programmes, and regional development consulting services. As a result, in addition to new products and better marketing approaches, complex solutions adapted to local contexts and the needs of producers, customers, and landscape conservation were created, with innovative measures along the whole length of the value chain, from land management to merchandising. The innovative solutions developed through cross-sectoral interaction at the micro level. In the following territorial marketing initiative around chestnuts, the actor network is even more complex with even more cross-sectoral connections.

4.4. Chestnuts—A Traditional Product for New Territorial Marketing

Historically, in Italy, chestnut cultivation was an important source of livelihood for people living in rural areas. At the end of 19th century, in Trentino, an autonomous province in Northern Italy, the chestnut was the “fruit tree cultivated with more profit and greater extension” and it was considered “the bread of the poor” [58]. However, during the 20th century, similarly to what happened in many areas of Italy, chestnut cultivation experienced a dramatic decline, partly due to abandonment of rural areas, decreasing competitiveness, and a restructuring in agriculture.

In the southwestern part of the region, the old chestnut tradition has been re-established recently [31]. Since 1994, local people from the village of Castione have been working together in the association “Associazione Tutela dei Marrone di Castione”, which has around 100 members today,

consisting of chestnut growers and other supporters. Thanks to the efforts of the association, the old chestnut groves were restored and are now well managed, delivering profitable production and representing an important landscape asset of the region. The chestnuts groves system is a traditional agro-sylvo-pastoral landscape. It includes the presence of cattle, which allows a clean undergrowth to be maintained. The system also represents a shelter and feeding area for wildlife; protects the soil; and purifies the water [59].

The success of the association is strongly based on the chestnut growing culture that the members inherited from their ancestors,

“To do what we do, first of all there is the need of a predisposition, which you must receive from the family. Your point of origin is important. In your veins the blood of the activity must flow. The true sportsman must have breathed sport. In our case we have chestnuts in the blood. It is transmitted to you in the place where you were born. It is a culture.” (interview with a member of the association).

At the micro level, the actor-to-actor interactions include the commercial production, with growers selling high quality fresh chestnuts and partly processed products such as flours or sweets directly to consumers. Interactions with a local distillery have resulted in the creation of an innovative sweet creamy liquor. Other practices include traditional landscape maintenance, with actions such as pruning and mowing in the private and public spaces.

However, it was only at the institutional level, thanks to the active collaborations of a diverse set of actors, that the success at territorial level was possible, leading to a value-creation space view (meso-scale). Farmers gathered together into the association with passion and with the aim to conserve their traditional culture. Multiple networks of the past were important to enable the work of today,

“In the past, Castione artists, specialized in marble sculptures, travelled around Italy and Europe. In addition to offering their professionalism, they brought with them the best products of their land, Castione's chestnuts. They were very appreciated. Why we did not completely abandon the chestnut activity as it happened in other places? I think that the role of the artists was for us the basis and helped to indissolubly link the place to the product and vice versa. So, chestnuts of Castione are, and will be, recognized, both in Italy and abroad. These are things to take seriously. They have a historicity. And I believe that in a globalized world more and more it will be necessary to link the products to the territories” (interview with the president of the association).

The association promotes chestnut cultivation and teaches people how to manage chestnut orchards not only in the Castione area but also at regional level and beyond, provides a conservation standard, and defines prices. All of these elements have been able to build a functioning framework and a trade structure, guaranteeing a high-quality product and allowing the restoration of the landscape. In addition, the association cooperates with the regional tourism sector, with restaurants and hotel owners, wine producers, and artists. These actors share the same aim and work together to create a territorial marketing strategy, under the common denominator of the chestnuts, which during the fall season attracts tourists to the area. The association offers a territorial value proposition and the multi-actor networks, through several chains, also reach people that are geographically distant. The governance structure pivots on important and passionate figures, such as those that on turn cover the role of president and vice-president of the association, and can count on the work done on a voluntary basis by farmers and other supporters. The members report that the engine of their passion and the voluntary work originate from the strong sense of belonging that they have toward the integrated agro-sylvo-pastoral system, which includes the presence of nonhuman elements, both plants and animals.

The season culminates with the annual chestnut festival, which is sponsored by several private companies and gathers thousands of people. During the event raw, cooked, and processed chestnuts are sold, and guided tours are organised. The storytelling of the landscape and the traditional culture is presented through the “National Festival of Arts Graphic Humour – the Smile of the Chestnut”. The culture of chestnuts is promoted through gastronomic competitions that involve the best chefs and wine cellars of the region.

The association can count on co-financing and support by public and semi-public bodies at different scales. For cleaning, pruning, and restoring their orchards, many farmers have applied for EU Rural Development Programme funds. Other funds for rural development and for the work of the association come from the regional, provincial, and municipal level, namely, the Autonomous Province of Trento, the Municipality, the Valley Community, and the regional Association for the Promotion of Tourism.

The association did not only build a local network but is also a member of the National Association of Chestnut Cities and the European network of chestnut growers and processors, and has been successfully initiated a national chestnut plan [58], implemented by the Italian Agricultural Ministry. Recently, with the support from the Ministry and a national research organisation, the association has played a crucial role in the process of developing and applying a successful remedy (natural antagonist) against a pest spreading throughout chestnuts in Europe (*Dryocosmus kuriphilus* Yasumatsu).

With its traditional but redefined “experiential” forest product and its European setting in a high labour cost country with a multi-level democracy, the macro scale frameworks and developments are similar to the Austrian case.

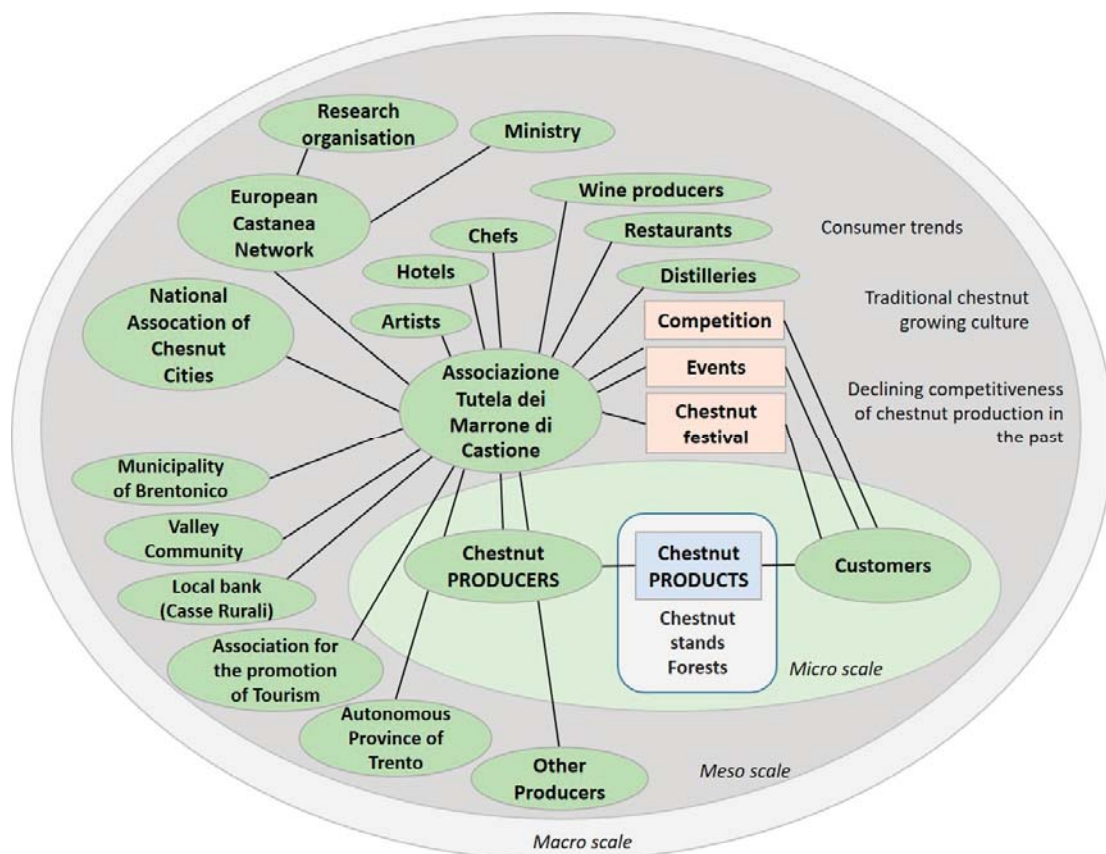


Figure 4. Actor network and context of the regional marketing initiative of “Castione” around chestnuts.

The chestnut case from Castione illustrates how diverse types of actors collaborate on various scales for the development of goods and services and for the promotion of the region (Figure 4). The actors span land-owners, processors, other sectors, artists, and public bodies. They act within a system of formal institutions (organisations and policies) as well as informal institutions such as traditional culture and current regional identity. Innovations occur on company level (e.g., invention of the chestnut liquor), regional level (the association as an institutional and social innovation), and beyond (national and European associations). It would, however, be artificial to separate different

innovations, for example, the product, service (festivals), process (e.g., the pest control), marketing (e.g., competitions), institutional (e.g., national chestnuts plan), or social innovations (e.g., volunteer collaboration for reviving the traditional culture and the territorial marketing of chestnut, and redefining the traditional staple food as a gourmet product), as all these are linked to and depend on each other. The value creation can only be understood when looking at the process and a multi-layered network as a whole.

5. Discussion and Conclusions

In the following subsections, we relate our results to innovation processes and the actors in them (innovators, service providers, and policymakers) and propose how co-creation can be realised on different levels to support innovations in NWFPs in future.

5.1. A Broader Understanding of Value Creation in Forest Products

The shift from goods-dominant to service-dominant logic [18,39] advances the understanding of the multiple roles of forest products in commercial and non-commercial contexts. In each of our case studies, the value of NWFPs is grounded in cultural values associated with the products offered and consumers' motivations.

SDL postulates co-creation of value through interaction between producers, consumers, and other actors in specific institutional settings [39]. Any analysis of innovation processes and value creation therefore must include the complex actor networks and institutional and social dimensions, which may go far beyond mere product developments or customer orientation towards social goals such as regional development, environmental conservation, or cultural identities. Thus, in addition to going beyond a producer-centric view or the analysis of production and marketing, SDL also requires attention beyond value-chain analyses and systemic innovation models.

Systemic innovation models [60–62] describe innovation processes as complex interrelations of multiple types of actors beyond the firm and formal and informal institutions [26]. They are, however, relatively pragmatic and atheoretical when analysing actor relations or the role of institutions. With the application of SDL [43,63], we included institutional, social, and cultural dynamics that are recognized as playing essential roles in the process of value creation and innovation. This approach demonstrates that conventional classifications of business-related innovations [64] are insufficient to capture and cultivate the sources of NWFP values, even when broadened to include institutional or social innovations [65]. Similarly, distinction between product and service innovations becomes obsolete in the case of experiential products, where the good and the service are embedded (e.g., the mushroom in the cooking workshop or collection tour, or remembering the landscape when eating the jam labelled as a Nature Park product).

Cultural dynamics are the driving force rather than company innovation when sugaring is experienced as cultural practice instead of commodity production. Fundamental social changes play a crucial role in the renewed interest for forest products when the wild or natural origin is certified for the Nature Park products. Likewise, institutional and cultural frameworks for producing and marketing chestnuts have changed profoundly—production changed from a staple subsistence food of a regional agrarian economy to a regional speciality marketed as an entertaining experience to outside tourists in a globally competitive economy. Business innovations and social-economic changes are interrelated processes—when considering innovations at the company and institutional scales in chestnut-based territorial marketing, it becomes clear that the sale of chestnuts and the existence of the association are mutually dependent. Without successful chestnut production, the association probably would cease to exist. Single innovations such as new chestnut products, promotion events, or the new perception of a traditional poor people's food as a gourmet product can only be understood when looking at the whole process, which intrinsically is an institutional and cultural process.

5.2. A New View on Customer Relations

Our analysis describes complex commercial and non-commercial relations of people to forest products based in traditions and other cultural contexts that produce value to people. We argue that the complexity of these values is relevant for businesses, even if many of these values are intrinsically non-commercial. For many people that grew up with the habit of gathering from the wild, on the basis of traditional practice and everypersons' rights, the special value of those goods lies in their free availability in nature. In this instance, purchasing the products or paying for the right to collect them may not be an option, as this would destroy the specific value for them. For others, nostalgic memory can be the impetus for buying goods and paying a higher price when they are locally produced, or for travelling on holidays to where the goods are produced in order to collect or buy them or attend workshops or guided tours with family and friends.

Complex cultural values thus create business opportunities, which can only be developed fully when understanding the values behind them, namely the fact that people are willing to pay because of the non-commodity characteristics of these traditional, regional products. The special value can in many cases be understood as an experiential offer [16,57,66,67]. The experiential aspects are more explicitly developed in examples where customers are involved in an activity such as educational services (e.g., exhibitions, seminars) and entertainment activities (e.g., chestnut festival). The experience is also indirectly included in a product when marketing touts it as a local, traditional, or hand-made product (e.g., label of Nature Park Specialities). Through such place-making marketing, businesses simultaneously achieve authenticity and escape the commoditization trap, generating demand [16].

The question arises whether there is an actual societal and business trend toward increased importance for experiential offers or simply a new analytical perspective that reveals these qualities and relations. We believe it is both.

5.3. A New Approach for Service Providers and Policy

Service providers such as extension services, producers' associations, or consultants can play key roles among the multiple actors involved in the complex value creation process. They have a special function as they often link producers with other actors in the value chain and meso-scale institutional processes. Service providers often facilitate innovation through networking various public and private stakeholders. They may also support provide financial or legal support. With their personnel and knowledge capacities, public and private service providers are especially suited to utilise advanced information or decision support tools that can support business owners with information that would otherwise not be available to them.

Because NWFPs open new market fields, there is a need for cross-sectoral thinking (e.g., with food or health sectors) or connecting across societal groups (e.g., rural/urban). For successful innovation support, service providers need to develop this ability. Traditional forestry organisations may be less prepared to provide such cross-sectoral, cross-cultural links than regional development oriented organisations, where multisector actors already are incorporated [26]. Associations can provide multiple services that contribute to value creation, including advisory services for producers and joint business activities (e.g., joint marketing), as well as interest representation vis-à-vis policy-makers and public relations activities. Regional organisations (rural development consultants, chestnuts association, Nature Parks) are particularly adept at understanding the needs of producers and consumers and their role in value creation and economic development. Specific local organisations or producers' associations can provide important institutional capacities for innovation and business development; however, their creation often depends on support from other institutional structures [31], be it sectoral organisations (forest or nature conservation associations) or regional bodies (local or regional governments).

The cases analysed here suggest that an orientation toward broader common goals such as strengthening a sector or establishing a product; contributing to jobs and income in a region; or maintaining natural or cultural environments may be important factors for success of the service provider function. This is facilitated by understanding co-creation processes and the cultural

dimensions of their role. Acting on such a broadened understanding, advisory and support services orient themselves toward both their customers (forest/business owners) and final consumers and societal benefits. By including self-reflection as part of the service ecosystem, service providers enhance their capacity for collaborative innovation [43].

SDL has profound implications for policy-making and for the design logic of support instruments. It calls for stronger stakeholder participation and co-creation mechanisms in the development and implementation of policy measures at all administrative levels. Making that work requires a stable institutional framework characterized by sufficient capacity and coherence. To support innovation, a stable and reliable environment is needed, for instance, with regard to property rights, administrative structures, and funding instruments. Good institutional capacities are particularly important for upscaling or diffusing innovations at the scale necessary to produce economic impact for rural development [31]. At the same time, support programmes need openness and flexibility to adapt to emerging ideas from local actors and bottom-up initiatives. They would benefit from a focus on unusual ideas, cross-sectoral interactions, and early phases of innovation, employing a risk- and innovation-friendly approach [26,68], as well as support instruments and support structures that provide information, networking and financial means in tailor-made support measures [12,22].

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Article

Social Innovation as a Prospect for the Forest Bioeconomy: Selected Examples from Europe

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Abstract: Very recently, social innovation has become a subject of investigation in forest research. Earlier on, social innovation turned into a term used in EU policy strategies for addressing social issues and the self-empowerment of local people, as well as for tackling economic, social, or environmental challenges. The question of how the forest bioeconomy might profit from social innovation remains. The article examined the forest bioeconomy from the perspective of social innovation features: How is social innovation reflected in the forest bioeconomy? The forest sector is identified as one principal supplier sectors in the updated *European Bioeconomy Strategy*. In the strategies' general objectives of job creation and employment through the green economy, we detected some links to social innovation. In contrast, the *EU Social Innovation Initiative* includes social aspects via addressing collective action, integration of vulnerable social groups, and rural and urban economic development, without mentioning explicitly the forest sector. In order to make use of both EU policy documents, it is necessary to enquire on the overlaps. This research focused on the communalities in their policy goals as a reference framework for systematically identifying specific forest bioeconomy activities fitting into both realms. With example of these activities, we showed how the forest bioeconomy plays a unique role in addressing hitherto unmet needs with the development of new types of services. There is rich potential in the forest bioeconomy for private forest owners and producers with activities that range from social biomass plants to collectively organized charcoal (biochar) production in remote rural areas. Most of these are service innovations, while some combine services with product innovations. Our findings challenge positions that regard economic and social issues as strictly separated. As a result, they are identified as two combined complementary sources of income for Europe's forest owners.

Keywords: collective action; entrepreneurship; service innovation; social aspects; societal challenges; qualitative research

1. Introduction

In forestry, social innovation is increasingly attracting scholarly attention [1–6]. Social innovation was one of the European Union's innovation policy initiatives. It is distinct from other innovation strategies because it moves beyond the focus on enterprise-driven technical innovation to include other sectors, such as health, social services, and education [3]. It adds a social dimension to innovation by including social-ecological innovation [4] and economic revival for remote rural areas [1,5]. This paper examined how the forest bioeconomy can profit from social innovation by using the two principal founding policy strategy documents as point of departure: The EU social innovation initiative [7] and the EU Bioeconomy [8]. Both have been developed within the last decade and were launched around the

same time. The former was presented by the then president of the European Commission, José Manuel Barroso, in 2013 [3], while the latter was introduced in 2012 through the Commissions communication “Innovating for sustainable growth: a bioeconomy for Europe” [9]. Since then, both have developed into increasingly prominent concepts for political leaders and policy administration [10,11]. They both promise great changes and answers to pressing issues. The Bioeconomy Strategy and its recent update identify several major objectives that dip into forestry, such as the need for reducing dependence on nonrenewable resources or the sustainable management of natural resources, as well as the provision of cleaner production in all possible economic realms [8] (p. 22), [12]. The EU Social Innovation Initiative addresses complex global social problems with collective engagement. The two programs aim to ensure and drive overall sustainable development.

All this implies an opportunity for the forest-based sector to take a lead in the sustainable development of the bioeconomy [13]. The forest-based businesses can contribute to a sustainable and inclusive biosociety.

Innovations of all kinds, including social innovation, can play a prominent role in the transformation to a sustainable future forest use. This article searched for successful examples in the forest bioeconomy that may have an opportunity to scale up in future alongside a wider transformation process [14]. The Bioeconomy Strategy explicitly refers to society with its objective number five of “creating jobs and maintaining EU competitiveness” [8] (p. 22). Social innovation necessarily appears as more encompassing of social aspects, as it has been presented as a solution to many kinds of old and new social risks at a time of growing uncertainty, budget cuts, and economic pressure on public administrations as deliverers of social welfare and economic development [15,16].

The Bioeconomy Strategy was updated in 2018 [8] and goes now hand in hand with the EU Agenda 2030 and the UN sustainable development goals (SDGs). It is using the very large notion of a bio-based economy that encompasses a broad range of related economic sectors and interlinks with all kind of ecosystem services [8] (p. 27). Clearly, there is a strong focus on “production” in most bioeconomy strategies [17]. The forest bioeconomy has potential for fostering employment and community development with its renewable resources. This article investigated modes of social innovation in the forest bioeconomy. How is social innovation taking place in a forest bioeconomy and what are its transformative potentials? What are the chances and prospects for private forest owners therein? We addressed collective action and communal benefits through both private and public-private collaborative efforts that go hand in hand with forest owners’ interests. Like the bioeconomy, the forest bioeconomy comprises multiple strands [18] that open opportunities for forest owners. So far, these opportunities have not yet been examined from a social innovation perspective. The question remains, where and how forestry can combine social aspects and collective action with economic interest and income security?

The paper first outlines the methods applied in order to subsequently draw the links between social innovation and the forest bioeconomy by focusing on the key features included in both. For this, we started from the text of the Bioeconomy Strategy and searched for overlaps with forest bioeconomy contributions. In what follows, the paper presents our results by linking the empirical examples from the forest bioeconomy to the key social innovation aspects. Our findings, presented in the conclusions, suggest that especially new collaborative forms of multifunctional forest management in combination with social services can be established on the basis of social innovations.

2. Materials and Methods

2.1. Conceptual Framework: Theories of Social Innovation and the Forest Bioeconomy

In order to answer the initial question of how the forest bioeconomy can profit from social innovation, we adopted a framework that first identified the main features of social innovation in order to subsequently carve out how it fit to the forest bioeconomy. The forest bioeconomy has no commonly agreed upon definition [9,18] and plays different roles in different EU countries [8,9]. Thus, it was

conceptualized here to encompass the whole supply and production functions of the sector. We used this broad definition for the purpose of our study as a starting point. The goals of social innovation are normative and also encompass a broad range of diverse aspects. One example is the Organisation for Economic Co-operation and Development's (OECD) "Forum on Social Innovations" [19] that has developed a general working definition of social innovation stating that it "can concern conceptual, process or product change, organisational change and changes in financing, and can deal with new relationships with stakeholders and territories." Social innovation seeks new answers to social problems by: (1) Identifying and delivering new services that improve the quality of life of individuals and communities; and (2) identifying and implementing new labor market integration processes, new competencies, new jobs, and new forms of participation, as diverse elements that each contribute to improving the position of individuals in the workforce [19]. In this view, social innovations are regarded as dealing with the welfare of individuals and communities. Linked to the forest bioeconomy and the forestry actors' network, social innovation includes societal values and trust among different stakeholders in order to maximize benefits for all. Hence, it is society and/or individuals (both as consumers and producers) that are included in the process of innovation, especially when their needs and demands are initiating innovations. So far, several definitions of social innovation exist [16,20–27]. In fact, most authors speak of "new arrangements" linked to societal needs, problems, and changes. The SIMRA project [28] has developed a definition of the concept: "SI is the reconfiguring of social practices, in response to societal challenges, which seeks to enhance outcomes on societal well-being and necessarily includes the engagement of civil society actors" [27] (p. 22). Social innovation is understood from different angles by its many proponents. From the forest bioeconomy perspective, we suggest disentangling the processes that lead to the innovation from its outcome, the innovative service(s) and/or product(s). Subsequently, we distinguished (i) the social innovation in the process of its creation (with the involvement of collective civil society actors) from (ii) the social innovation in its outcome (the output and its societal impacts) (see Figure 1).

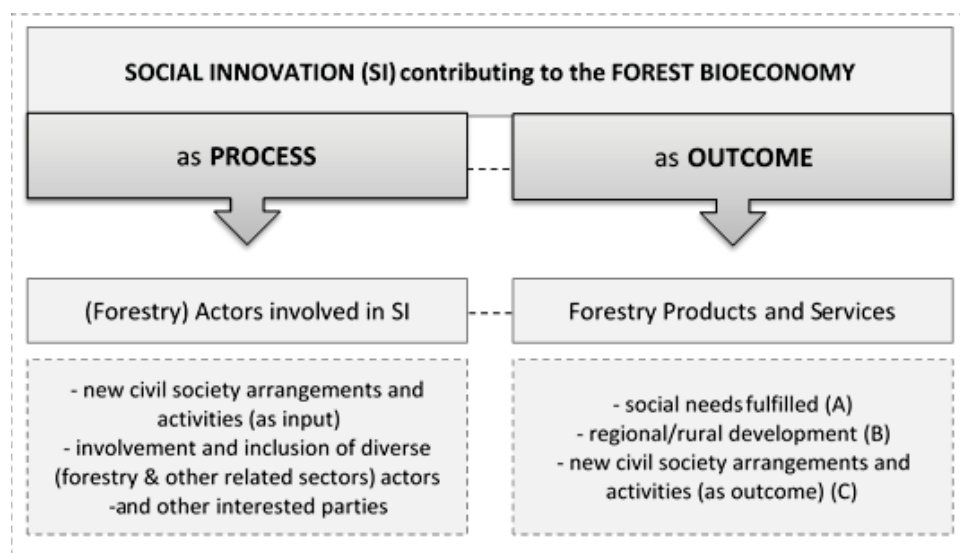


Figure 1. Role of social innovation as process and outcome in the forest bioeconomy.

2.2. Two Stages of Social Innovation and Three Types of Relevance for the Forest Bioeconomy

In the first stage, "social innovation as process," the innovation process is fed by new actors' arrangements, new institutional settings, and new forms of civil society engagement. In this stage, social agreements and negotiations of diverging interests are necessary attributes. The second stage, "social innovation as outcome," ideally creates wider social impacts through the social innovation, such as new organizational or institutional arrangements, new civil society engagement processes, economic development, and forest products and/or services.

This links to our initial research question, how is social innovation relevant to the forest bioeconomy? What role can it play for the provision of goods and services and the creation of new products? In order to become relevant for forestry, social innovation must be expanded to the private and public sectors, to new technologies, and research institutions, as well as reach out toward diverse actors and institutions of civil society than the single forestry actors' networks. The expanded network has higher adaptive capacity, as it contains not only the strong ties between the trusted actors, but also weaker ties to other actors with complementary knowledge sources. The bioeconomy concept needs to intensify its sustainability aspects and include more actors and the civil society as well, as consider intangible services in the forest bioeconomy [29]. This way, it must reach out beyond its main focus of production. Therefore, we see a need to distinguish between three main types of social innovation of relevance for forest bioeconomy (as illustrated in Figure 1) [3]:

- *Social benefits and needs (A)*: Social innovation covering forest owners' objectives in combination with fulfilling social benefits and needs.
- *Sustainable rural development (B)*: Social innovation covering forest policy objectives in consistency with regional/rural development.
- *Participation and collective action (C)*: Social innovation covering collective civil society involvement, community forestry, and interactions in the forestry actors' network.

The first type of social innovation combines forest owners' objectives with social needs and includes vulnerable groups. Very often, these are organized as social enterprises and comprise volunteer work.

The second type covers forest policy objectives of multifunctional ecosystem services and regional economic development [30]. Forest owners act collectively as parts of the rural society at large with initiatives like the formation of regional or marketing labels, bioenergy initiatives, or activities around non-timber forest products.

The third type covers the attributes of social innovation in terms of civil society participation and new forms of stakeholder involvement in forest activities. Here, private forest owners engage in joint voluntarily cooperation and collective stakeholder engagement.

Of course, all three types of social innovation in forestry have overlaps and no strict boundaries.

The conceptual framework above is summarized further in Figure 2 (below) and connects to the empirical sources of this article, which are described in more detail in Sections 2.2 and 2.3 below.

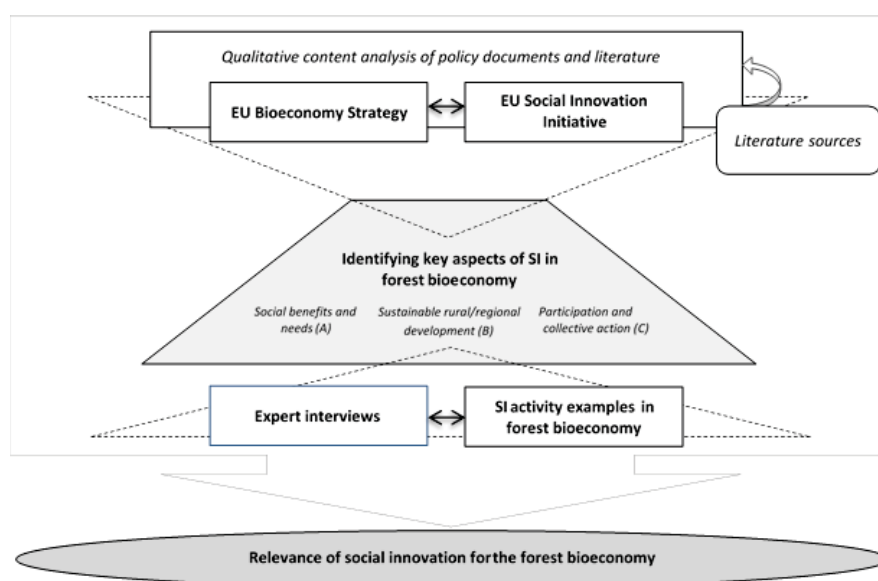


Figure 2. Conceptual and methodological approach.

2.3. Document and Literature Analysis

To answer the initial question of how the forest bioeconomy can profit from social innovation, we investigated the role that social innovation plays within the forest bioeconomy. Hence, a *systematic document and literature analysis* on the addressed topic was undertaken. We focused on the two main topical policy documents: The EU Bioeconomy Strategy including its update, and the EU Social Innovation Initiative. The topics for analysis in the documents were informed by our parallel literature analysis (see below) and were linked strongly to our research interest, namely the reflection of social innovation in the bioeconomy strategy and the notion of forestry in the single objectives of same strategy. The single steps of the analysis were informed by the qualitative analysis exemplified in the work of Mayring [31], as follows:

- From what level do the documents originate?
- How is social innovation described in the policy documents? (categories for perception of social innovation)
- How is the forest bioeconomy described in the policy documents? (categories for perception of forest bioeconomy)
- What policy instruments are suggested for social innovation and the forest bioeconomy? (categories for monetary, legal, informational)
- Who are the main audiences or beneficiaries of the social innovation and the forest bioeconomy strategy? (categories for community support, socially excluded groups, participation, beneficiaries, private, semi-private, the role of public institutions, notions of civil society, notions of stakeholders)
- How is the budget allocated to specific measures? (power distribution)
- How is the role of public institutions designed in the strategies?

In parallel, an accompanying secondary data collection was accomplished by conducting *literature search*. The focus was on (i) peer refereed papers in high ranking scientific journals, (ii) policy documents, and (iii) grey literature (conference papers, research reports). We searched systematically for literature in our universities digital library catalogues, internet sites, and databases such as Scopus, ISI Web of Science, and Google Scholar, as well as institutional databases regarding policy programs (EFI–The European Forest Institute, EU–the European Commission, FAO–The Food and Agricultural Organization of the United Nations, UNECE–The United Nations Economic Commission for Europe, the European Commission’s webpage). We identified the literature that deals with social innovation following the principle of salience of topics: Social innovation, innovation support, institutional change, political framework, and innovation systems, as well as specific aspects of social innovation like social inclusion, participation, social change, social policy, employment, rural problems, and marginalization. From the peer reviewed papers and grey literature, we used the abstracts, as well as the whole articles focusing on drawing insights for our research interest, the links between social innovation, and the forest bioeconomy. The guiding analytical sub-questions were:

- What is the concept of social innovation?
- What is the concept of the forest bioeconomy?
- How do the authors deal with institutional change, transformative change in relation to rural problems, and marginalization?
- What role does the forest industry have in the articles?
- How are social problems overcome and how are solutions designed towards a forest bioeconomy?

The results were documented in literature protocols and have supported our conceptual approach, as well as the evaluation of relevance of coverage of key aspects of social innovation in the forest bioeconomy (Table 1, below). For our interpretation, all publications and documents in the public domain state an organizations’ aims and objectives. Hence, they can be used as suitable benchmarks against which the evidence from forestry can be measured. Only those documents which were

deemed to be explicitly relevant and as leading to potential impacts on social innovation and the forest bioeconomy were selected for identifying the relations and overlaps. The time frame for our research covered the 10 years before the launch of our main two main policy strategies, the EU Social Innovation Initiative and the EU Bioeconomy Strategy, both from 2012. Thus, the time frame for our research began in 2002.

Table 1. The key bioeconomy objectives and related supply functions from forestry. EU Bioeconomy Strategy objectives [8] (p. 26) and rating of key aspects and role of social innovation (according a scale of strong, medium, and weak).

5 Key Objectives in the Updated Bio-Economy Strategy [8] (p. 26)	Role of SI Amongst Principal Objectives in the Forest Bioeconomy Strategy (Strong, Medium, Weak)	Forestry as a Supplier of Key Objectives of the Bioeconomy	Key Aspects of SI in Forest Bioeconomy Covered (Strong, Medium, Weak)		
			Social Benefits and Needs (A)	Sustainable Rural/Regional Development (B)	Participation and Collective Action (C)
Objective #1: Ensuring food security	Weak	Food and farming: -edible NWFPs -watershed management -feed for livestock	medium	medium	weak
Objective #2: Managing natural resources sustainably	weak (to medium)	Sustainable forest management: -efficient use of biological resources	weak	medium	weak
Objective #3: Reducing dependence on nonrenewable resources	medium (to weak)	Sustainable timber production: -substitution through harvested wood products -substitution through energy use	weak	medium	weak
Objective #4: Mitigation and adapting to climate change	weak	Tackling climate change: -forests as carbon sinks -harvested wood products as carbon sinks -resilience and risk prevention through forests	weak	medium	weak
Objective #5: Creating jobs and maintaining European competitiveness	strong	The forest economy and the wood-based industries: -forest sector workforce -employment in rural and urban areas -green jobs -service provision -services to the forest sector -innovative services, goods and products [32,33] -newly emerging societal trends and emerging markets -new startups	strong	strong	medium

2.4. Interview Data

The interview data collected in this study were part of larger data collection process in the SIMRA project [28]. The role of the interviews was to verify the data obtained from the document search, to increase reliability and validity of the research [34,35], and to prepare the deductive criteria for subsequent qualitative content analysis [31].

With this in mind, in the first step, key experts were identified for interviews. Their selection was based upon expertise in innovation, forestry, forest bioeconomy, forest industries, social innovation, policy implementation, and policy administration. For the interviews, we used a written list of guiding questions [36] which, in our case, focused on the assessment of the particular expert of the policy strategies, their evaluation of future prospects, and their reflection on the links between social innovation and the forest bioeconomy, as well as their assessment of specific social innovation activity examples which illustrate these links across Europe. Each interview was adapted to the respondent, according to the specific expertise requested for the enquiry. We conducted 10 high level expert interviews during 2017–2019, with each one lasting between 30 to 90 min. They took place in a range of locations throughout Europe during the project. Six interviews out of ten were recorded and transcribed. All interview partners were ensured anonymity according to the project's ethical clearance procedures. For the rest of the four interviews that were not recorded (in three, we did not obtain consent, and in one, the recorder did not work), we took notes during the interview itself. The interviews had two main aims in the research process: (i) They served as a complementary tool

for our own interpretation, especially the division we derived on the key aspects of SI in the forest bioeconomy (Figure 2), and (ii) they were used as additional validation instrument for our selection of case examples for social innovation activities (presented in Table 2). In concrete terms, the insights from the interviews were used as one basis for the ranking undertaken by the authors and outlined in Section 3.1 and illustrated in Table 1. They supported the analysis of all material obtained with a focus on our research question.

Table 2. Key targets of social innovation in forest bioeconomy social and business activities.

Key Targets of SI	Activities in the Forest Bioeconomy	Main Focus of the Activities	Assets for the Forest Bioeconomy	Principal Organizational Format of the Activity
(A) Social benefits and needs: Addressing and fostering social inclusion	Forest bioeconomy enterprises targeting vulnerable groups (Social biomass plants (AT and SI), Waldprojekt (AT), Green Care (EU wide), Green Care Forest (AT), Social Farming (EU wide), Forest production projects with former drug addicts (EU wide and AT))	Social inclusion	Economic and cultural benefit for forest owners and enhancement of social values.	Charity, Social Enterprise, NGO
(B) Sustainable rural development: Addressing rural/regional economy	Institutional innovations such as the formation of labels and brands amongst collectives of forest owners: Regional or nature marketing labels; regional development initiatives and bioenergy initiatives ((Nature parks (AT), Charcoal initiatives (SI) [37], chestnut associations (IT), bioenergy (AT))	Economic revenue and soft values such as strengthening of social stability and identity with the income to the region, but also “intangible services” in the forest bioeconomy [23]	Networking and business benefits for forest owners, local empowerment, and economic development.	Business
(C) Participation and collective action: Engagement of civil society, forest owners, and forestry actors	Volunteering (e.g., volunteer reforestation projects in Austrian Mountain regions (AT)) and voluntary cooperation for joint goals (fire brigades (ESP [11]); Mountain bike trails (CH) [38]), communal engagement for woodland management with social, cultural and economic benefits (Woodland Skills Centre, Coppice Wood College (Wales) [39])	Collective activities of multiple stakeholders with a communal goal	Cooperation and trust building around a common goal for all actors involved.	All forms: New organizations and new institutional arrangements, NGO, strong volunteer engagement

The *social innovation activity examples* that the experts were reflecting on during the course of the interview have been selected by the team of researchers (authors of this article) from the SIMRA case study database [28] and the University of Natural Resources and Life Sciences, Vienna-BOKU innovation case database [40]. The activity examples are initiatives that match the search criteria “forestry”, “forest sector”, and “forest-based bioeconomy” in combination with social innovation in their abstracts. In concrete terms, starting from the pre-defined theoretical definition of social innovation (see Section 2.1, above) [27], our deductive approach enabled the identification of three key themes (outlined in Table 2 below and explained in the conceptual part above): (A) Social benefits and needs, (B) sustainable rural and regional development, and (C) participation and collective action, which were used for identification of social innovation activities in the forest bioeconomy.

Subsequently, our analysis was based on a set of parameters, presented in a matrix in Table 1. The results of the analysis are presented in the evaluation rows of the same matrix (Table 1: “activities in the forest bioeconomy” and “assets for the forest bioeconomy”). They are based on the experts’ interpretation and their perception of the potential role of social innovation key aspects in the forest bioeconomy (always in regard to specific objectives in the bioeconomy strategy). The links between social innovation and forest bioeconomy are presented in Table 2, which combines our conceptual basis with the experts’ perceptions of provided social innovation activities. Table 2 also elaborates focus and approach of the detected social innovation activities in detail. The conceptual and methodological approach is presented in Figure 2.

3. Results

3.1. Forestry and Social Innovation in the Bioeconomy Strategy

In course of the document analysis, we started from the five main objectives of the updated EU Bioeconomy Strategy [8] (p. 26f.) in order to put them in contrast to the role of social innovation among principal objectives in the forest bioeconomy, starting from conceptualization of social innovation as

new solutions to societal challenges with enhanced participation of civil society actors while seeking to enhance outcomes on societal well-being in the related EU document from 2014 [22]. Within the author team, we ranked the results along a continuum of strong to weak. The ranking was done by each author individually. Then, the ranking was discussed and final rankings were fixed. The social innovation aspects are most strongly addressed in objective #5, creating jobs, and weak in all other aspects, which focus on the natural resource aspects of the bioeconomy. Third, we linked the forest bioeconomy as a main supplier to each objective. Here, we found manifold ways of supply functions for the forest sector for all the five objectives of the updated EU Bioeconomy Strategy (row 3, Table 1).

In the next step, our research assessed the three key aspects of social innovation in forestry and put them in relation to the five main objectives of EU Bioeconomy Strategy using the same continuum from strong to weak (column 4, Table 1). This provided a more distinctive picture. The aspect of “Social benefits and needs (A)” in social innovation includes addressing needs of various societal, also vulnerable groups, which is covered to medium extent on the Strategy’s objective of ensuring food security (#1 and covered strongly in objective #5 of creating jobs. This aspect is weakly covered in other objectives which focus on the natural resources side of bioeconomy. “Sustainable and rural development (B)” are strongest addressed in objective #5 (creating jobs) and medium in the others. “Participation and collective action (C)” aspects are covered weakly in first four objectives, because the EU Bioeconomy Strategy concentrates mainly on the production side of natural resources while including people with objective #5, and is therefore ranked medium. Objective #5 reads in full “Creating jobs and maintaining European competitiveness”, and thus seems to be the main link between social innovation and forest bioeconomy. Objective #5 in the strategy emphasizes the fact that the EU bioeconomy employs 18 million people with a 2.3 EUR trillion turnover [8] (p. 27). The quality and nature of social innovation are not fully mirrored in these objectives and, in most of the key objectives, we had to rank the relevance and role of social innovation in them as weak or medium (Table 1).

From a much broader perspective, the connection between the bioeconomy objectives and social innovation would turn out slightly stronger, e.g., if we would link general features of social innovation, like serving to combat rural depopulation, and provide (educational, cultural, and economic) opportunities to the sustainable use of resources as main condition (objective #2 of the updated EU Bioeconomy Strategy [8]), but it would still only be one condition and not a main feature of the activity. Hitting into this vein, Mustalahti [41] has indicated with the example of the Finnish National Bioeconomy Strategy that it is not responsive, as it does not include citizens. The transition to a bioeconomy needs the citizens as one of the main pillars of socially sustainable development [42,43]. Such social features are covered as lip services (mentioning of sustainable resource management) but not thoroughly addressed, e.g., with revealing its social goals. This is because the EU Bioeconomy Strategy and the circular Bioeconomy Strategy are resource-focused [8,44]. For instance, the updated EU strategy presents the key contributions of forestry in terms of turnover, added value, and numbers of jobs [8] (p. 29). It also outlines the value of ecosystems and their services [8] (p. 33), but none of the parts relate the features to social sustainability. Mustalahti [41] has detected similar weaknesses in the Finnish Bioeconomy Strategy. The question of how the European Bioeconomy Strategy(ies) impact on social sustainability and the multipurpose use of forests appears underdeveloped. Social sustainability deals with the question of achieving well-being for future generations and social innovation addresses the inclusion of vulnerable parts of society. Other authors have criticized the text of the EU Bioeconomy Strategy because it does not explicitly mention a need for reduction in the use of biological resources due to natural ecological limits [30].

A combination of social, ecological, and economic goals is mentioned in the part of the updated EU strategy, where it emphasizes to “*mainstream the Sustainable Development Goals into EU policies and initiatives, with sustainable development as an essential guiding principle to all its policies*” [8] (p. 27).

Yet, individuals and society are mentioned solely in the supporting text on objective #5 in terms of work force and the potential for job creation at local levels. This part of the text asks for a “[...] more proportionate sharing of the benefits of a competitive and sustainable bioeconomy amongst its producers [

...].” [8] (p. 27). Thus, the social agenda is covered via objective #5 (Creating jobs), mirrored in the degree of key aspects from social innovation covered in forestry and ranked by us from weak to strong toward objective #5 rather than the others (Table 1, column 2). Thus, without creating opportunities for (small) forest owners to also achieve and use outcomes of multi-purpose forest utilisation (services and multi-forest products), the full range of the forest bioeconomy does not appear to be addressed in the strategy(ies), as they simply concentrate on a more strategic use of the biological resources (focusing mainly on bigger producers). With this overlooking of the full range of forestry services, the social aspects and the society are equally left out. The following section will bring in social aspects and present our results on examples from the forest bioeconomy, which include the full range of services under the perspective of social innovation. We will outline them according the three aspects of social innovation made above.

3.2. Social Innovation in Forest Bioeconomy Social and Business Activities

New institutional arrangements and social configurations can lead to successful social innovations in forestry. From this perspective, we focused on examples for innovations that examine forest owners’ objectives (A) in combination with social needs, objectives that (B) foster regional and rural economic development, or that (C) involve engagement from stakeholders and deal with tensions in the forestry actors’ network.

The selected examples in different countries in Europe show how collective action and social engagement of forest owners and other stakeholders have found creative solutions in developing new and improved services and goods. Some of them have a nonprofit background and some, but not all, involve volunteer work. Some have their regular income as businesses.

When addressing social needs (A), the innovation in some cases can also encompass “social enterprises”, “social business” [22,37] or become part of the “social economy” [22] (p. 37), all having particular goals and forms of organisation. For instance, a social enterprise in the forest bioeconomy is an organisation that applies commercial strategies to maximize social impacts together with its profits. This way, it forms part of the so-called “social economy,” which includes a broad range of all kinds of organizations and businesses, such as co-operatives, nonprofit organizations, social enterprises, and charities. We found, in the specific cases, that goals and activities sometimes have a fuller range and can also overlap. In the cases that address regional and rural economic development (B), the innovation process has also involved civil society engagement and engaged stakeholders (C), which is one of the principal prerequisites in the LEADER regional development programs (B) where Local Action Groups are steering the projects. Despite the overlaps, we distinguished the social innovation examples in the forest bioeconomy according to the main principle focus and objectives of the projects. The distinction is insofar useful as it manages to provide a comprehensive picture of the features of social innovation in forestry. The following table (Table 2) outlines the results according to these principal markers.

3.2.1. Social Benefits and Needs: Social Inclusion of Vulnerable Groups in Forest Bioeconomy Activities

This type of social innovation focuses on vulnerable groups in society, like youth, migrants, elderly, unemployed, single mothers, and otherwise socially excluded. One very recent example is the “social biomass farm” (*sozialer Biomassehof SOBIO* [45]), with two biomass plants located in Austria and Slovenia. They were initially funded by the EUs Territorial Employment Pacts Programme (TEP) between 2007 and 2013 and have a common management system. The employees are mainly long-term unemployed from both regions. Another example from Austria is the “CARITAS Waldprojekt” (Caritas forest project) [46] in the Western federal state of Vorarlberg. It was founded in 1998 and has been provided during the last 20 years’ continuous integrational work and therapeutic daily structural work as therapy for drug addicts in a forest, garden, and kitchen. In forestry, such initiatives also range under labels like “Green Care” or “Green Care Forest”, with both having similar backgrounds and overlapping with “Social Farming.” In addition to saleable products, green care and social farming

produce health, employment, education, and therapy. Both integrate people with physical, mental, or emotional disabilities. Farms offer openings for the socially disadvantaged, for young offenders, or those with learning difficulties and people with drug dependencies [47,48]. Within Europe, at least, many countries have different programs and examples with specific national characteristics both in focus and realm [48–50]. They take place on family forest land, either with the landowner as a social entrepreneur or contracted with their non-owner partners, therefore diversifying the use of private forest land toward wider benefits. The idea of Green Care includes health services, education, and employment on farms, and sometimes includes certification schemes for participating farm holders and forest owners. “Green Care Forest” provides new ideas for forest-based products and services. Both Green Care and Social Farming initiatives can also include practical training and employment opportunities for marginalized parts of society, e.g., under the social forest scheme. Its main goals are social, and in their organizational form, they can include social enterprises and other social economy businesses. It will depend on the legal situation for such enterprises in the area. In some EU countries, forest owners have a status as “social entrepreneur,” which is also part of the EU Commissions’ Economic Strategy 2020. Table 2 indicates social farming on private forest land as an example for charitable activities to create opportunities for vulnerable groups of society, such as early-school-leavers, young immigrants, prisoners, and long-term unemployed. These groups of people are enabled to stay and work together with family farmers and social practitioners in the course of farm activities [47].

3.2.2. Sustainable Rural and Regional Development through Forest Bioeconomy Activities

Disadvantages in rural areas lead to economic problems of regions to secure welfare and income. Ideally, social innovation shall address rural and regional development as a response to societal challenges, e.g., land-flight, unemployment, or lack of infrastructure. Forest policy objectives are consistent with regional development objectives when they strengthen the position and economic stability for forest landowners. One key term is multi-purpose forestry and the combination of forestry goods and services. Associations of farmers and forest owners can contribute to regional and rural development and bring income to the region. Forestry enhances rural and regional development with forest-related, cultural, touristic, and commercial activities, collectively and in collaboration with forest owners, the local population, and stakeholders. In Austria, traditional farm forest owners formed cooperatives to set up and run biomass-based district heating systems in rural villages. By this, they created new business opportunities and created a market for forest residues but tackled also air pollution problems (caused by single house oil and coal heating). The social innovation aspects are the bottom-up initiative and collaboration with various local actors including the municipalities and public and private customers. Another Austrian example is the association of nature parks that developed the brand of “Nature Park Specialities”. There, the biological, recreational, and cultural functions of the regional nature parks are complemented and supported by the traditional products produced and provided by local farmers living in the decided nature park regions and utilizing the label. Another example for regional development through such local initiatives is the “*Associazione Tutela del Marrone di Castione*”, where some hundred associated chestnut growers and supporters from the Brentonico Plateau in a small valley near Trentino in Northern Italy organized activities, services, and gourmet events around their chestnuts. The initiative started with the goal to keep the abandoned cultural tradition of chestnut production alive, but eventually led to the creation of jobs around the production, processing, and marketing of this fruit and associated tourism services [32]. In a similar way, in 2003, one forest owner and other inhabitants of Dole pri Litiji (Slovenia) formed an initiative to support local development through the revived charcoal production [37]. The initiative evolved and local inhabitants started to offer tourist activities around the charcoal production (walking paths, accommodation, and local food). All those examples have in common that through the projects, the initiators managed to successfully cooperate with various regional actors such as forest or agricultural services, research institutes, or local administrations. In most cases, the initial ideas were derived through bottom-up activities. It is also common that the exchange of accumulated knowledge, tradition, and skills play a

great role. Sometimes these resources are combined with knowledge coming from the outside (through advisory services and other interest organizations). Such innovations add benefits in networking and business activities to forest owners and bring income to their regions. Cross-sectoral collaborations along the lines of forestry food, beverage, and tourism are creating new roles for private forest owners in the rural actor networks throughout Europe. The initiatives also contribute to social and cultural capacity building in marginalized and economically weak rural areas.

3.2.3. Participation and Collective Action in the Forest Bioeconomy: Engagement in Decision Making Through New Actors' Constellations in Forestry

Unlike in the examples in rural and regional development above (B), where the engagement was mainly induced by private forest owners, farmers, and single entrepreneurs, in this third key aspect within the main attributes of social innovation, the primary engagement comes from other civil society actors [11,51,52]. Although the term civil society has several meanings [53], it includes nonprofit work in nongovernmental organizations. Examples for community engagement can be found in grassroots movements that evolve through investment of a considerable amount of continuous volunteer work. Such types include community forestry activities like Coppice Wood College (CWC) or Woodlands Skills Centre (WSC) in Wales on communal woodland [39]. Their collective activities have evolved over many years and combine social forestry and communal land management with skills-based training and educational services on woodland management as well as craft-making. The examples also embrace strong involvement of many local individuals and groups that support the work, either through cooperation with and investments of external organizations or through direct collaboration in woodland management, crafts making and training.

Such third sector involvement has become also increasingly important in the coordination and delivery of green infrastructure in urban forestry [54]. Another example of civil society engagement with bottom-up activities can be found in negotiation processes around two formerly illegal mountain bike instalments in Swiss forests, namely the Runca Trail and the Schwanden-Brienzen Trail, where intense conflict resolution processes and stakeholder negotiations led to finally acceptable solutions for all stakeholders [38]. This kind of deliberative social processes with the engagement of numerous civil society actors proved to counterbalance the high costs, which forest owners would have otherwise had for any provisioning and maintaining of the forest recreation infrastructures that were asked for. Continuous exchange and collaborations foster trust and benefits around a common goal and ultimately collective services as output of the efforts.

4. Conclusions and Future Outlook

In order to thoroughly understand the future relevance of social innovation for the forest bioeconomy, the has applied a threefold distinction: The social innovations that cover forest owners' objectives in combination with social benefits and social needs; the ones that target forestry objectives in consistency with regional/rural development; and the social innovations that include strong civil society engagement and combat tensions within the forestry actors' network. The division is not entirely sharp and there will always be overlaps, which only mirrors the diversity and societal dynamics inherent in the concept of social innovation. From this perspective, social innovation also has structuration/organizational sides in terms of the new organizational social arrangements, as well as newly emerging local social patterns that can be outcome or initial push (Figure 1). Most of the examples for social innovation above are service-based and include strong societal and social aspects. They either involve a broader range of actors and stakeholders than mere producers and initiators, or they have strong socially inclusive features and targets. Furthermore, they cover a broad range of services and goods in the forest bioeconomy which extend from intangible features going hand in hand with the production [29]. They also include "softer" outcomes, such as ensuring of social stability or strengthening identity via collective action and the creation of some income in remoter rural areas. This distinguishes them from the perspective of a technical and production-oriented

bioeconomy strategy [42]. As social innovation includes societal benefits and services within its core meaning, it links to the bioeconomy concept foremost on the notion of sustainable development. Hence, they can connect when social innovation serves as a way to keep people in rural areas, avoid land flight, and provide (economic, educational, and cultural) opportunities. However, the coverage of key aspects of social innovation in forestry by the EU Bioeconomy Strategy resulted rather weak. Neither are social benefits and needs, (A) participation, and collective action (C) are not strongly addressed. Only sustainable rural development (B) is covered medium to strong within the Strategy's objectives due to the feature of "sustainability" (Table 1). Hence, social innovation connects to the forest bioeconomy when new institutional arrangements are created and there is inclusion of the local population. When the innovation is not merely business- and profit-driven, and when multiple actors are involved in the creation of the innovation and are also affected by its outcome, the innovations turn into social innovations. This appears to be the case with many innovations in the forest bioeconomy that involve multiple and larger constellations of actor groups and organizations and create social impacts. The decisive point is quality and degree of the social aspects of the innovations' impacts as well as the quality and degree of the inclusion of civil society actors (other than business) that are involved in order to render an innovation a social innovation. Thus, its benefit to the forest bioeconomy has to be seen in light of creating social values in its outcome, as well as in the stages of the innovation process (Figure 1). In both stages, it includes social inputs and societal engagement, as well as communication between stakeholders and the innovators, who are very often forest owners. Finally, the innovations in forestry that we detected in our analysis are most often service-driven. The EU Bioeconomy Strategy outlines a bio-based economy, which mainly focuses on products and greener production throughout all economic sectors. The forest sector serves as providing the raw material. Societal aspects are included with the strategies' objective #5 of creating jobs and otherwise implicitly addresses (e.g., with the objective #2, sustainable management of resources). Services are becoming more and more important for forest owners besides the production of timber and biomass. In some of the examples described above, it is farmers and forest landowners who found single social enterprises (as startups) and created income and employment in the region. Some also invented and found a service that serves "social" demands to the benefit of many, such as local food cooperation new to a region or other new activities around ecosystem services, like biochar initiatives or mountain bike trails. In other cases, multiple actors find consensus and mutually support an innovative project that would be difficult to realize by a single entrepreneur, farmer, or forest landowner and form associations and collective action for their land. The outcome can be recreational activities around ecosystem services, such as collective bioenergy heating systems, but also can also be protective measures, such as the formation of volunteer fire brigades. Such expanded networks are most necessary in many of the social innovations that we described as examples in private forestry and the mutual cooperation of forest owners.

In sum, the activities are creating new opportunities and are fulfilling niches in forestry. They provide opportunities out of necessities or out of mere passion of the innovators. Some use the potential of new urban needs as well, especially when it comes to recreational requirements. They provide answers to urban needs with the provision of various services or the revival of traditional activities as touristic or cultural offer. Some of the examples found are responding to environmental and ecological challenges, recognized at the local level as a problem, with the outcome of providing a better life to locals.

We conclude that these achievements are not explicitly dealt with in the bioeconomy strategies, as they are not in the main focus of the bio-based economy. Yet, clearly, the impacts and effects of social innovation mentioned above are also not in opposition to the strategy which covers all possible sectors and systems that rely on biological resources and also aims at linking the strategy to the UN Sustainable Development Goals (SDGs) [8], (p. 28).

The evolving nature of the social innovation concept made us choose a research strategy relying more on subjectively targeted sources and a wider set of search terms. Although this procedure did not follow a pre-defined protocol, it was analytical and the "best available" procedure when

taking the broad concept characteristics into consideration. Our evidence base is partly indicative and observational, suggesting social innovation benefits that will need to be confirmed in further, more rigorous studies. With these limitations in mind, we believe the following questions will be central to forest bioeconomy research for the coming years:

- What type of support do innovations in forestry need, especially for upscaling stages?
- Do we need tactical and operational management in terms of service innovations?
- Are there alternatives to the concept of social innovation in services within the forest bioeconomy?

Building on the social innovation activities and their assessment in this article, requirements for various services may thus be anticipated in years to come. Therefore, the potentially growing relevance of social innovations incorporating wider range of actors is also reasonable to expect. From a social innovation perspective, the limitations of the concept presented in the EU Bioeconomy Strategy lie in its prevalent focus on production. The strategy does not directly include the services related to forests and the forest sector. The services are likely to be very important, as they provide material (wood and non-wood), bioenergy, and a full range of other regulating and cultural ecosystem services [13], as well as intangible services [29]. The forest bioeconomy has potential, but it must consider the chances that could be derived from social innovation in the same sector. It is precisely the diversification of the forestry sector that offers broad and new opportunities for innovations, products, services, markets, and jobs than the sole deliverer of raw material. One step in this direction is a widening of its actors' networks and a consideration of social needs and societal benefits.

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Erratum to PhD Thesis

“Social innovations in forestry and innovations in non-wood forest products: the role of institutions and actors” by Ivana Živojinović

Due to an oversight by the Author during the finalisation of the thesis framework text, a final reference list was not added to the document. The erratum adds missing references to the existing list in the thesis framework text that was submitted to University of Natural Resources and Life Sciences (BOKU), Vienna in December 2020.

The Author apologises for this error.

21 January 2021, Vienna, Austria

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