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Doctoral Dissertation

Organizational and Institutional Change toward Sustainability in Higher Education Institutions. Exploring Transformations of Austrian Universities

submitted by

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in partial fulfilment of the requirements for the academic degree

Doktorin der Bodenkultur (Dr.nat.techn.)

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Affidavit

I hereby declare that I have authored this dissertation independently, and that I have not used any assistance other than that which is permitted. The work contained herein is my own except where explicitly stated otherwise. All ideas taken in wording or in basic content from unpublished sources or from published literature are duly identified and cited, and the precise references included. Any contribution from colleagues is explicitly stated in the authorship statement of the published papers.

I further declare that this dissertation has not been submitted, in whole or in part, in the same or a similar form, to any other educational institution as part of the requirements for an academic degree.

I hereby confirm that I am familiar with the standards of Scientific Integrity and with the guidelines of Good Scientific Practice, and that this work fully complies with these standards and guidelines.

Vienna, November 10, 2023 Elisabeth BOHUNOVSKY *(manu propria)*

'To be transformative, higher education must transform itself.'

Principle #1, People's Sustainability Treaty On Higher Education

Supervisory team and reviewers

Supervisory team

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Preface

This research was conducted as part of my employment at the BOKU Center for Global Change and Sustainability, which also co-financed the publication of Paper 3.

The BOKU Institute for Sustainable Economic Development (Department of Economics and Social Sciences) provided supervision through Prof. Marianne Penker and Dr. Verena Radinger-Peer and also co-financed the publication of Paper 3. Dr. Verena Radinger-Peer, meanwhile, is affiliated with the BOKU Institute of Landscape Development, Recreation and Conservation Planning.

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My work at BOKU is embedded in a solid and supportive network of people. I am happy to be part of various working groups and teams where we share our time, knowledge, and energy to strengthen sustainability at BOKU. I cannot name all of those BOKU colleagues I collaborate with, who inspire me, let me learn from their field of work, and whose spirit energizes me. Thanks to all of you – I appreciate this collaborative and supportive environment at BOKU.

Energy and dedication for a topic and work can only grow on a solid basis provided by friends and family. I am blessed with friends who always take the opportunity to ask how I am doing and to motivate me. Special thanks to Carola for the "Schreibklausur" in your lovely place in Hinterstoder – full of concentration, garnished with enjoyable talks, food, and much rain, and to Christine and Barbara for your listening, encouraging, and believing in me. Thanks to all of you for your friendship!

My parents provided the foundation of interdisciplinary thinking, and my sister and brother endured my doubts and encouraged me. Thanks, Gudrun, for sharing your good and challenging moments in your Ph.D. studies and listening to mine during our hiking tours.

Last but by no means least: Thanks, Martin and Moritz, for the supportive, understanding, and loving home that allowed me to persevere, reload, and make sense of my efforts!

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List of publications

Publications that comprise the main part of this cumulative dissertation:

Bohunovsky, L.[1], Radinger-Peer, V., & Penker, M. (2020). Alliances of Change Pushing Organizational Transformation Towards Sustainability across 13 Universities. *Sustainability*, *12*(2853). https://doi.org/10.3390/su12072853

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Bohunovsky, L., Radinger-Peer, V., Zint, M., & Penker, M. (2023). Change agents under tensions: a paradox approach to strategies for transforming higher education toward sustainability. *International Journal of Sustainability in Higher Education*, *24*(9), 372-392. https://doi.org/10.1108/ijshe-12-2022-0393

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The full text of these publications can be found in Chapter 0. An extended publication list of the author is included in Appendix D (Academic CV & Publication List).

[1] Please note that the author publishes her work under her common first name, Lisa, instead of her official name, Elisabeth.

Abstract

Higher education institutions (HEIs) as places of research, education, innovation, and critical reflection bear a special responsibility to contribute to a sustainable future for humanity. The author of this dissertation argues that fundamental transformations of organizational practices (organizational change), as well as transformations of norms, values, formal and informal regulations (institutional change), are required to meet this responsibility. Thus, this dissertation focuses on change processes toward integrating sustainability in HEIs. In the first part of this dissertation's framework, the main assumptions about change processes toward sustainability in HEIs are discussed theoretically and conceptually, i.e., what changes, why, how, driven by whom, and causing which challenges and tensions. The three publications that form the central part of the dissertation are based on a multiple-case study covering 17 Austrian universities and a mixed-method design that includes several (participatory) data collection steps as well as analytical and interpretative steps. The results show that Austrian universities strive for a comprehensive transformation despite different paths and depths of change. These change processes are primarily driven by academics, but the interplay between them, the top-management, bottom-up engagement, and the Austrian Federal Ministry of Science and Research is crucial. An in-depth analysis of the challenges and underlying tensions revealed management strategies for change agents in their transformational work. The framework ends with discussing the dissertation's limitations and contributions to scholarly literature.

Kurzfassung

Hochschulen sind Orte der Forschung, Bildung, Innovation und der kritischen Reflexion und damit auf besondere Weise verantwortlich, zu einer nachhaltigen Zukunft der Menschheit beizutragen. Die Autorin argumentiert, dass ein grundlegender organisatorischer und institutioneller Wandel erforderlich ist, um dieser Verantwortung gerecht zu werden. Die Dissertation untersucht diese Transformationsprozesse hin zu nachhaltigen Hochschulen. In einem ersten Teil der Rahmenschrift werden die wichtigsten Annahmen über solche Veränderungsprozesse theoretisch und konzeptionell diskutiert, d.h. welche Veränderungen sind notwendig, warum, wie, von wem werden sie vorangetrieben und welche Herausforderungen und Spannungsfelder werden dadurch verursacht. Die drei Publikationen, die den Hauptteil der Dissertation bilden, basieren auf einer 17 österreichische Universitäten umfassenden Fallstudie und einem Mixed-Methods-Design, das mehrere (partizipative) Schritte der Datenerhebung als auch analytische und interpretative Schritte umfasst. Die Ergebnisse zeigen, dass österreichische Universitäten trotz unterschiedlicher Wege und Tiefen des Wandels eine umfassende Transformation anstreben. Diese Veränderungsprozesse werden zu einem großen Teil von Wissenschaftler*innen vorangetrieben, aber das Zusammenspiel zwischen ihnen, der Universitätsleitung, Bottom-up-Engagement und dem österreichischen Wissenschaftsministeriums ist entscheidend. Eine eingehende Analyse der Herausforderungen und zugrundeliegenden Spannungsfelder legte Managementstrategien offen, die Akteure des Wandels bei ihrer Transformationsarbeit anwenden können. Im letzten Teil der Rahmenschrift werden Grenzen der Arbeit aufgezeigt und die Ergebnisse im Kontext der wissenschaftlichen Literatur diskutiert.

1. Introduction

Higher Education Institutions (HEIs), as knowledge producers, as places of innovation and critical reflection, and as organizations that teach future leaders, are called upon to make their contributions to current global challenges (Gratzer et al., 2019; Holst, 2022; Rieg et al., 2021). Austrian universities[2] are demanded to take over responsibility by the Austrian University Act of 2002 (UG (University Act), 2002), which starts by emphasizing the responsibility of Austrian universities "*to contribute to the personal development of the individual, and to the welfare of society and the environment*" (translation from Bundesministerium für Bildung, 2023).

Severe environmental and social crises like the climate crisis, the biodiversity crisis, social inequalities, hunger, poverty, and others dominate current human problems. While the notion of sustainable development is widespread, at least since the so-called Brundtland-Report (United Nations, 1987), the idea of a prosperous development of the society and the natural environment was further structured and conceptualized in the Sustainable Development Goals (SDGs). These globally accorded UN goals reflect the main aspects of a sustainable world by 2030 in 17 goals that cover social, environmental, and economic issues (United Nations, 2015). Sustainability or sustainable development, two terms used synonymously in this work, is – in a nutshell – a development that respects planetary boundaries and provides for social standards that allow for a good life for now and in the future. It is thus a development that guarantees "*a safe and just space for humanity*" (Raworth, 2017). Commonly, it is operationalized by the three interlinked dimensions of environment, economy, and society.

Shortly after the first global agreements on sustainable development had taken place, declarations of university leaders responded to the environmental challenges (Kohl et al., 2021). In 1990, university leaders from all over the world issued the first official statement, the Talloires Declaration (ULSF, 2023). It already stated that it needs urgent actions to address fundamental environmental problems like air and water pollution, loss of biodiversity, and greenhouse gas emissions. The signing rectors agreed to follow ten specific actions, e.g., increasing awareness, educating for environmentally responsible citizenship, involving stakeholders, and collaborating for interdisciplinary approaches.

Since then, there has been a growing response from HEIs to the call for sustainable practices in education and research to contribute to sustainable development (Kohl et al., 2021). While the notion of Sustainability in Higher Education Institutions (SHEI), i.e., the integration of sustainability aspects in HEIs, has gained traction, there remains no final answer regarding what makes HEIs sustainable and how HEIs can become sustainable. UNESCO (2021) and academic scholars (e.g., Holst, 2022; Kohl et al., 2021; Sterling, 2004) call for whole-institution approaches (WIA), i.e. holistically integrating sustainability in all areas of HEIs. A whole-institution approach means a fundamental transformation of organizational practices (organizational change) and a transformation of norms, values, formal and informal regulations (institutional change), affecting individual HEIs and the higher educational system. However, despite long-lasting calls, such a fundamental transformation in the science and educational system has yet to materialize.

Conversely, failing to transform HEIs would mean preserving them in their current unsustainable structures and practices (Loorbach & Wittmayer, 2023). As Orr (2004, pp. 7-8 in Cebrián et al., 2013) points out, environmental degradation "*is not the work of ignorant people. Rather, it is largely the result of work by people with BAs, BSs, LLBs, MBAs and PhDs*". The currently predominant logic in HEIs is one of an entrepreneurial university with a general focus on output, efficiency, and competition (Giesenbauer & Müller-Christ, 2020; Gumport, 2000). This logic of an entrepreneurial university fits well with broader societal trends of neoliberalism, managerialism, and the focus on economic growth,

[2] For a differentiation between HEIs and universities see 3.1 Research Context and Cases

which were identified by Deleye et al. (2019). It involves tendencies such as a narrow interpretation of knowledge, compartmentalization, exclusion of essential voices, Western-dominated and capitalist-driven knowledge production (Fazey et al., 2020, Table 1) that are problematic as they inhibit knowledge systems from supporting societal transformation (ibid.). Deviating from this predominant logic is difficult and thus makes change for HEIs and individual researchers challenging.

This dissertation aims to contribute to the transformation of (Austrian) universities and adds to the SHEI body of literature, which is introduced in the following. Subsequently, the dissertation's research objectives and questions and the research papers that form the main part of the dissertation are shortly presented. Chapter 2 reviews and reflects on the key concepts and strands of theory that form the basis for this dissertation. Chapter 3 describes the research context and cases, as well as the methods applied in this dissertation. Publications that comprise the main part of this cumulative dissertation are presented in Chapter 4. Finally, the main findings are summarized and discussed in Chapter 5, and conclusions are drawn in Chapter 6.

1.1. Sustainability in HEIs as a Research Strand

Along with its increasing importance in practice, the topic of Sustainability in Higher Education Institutions (SHEI) has gained an increasing reputation in scientific literature since the 1990s. The number of publications in this field has significantly increased since the mid-2010s (Holst, 2022; Omazic & Zunk, 2021; Rieg et al., 2021) due to the start of the Global Action Programme on Education for Sustainable Development (ESD) in 2015 (Holst, 2022). The vast majority (about 80%) of this body of literature is published in three journals (Montenegro de Lima et al., 2020; Omazic & Zunk, 2021; Rieg et al., 2021), namely, the Journal of Cleaner Production, the International Journal of Sustainability in Higher Education, and Sustainability.

Most of the publications on SHEI are single or multiple-case studies describing specific endeavors at HEIs (e.g., Akins II et al., 2019; Barth, 2013; Findler et al., 2019; Larsson & Holmberg, 2018; Niedlich et al., 2019; Pflitsch & Radinger-Peer, 2018; Ramísio et al., 2019; Vargas et al., 2019). This fact is also one of the main points of criticism against this strand of literature, i.e., being too focused on siloed single-case study (Rieg et al., 2021). Although these case studies provide rich narratives on individual HEIs (Findler et al., 2019), they are criticized for being rather descriptive and containing limited general insights (e.g., Findler et al., 2019; Rieg et al., 2021). Many case studies are rather success stories than critical analyses (Corcoran et al., 2004; Kyburz-Graber, 2015) and present hybrid scholar-practitioner perspectives that focus on the immediate need to share information in a rapidly changing environment (Stephens & Graham, 2010).

Moreover, only some give a more comprehensive overview of change processes (e.g., Baker-Shelley et al., 2017; Hoover & Harder, 2015; Lozano, Ceulemans, Alonso-Almeida, et al., 2015). They lack an explicitness of theoretical frameworks (Cebrián et al., 2013; Lozano, Ceulemans, Alonso-Almeida, et al., 2015; Rieg et al., 2021; Stephens & Graham, 2010), and concepts of SHEI are vague and diverse (Bautista-Puig et al., 2022, UNESCO, 2021).

Nevertheless, Rieg et al. (2021) – focusing on organizational change management for SHEI – observe an increasing number of high-quality papers with holistic yet still conceptually and thematically diverse approaches.

1.2. Research Objectives, Research Questions, and Definitions

This dissertation contributes conceptually, analytically, and methodologically to the SHEI body of literature, thus addressing several of the shortcomings mentioned above:

- It develops an analytical framework to investigate the organizational and institutional change toward SHEI ("SHEI Analytical Framework"), thus contributing to sharpening the concept of SHEI.
- Besides this rather statical view, it also takes a dynamic perspective and analyses how HEIs become sustainable.
- Moreover, tensions that hinder such change processes and strategies to deal with them are examined from a change agent's perspective.
- Furthermore, methodological contributions are made to address tensions with the participation of change agents.
- This dissertation builds on a multiple-case study that integrates findings from a majority of Austrian universities that are members of the Austrian Alliance of Sustainable Universities (Alliance) (see Chapter 3.1).

Specifically, this dissertation aims to contribute to the scientific debate on SHEI by investigating the STATUS and PROCESS of ORGANIZATIONAL and INSTITUTIONAL CHANGE toward SHEI. This overarching research objective is broken down into one research objective focusing on the status (RO1) and two research objectives focusing on the PROCESS (RO2 & RO3) of organizational and institutional change toward SHEI**.**

Each research objective is divided into two to three research questions. The first two publications of this dissertation (Papers 1 and 2) contribute to both the status and process of SHEI and cover RO1 and RO2. Paper 3 focuses on the hindering factors in change processes and, thus, on RO3. Figure 1 gives an overview and presents the research questions of this dissertation. KEY TERMS are defined in the following and discussed theory-based in Chapter 2 (see references to specific sub-chapters in the text).

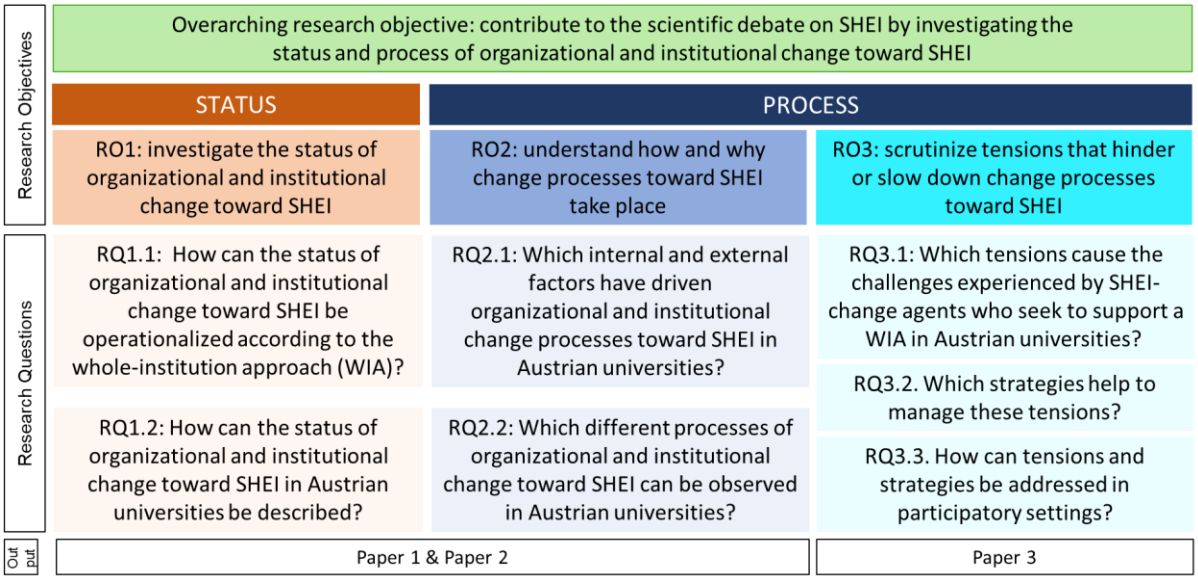


Figure 1: Overarching research objective and research objectives (RO) 1-3 referring to either the status or the process of organizational and institutional change toward Sustainability in Higher Education Institutions (SHEI), respective research questions (RQ), and reference to publication in papers 1-3.

SUSTAINABILITY IN HIGHER EDUCATION INSTITUTIONS (SHEI) refers to integrating sustainability aspects in HEIs. It per se does not account for the depth or quality of changes but comprises any endeavors of HEIs to address sustainability issues in one or more areas of the HEIs. A holistic integration of SHEI is called the WHOLE-INSTITUTION APPROACH (WIA). It addresses a fundamental transformation in HEIs' paradigms and the mainstreaming of sustainability in all areas of HEIs, i.e., research, education, campus operations, organizational culture, and societal engagement (-> Chapter 2.2).

ORGANIZATIONAL CHANGE TOWARD SHEI (-> Chapter 2.1) refers to significant alterations in HEIs' practices supporting sustainable development. INSTITUTIONAL CHANGE TOWARD SHEI (-> Chapter 2.1) refers to changes in values, norms, formal regulation, and voluntary standards that influence the – more or less sustainable – behavior (i.e., social practices) of the organization and its members. It is essential to note the twofold aspects of the term "institutions/institutional": In HEIs (higher education institutions) or WIA (whole-institution approach), the term "institution" refers to HEIs as an organization[3]. Whereas here and in the following, "institution" is framed in the narrow sense of values, norms, formal regulation, and voluntary standards.

By differentiating between the STATUS and the PROCESS of organizational and institutional change toward SHEI, the focus is either on the type, area, and depth of change (-> Chapter 2.1, 2.2, 2.3) or on drivers and pathways. Asking why change takes place strongly relates to driving factors of change (-> Chapter 2.4.). EXTERNAL FACTORS refer to factors that HEIs are influenced by, relate to, network with, or depend on. Such external factors constitute the organizational field of HEIs and mainly denote the government, other HEIs, funding organizations, and other stakeholders that do not belong to the HEI. INTERNAL FACTORS OF CHANGE distinguish individuals or groups from within the organization that take over leadership and agency. In this dissertation, internal factors specifically refer to Change Agents (-> Chapter 2.5.), defined as individuals who actively participate in SHEI change processes as they initiate, run, or support them.

TENSIONS refer to the assumption that challenges and barriers (Chapter 2.6.) that hinder or slow down change are often rooted in (more or less hidden) contradictions (Chapter 2.7). Such (paradoxical) tensions consist of two or more contradictory yet interrelated poles. As such, they cannot be "solved". If addressed right, they can be managed in a virtuous way, however. These ways of addressing tensions are called MANAGEMENT STRATEGIES, i.e., actions that can be taken to overcome barriers that hinder or slow down change. (-> Chapter 2.8.)

[3] Universities can be seen as organizations and institutions (Olsen, 2007), the latter in the sense of "*a relatively enduring collection of rules and organized practices, embedded in structures of meaning and resources that are relatively invariant in the face of turnover of individuals and relatively resilient to the idiosyncratic preferences and expectations of individuals and changing external circumstances*" (ibid., page 5).

1.3. Research Papers: Core of the Dissertation

In accordance with the requirements for a cumulative dissertation at BOKU University of Natural Resources and Life Sciences Vienna, this dissertation consists of two publications as first author in journals with impact factor (Paper 1 and 3) and this framework paper. Moreover, a third publication (German, editor-reviewed) is included, to which I contributed as a second author (Paper 2). It adds a dynamic perspective to the results from Paper 1.

Paper 1, "Alliances of Change Pushing Organizational Transformation Toward Sustainability across 13 Universities" (Bohunovsky, Radinger-Peer, et al., 2020), sets the foundation by developing an analytical framework ("SHEI Analytical Framework") (RQ1.1) that was applied to scrutinize SHEI in 13 Austrian universities. The framework differentiates between the depth, the area, and the type of change (RQ1.2) and addresses internal and external drivers of change (RQ2.1).

Paper 2, "Strukturelle Einbettung von Nachhaltigkeit an Österreichischen Universitäten" [Structural embedding of Sustainability in Austrian Universities] (Radinger-Peer & Bohunovsky, 2021), builds on the "SHEI analytical framework" and findings. This paper analyzed changes and actors with a time perspective to identify four types of change representing different pathways of change processes of Austrian universities (RQ2.2).

Paper 3, "Change Agents under Tensions. A Paradox-Approach to Transforming Higher Education toward Sustainability" (Bohunovsky et al., 2023), focuses on change agents' unique role in SHEI change processes. It analyzes challenges experienced by change agents to uncover underlying tensions (RQ3.1). It also presents management strategies (RQ3.2) that change agents identified to address these tensions. Finally, a methodological approach is developed to address tensions in a participatory setting (RQ3.3).

These publications comprise the main part of this cumulative dissertation. They are summarized and presented in full text in Chapter 4.

2. Understanding Change toward SHEI – Theories & Concepts

This section introduces the theoretical and conceptual basis of this dissertation that builds on the SHEI body of literature, organizational and institutional theory, as well as paradox theory. By doing so, this dissertation is positioned within the broader debates in the literature.

The first part of this section focuses on the status and process of change and is structured as follows:

- Two types of change are differentiated, i.e., organizational and institutional change (Chapter 2.1.)
- Diving deeper into specific changes in SHEI, the areas and topics of HEIs affected by SHEI are presented, and the whole-institution approach is introduced (Chapter 2.2.)
- The depth of change, i.e., the question of how profound change is, comes to the fore (Chapter 2.3.)
- Driving factors of change, i.e., the why, are discussed (Chapter 2.4.) before,
- change agents as internal driving forces come into focus (Chapter 2.5.)

The second part of this section focuses on why change is happening much more slowly than expected (Hueske & Guenther, 2021; Kemp & Scoffham, 2022).

- It starts by describing barriers and challenges as described by SHEI scholarship (Chapter 2.6.).
- Then, the assumption is deepened that SHEI triggers fundamental contradictions within HEIs that might cause these barriers and challenges (Chapter 2.7.).
- Finally, paradox theory is introduced, which proposes an alternative way to think about contradictions (Chapter 2.8.).

In Figure 2, key concepts, main theories, and respective bodies of literature are shown, as well as how they contribute to answering the research questions. Theories drawn on for RQ 3.3 are not included in this chapter, as RQ 3.3. is a methodological question. Further details can be found in Chapter 3.4.2.

2.1. The Organizational and Institutional Level of Change

Introducing and strengthening SHEI is a change process that affects the main parts of the organization (Holst, 2022) and challenges the organization's current institutional logics (Greenwood et al., 2015). Thus, it makes sense to look at SHEI from two perspectives: the organizational change perspective and the institutional change perspective.

An organizational change perspective toward SHEI focuses on significant alterations in HEIs' practices that support sustainable development. As Kezar (2011) points out, definitions of organizational change are difficult as a common language in this research field is missing, and theories differ. Usually, organizational change deals with analyzing why, what, and how change happens. Furthermore, it asks about the target of change (ibid.). Moreover, the question of what hinders change is at the center of research on organizational change toward SHEI. According to Rieg et al. (2021), organizational change research focuses on the context, content, and processes of change with a particular focus on the human factor. The organizational perspective emphasizes the role of managers in the change process (Greenwood et al., 2015) and their actions for change.

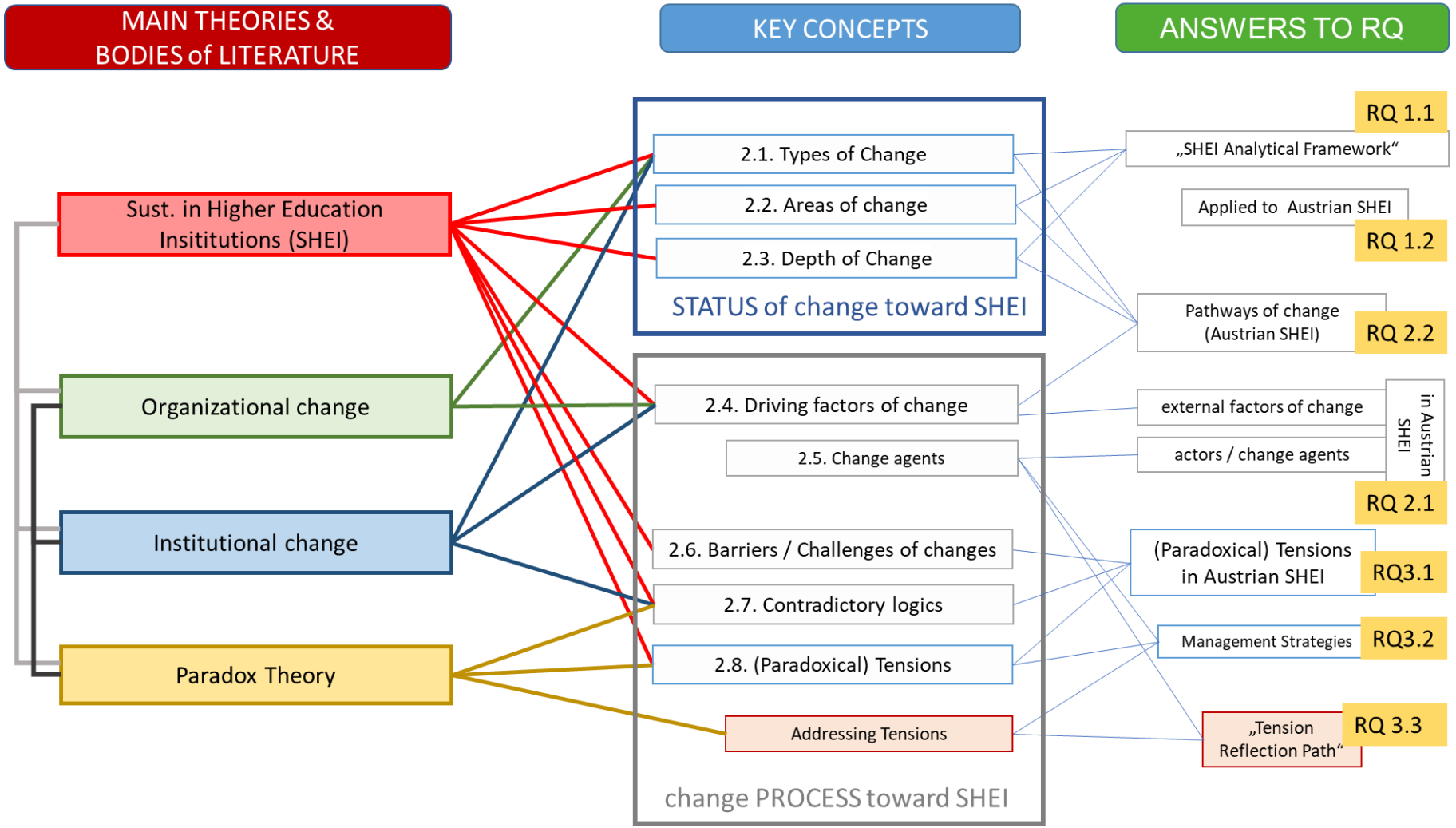


Figure 2: Main theories, bodies of literature, their relation to key concepts of this dissertation (incl. chapter numbers), and how they contribute to answering the research questions. For research questions (RQ1.1-3.3), see Chapter 1.2.

Most publications in SHEI focus on the organizational level and follow an organizational change management approach (e.g., Akins II et al., 2019; Bien & Klußmann, 2021; Blanco-Portela et al., 2017; Verhulst & Lambrechts, 2015), i.e., they analyze how change takes place in HEIs, but they also ask how this change can be managed and pushed ahead (Verhulst and Lambrechts 2015; Rieg, Gatersleben, and Christie 2021).

An institutional change perspective toward SHEI focuses on changes in the institutional context, which consists of values, norms, formal regulation, and voluntary standards that influence the behavior (social practices) of (people in) the organization (Haunschild & Chandler, 2008). Examples of institutional change are the implementation of new formal regulations or the official announcement of new voluntary standards, which legitimize new social practices in favor of sustainability or delegitimize unsustainable behavior. Thus, an institutional-level approach focuses on values, norms, and rules that enable or hinder change and emphasizes broader, sociocultural factors of change – managers only playing a secondary role (Greenwood et al., 2015). Institutions can be part of the organization itself (e.g., rules apply to one specific organization) or the organizational field (e.g., rules apply to all organizations in the field).

SHEI scholars mention the following – quite diverse – aspects under "institutional framework" (Blanco-Portela et al., 2017; Lozano, Ceulemans, Alonso-Almeida, et al., 2015; Omazic & Zunk, 2021; Radinger-Peer & Pflitsch, 2017): sustainability policies, ordinances, guidelines, visions, missions, strategies, action-plans, environmental management programs, sustainability offices, declarations, commitments, charters, initiatives, or partners. On the organizational field level, especially the evaluation system, career systems, HEIs legislation, funding organizations and programs, as well as policy strategies are mentioned as important institutional frames that influence SHEI (Radinger-Peer & Pflitsch, 2017; Sigl et al., 2020), as they exert coercion or offer incentives. Single HEIs can hardly influence institutions that derive from the organizational field level. In the SHEI body of literature, often, no distinction between internal institutions (organizational level) and external institutions (organizational field level) is made. Although SHEI initiatives can take place without affecting the institutional framework, institutional change is essential when aiming at a holistic integration of sustainability in HEIs, as it can influence decision-making, resource distribution, and stakeholder behavior (Rieg et al., 2021).

Both, organizational and institutional change, are inseparably intertwined with (individual, organizational and institutional) learning (Mayntz & Scharpf, 1995). **Organizational learning** – like individual learning – means to change the range of potential behavior due to the processing of information (Huber, 1991 in Haunschild and Chandler, 2008). Organizational learning can be broken down to knowledge acquisition, information distribution, information interpretation, and organizational memory (ibid.). In contrast to individual learning, organizational learning refers to changing routines which are independent from individual actors (Haunschild & Chandler, 2008).

Institutional learning means the change of values, norms, formal regulation, and voluntary standards (Greenwood et al., 2015). It includes so-called double-loop learning which is the reflection of current assumptions and norms (Argyris & Schön, 2018). Double-loop learning exceeds single-loop learning, as the latter does not question fundamental goals and activities of an organization. This differentiation of learning thus also refers to the depth of change (see Chapter 2.3). Cebrián et al. (2013) combine Argyris and Schön's model with further learning theories into a model of organizational learning toward sustainability, highlighting the importance of individual transformation, becoming a learning organization, deal with cultural and historical contradictions and effective leadership.

Reference to papers of this dissertation:

The "SHEI Analytical Framework" developed in Paper 1 of this dissertation integrates both organizational and institutional change. The type of change toward SHEI refers to organizational changes on the one side and institutional changes on the other.

2.2. Areas of Change

HEIs are organizations that consist of various areas (sub-systems). Usually, one speaks of three HEIs' missions, each represented by a different sub-system: research, teaching/education, and societal engagement. Besides this, HEIs are physical structures and social entities with a specific organizational culture. Organizational and institutional change toward SHEI means to address sustainability aspects in (all of) these areas. While some publications refer to different numbers and slightly differently defined areas, this dissertation sticks with the five areas defined in the Handbook for Sustainability Strategies of the Alliance of Sustainable Universities in Austria (Bohunovsky, Weiger, et al., 2020): campus operations, education, research, societal engagement, and organizational culture (see Figure 3).

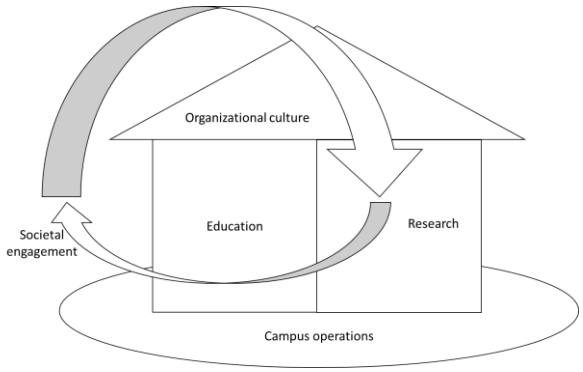


Figure 3: Simplified overview of HEIs' sub-systems (areas).

The ultimate goal of sustainability in **campus operations** is to reduce the ecological impact of what HEIs are doing. This calls for changes in physical structures and technologies but also changes in the daily routines of employees and students. Sustainability in campus operations includes endeavors to increase energy efficiency and reduce greenhouse gas emissions, waste, or save water, but also a focus on sustainability in food or transport (Holst, 2022; Omazic & Zunk, 2021; Rieg et al., 2021). Assessment of and reporting on SHEI, which is often seen as a separate category (e.g., Lozano, Ceulemans, Alonso-Almeida, et al., 2015), is also included in this area, as it often focuses on or at least touches many operational aspects. Diverse environmental management systems like EMAS (Eco-Management and Audit Scheme), ISO 50001, etc., address environmental aspects. As students also learn outside the auditorium, sustainable campus operations are vital to SHEI. By integrating sustainability into campus operations, HEIs can function as a living experiment for a sustainable future (Holst, 2022; Rammel & Vettori, 2021).

One aspect of campus operations that has a high environmental impact and is often explicitly discussed for HEIs is emissions from airplane travel (Nursey-Bray et al., 2019; Plieninger et al., 2020; Schmidt, 2022; Schrems & Upham, 2020; Schreuer et al., 2023; Wynes et al., 2019). Exchanging with the international research community is a vital part of research. Still, it also causes high greenhouse gas emissions, especially if trips to conferences or meetings are made by airplane. Nursey-Bray et al. (2019) e.g., demonstrate how difficult it is for researchers to reduce airplane travel despite their worries about climate change, as international exchange is deeply rooted in academic routines. This

example shows that a sustainability turn in campus operations exceeds technical approaches and touches academic norms and routines.

Education for Sustainable Development (ESD) has strong political foundations as already in 2005, the United Nations Decade of Education for Sustainable Development (2005-2014) was declared, followed by the UN Global Action Programme on Education for Sustainable Development (2015-2019) (UNESCO, 2014) and the current ESD for 2030 framework (UNESCO, 2021). One of the priority action areas of the UNESCO framework is the transformation of learning environments. Therefore, in a broader sense, the term ESD is sometimes used as an overarching term synonymously for S(H)EIs. In a narrow sense and the context of this dissertation, ESD refers to aspects of teaching and education on all levels (from primary to higher education) as well as in formal, informal, and non-formal settings education (Singer-Brodowski et al., 2019).

ESD discusses what is taught and how it is taught (pedagogy and didactics) (e.g., Tejedor et al., 2019). The idea is that learners should acquire the necessary competencies to contribute to sustainable development (Barth et al., 2007; Brundiers et al., 2021; Mochizuki & Yarime, 2015; Rieckmann, 2012; Wiek et al., 2011). But ESD is also a strongly value-based concept of learning. It is linked to concepts of justice, equity, tolerance, sufficiency, and responsibility. Inter- and transdisciplinarity are two important aspects of ESD (Mochizuki & Yarime, 2015), as well as the appreciation of diverse sources of knowledge (e.g., Bohunovsky & Keller, 2023; Caniglia et al., 2020).

Taking these ideas seriously, education institutions would have to fundamentally change their teaching approaches, which are currently very much knowledge-oriented, disciplinary, and enhance rather linear problem-solving approaches (Loorbach & Wittmayer, 2023). Thus, ESD calls for changes in teachers' teaching approaches, methods, and didactics, but also respective frame conditions like opportunities for team teaching, action-oriented or project-oriented teaching, and appropriate learning environments (Holst, 2022). On an institutional and higher educational level, it includes the development of curricula with a sustainability focus, integrating sustainability in existing classes, or ESD training and qualification for higher education teachers and respective support structures (Fischer et al., 2022; Omazic & Zunk, 2021; Singer-Brodowski et al., 2019).

Research, as the other primary mission of HEIs, is also discussed as an area to change regarding sustainability. Sustainability science "*seeks to understand the fundamental character of interactions between nature and society*" (Kates et al., 2001, page 641). Hugé et al. (2016, page 86) define the more generic term "research for sustainability" as "*science performed in a solution-oriented context of social relevance, characterized by complexity, uncertainty and the importance of values.*" Although research for sustainability can be monodisciplinary, inter- and transdisciplinary approaches are especially important in this field, as they expand system boundaries and increase the knowledge base beyond the scientific field (UNESCO, 2017). Transformative research, as a type of research that focuses on action and participation for sustainability, expands the boundaries of science even more (Loorbach & Wittmayer, 2023).

Such research approaches require changes in HEIs' structures, like new funding schemes, changes in research and career evaluation schemes, different organizational structures (e.g. to operationalize transdisciplinarity), capacity building, policies, modified review and reward systems, new collaborations and partnerships, or the removal of hindering factors for sustainability research (Gratzer et al., 2019; Holst, 2022; Hugé et al., 2016; International Science Council, 2021; Krainer & Winiwarter, 2016; Omazic & Zunk, 2021; UNESCO, 2017; Whitmer et al., 2010). Yarime et al. (2012) also name educational and research programs, academic societies, associations, and textbooks and journals as important aspects of institutionalizing research for sustainability.

The area of **societal engagement** encompasses outreach activities and knowledge exchange between HEIs and society. It is strongly related to transdisciplinarity, where research is co-designed, co-created, and co-implemented with societal stakeholders (Lang et al., 2012; UNESCO, 2017). Moreover, this area includes science communication, collaboration with other scientific and non-scientific stakeholders,

sustainability events open to the broader public, participation in sustainability-related networks, cooperation with the regional environment, etc. (Lozano, Ceulemans, Alonso-Almeida, et al., 2015; Omazic & Zunk, 2021).

This area is often called the 3rd mission of a HEI, besides research and teaching. This denomination implicitly expresses the importance of societal engagement within HEIs, as it comes after research and teaching – a fact that also makes it difficult for researchers to take over societal responsibility (Sigl et al., 2020). Thus, to strengthen societal engagement, it would need a shift in value and incentive structures (e.g., in hiring or evaluation procedures) in scientific organizations to establish "*new reference practices and also in establishing new structural conditions*" (ibid., page 1590).

Furthermore, to mainstream sustainability in HEIs, it is important to address the **organizational culture and governance** of HEIs. This area includes integrating sustainability into the institutional framework, i.e., policies, vision, or mission, but also founding sustainability offices and signing respective declarations, charters, and initiatives (Omazic & Zunk, 2021). It also relates to how sustainability is organized within HEIs, i.e., governance issues (Holst, 2022). On-campus experiences for sustainability are another vital factor of SHEI (Lozano, Ceulemans, Alonso-Almeida, et al., 2015; Omazic & Zunk, 2021): i.e., sustainability working group, sustainability policies for students and staff, sustainable practices for students, visibility of sustainability throughout the campus, sustainability awareness raising in the campus, and student and staff engagement. The Handbook of the Alliance of Sustainable Universities in Austria also includes social aspects like equality and diversity or accessibility and activities of conscious raising among the employees (Bohunovsky, Weiger, et al., 2020).

Not all of these changes can be driven by a single HEI. Some can only be achieved on the field level, e.g., funding schemes, journals, and research programs can hardly be implemented for one organization. Accordingly, Holst (2022) identified three critical external conditions, i.e., prioritization in policies, sufficient and long-term funding, and access to expertise and support.

It is important to note that these areas and topics are highly interlinked with each other: e.g., transdisciplinarity links research and education to societal engagement (Lang et al., 2012); the area of operations is linked to research, e.g., through research-related traveling (Nursey-Bray et al., 2019; Schmidt, 2022) or to education when acknowledging that learning also takes place outside the classroom (Holst, 2022; Rammel & Vettori, 2021). The claim to mainstream sustainability in all areas of HEIs and to aim for a holistic integration and fundamental transformation of HEIs is called a **whole-institution approach (WIA)** (Holst, 2022). Often, it is referred to as a system redesign, a paradigmatic change (Sterling, 2004), in contrast to an add-on, which means that sustainability is yet another topic attached to what is already done (Holst, 2022).

WIAs are widely referred to in scholarly literature (e.g., Baker-Shelley et al., 2017; Dlouhá et al., 2017; Kohl et al., 2021; Lozano, 2006; Rieckmann & Bormann, 2020; Ruiz-Mallén & Heras, 2020b), but also called for in political documents (e.g., Representatives from twenty five higher education agencies, 2012; UNESCO, 2021). While on the one hand, this claim for WIAs is widespread, on the other hand, there remains a lack of whole-institution approaches and perspectives in practice (Holst, 2022).

Holst (2022) recently addressed the lack of clarity regarding the concepts of a WIA and identified areas of action, core principles, and critical external conditions for a WIA. As mentioned before and supported by Niedlich et al. (2019), he defined the organizational culture as an overarching and essential issue, as it is affected and affects all core principles of a WIA and areas. His core principles include (applied to HEIs), (a) coherence within all parts and roles of an HEIs, (b) SHEI as a continuous learning process (HEI as learning organizations), (c) a participatory and inclusive setting, (d) the responsibility of various actors, and (e) SHEI as a commitment that takes its time. He thus stressed that WIA is more than integrating sustainability in selected areas of HEIs as an "add-on". This discussion about deeper, fundamental changes strongly relates to the next topic, i.e., the depth of change.

Reference to papers of this dissertation:

All three papers of this dissertation follow a whole-institution approach. In accordance with the "Handbook for Sustainability Strategies" of the Austrian Alliance of Sustainable Universities (Bohunovsky, Weiger, et al., 2020), the five areas described above (campus operations, education, research, societal engagement, and organizational culture) are considered in the "SHEI Analytical Framework" developed and applied in Paper 1 and Paper 2 (see Chapter 3.4.1). Tensions discussed in Paper 3 also relate to all areas described here. Analyzing if sustainability is integrated into HEIs only in some or all of these areas means investigating how broadly sustainability is integrated into HEIs. It thus contributes to research objective 1 (RO1): to investigate the status of organizational and institutional change toward sustainability in universities.

2.3. Depth of Change

As already mentioned before, many authors claim that SHEI means a deep transformation of how HEIs work (e.g., Representatives from twenty five higher education agencies, 2012; Sterling, 2004) – an argument that goes beyond the breath of change (number of areas of universities included) and instead stresses the depth of change.

Sterling (2004), e.g. proposes a four-stage model for responses to sustainability. The initial stage reflects a very weak response, which entails denial or minimal, superficial adjustments; weak responses are characterized by making add-on changes and cosmetic reforms. In contrast, strong responses actively incorporate sustainability principles and do serious greening. Finally, a very strong response entails rebuilding the educational system and integrating sustainability holistically. The latter means an epistemological change toward holistic sustainability principles and a change in ethos, purpose, and policy.

Giesenbauer & Müller-Christ (2020) differentiate between four narratives of universities, HEIs 1.0-4.0. In short, the 'traditional' HEIs 1.0 narrative emphasizes preserving universal truth, the authority of professors, and disciplinary separation and unlikely integrates sustainability issues. A 'modern HEIs 2.0' narrative resembles entrepreneurial institutions focusing on economic development, research standardization, peer-review, competition for grants and students, and rankings. Sustainability is seen as a management task. 'Postmodern' HEIs 3.0 strengthen the dialogue with stakeholders and learners and inter- and transdisciplinarity. Sustainability is seen as a community task and 3rd mission content. An 'integrative' HEIs 4.0 narrative follows a system-centric, holistic, whole-institution approach toward sustainability and actively contribute to the co-creation of sustainability. Although most universities today align with the HEIs 2.0 narrative, elements of the traditional model can still be found in each university. Only individual researchers or small projects currently follow the ideal of HEI 3.0 or HEI 4.0 – while simultaneously having to comply with the rules of the predominant higher education system.

A similar three-stage model can be found for education and research regarding sustainability. Mochizuki and Yarime (2015) differentiate three levels of sustainability education: education about sustainability, education for sustainability (ESD), and education as sustainability. While education about sustainability is mainly content-based, ESD is oriented toward problem-solving and includes a "critical questioning of assumptions". Education as sustainability includes transformative learning, i.e., a shift of worldviews (Mochizuki & Yarime, 2015, page 19). Regarding research, they differentiate multi-, inter-, and transdisciplinary approaches toward sustainability (ibid.)

These pieces of literature stress the fact that a closer look at the depth of change is necessary when analyzing organizational and institutional change in HEIs.

Ferrer-Balas et al. (2008) developed a three-dimensional approach to analyze system change, which served as an input for the "SHEI Analytical Framework" developed in Paper 1 of this dissertation. Each dimension of Ferrer-Balas et al.'s (2008) FLA approach is differentiated into four stages (scale of 0 to 3 – with 0 always referring to "no change/no involvement") and described in the following:

- The F-dimension (framework) relates to organizational culture, structures, processes, and technologies – and the question of whether changes in these fields are only initiated (stage 1), practiced progressively (stage 2), or addressed simultaneously, i.e., mainstreamed (stage 3). This dimension relates closely to the type of change and the areas and topics of activity.
- The L-dimension (level) reflects the characteristics of change. Ferrer-Balas et al. (2008) differentiate between optimization (stage 1, e.g., through quality management, audits); improvement (stage 2, i.e., reorganization, redesign); or a real renewal of the system (stage 3, i.e., fundamental changes in structure, culture, and technology). These stages of change also span different timeframes, i.e., 1-5 years, 5-20 years, or more than 20 years, respectively. Similar stages of change appear in Fazey et al. (2018), who differentiate three types of change (incremental, reform, transformation) with their core dynamics of replication, reorganization, and transcendence regarding transformation research. These steps also relate to the idea of education about, for, as sustainability by Mochizuki and Yarime (2015) or Sterling's model (2004, see above). Also, Ruiz-Mallén and Heras (2020a) differentiate between three stages of change when looking at sustainability discourse traits (what does sustainability mean?) and practice traits (how is sustainability promoted in practice?) in HEIs: (1) technological optimization and ecological modernization (i.e., improvement), (2) organizational transformation (changing values, behaviors, and attitudes of the organization) and resilience, and (3) system-building (i.e., changes on the field level) and society transformation.
- Moreover, the A-dimension (actors) of Ferrer-Balas et al. (2008) displays how many different persons (groups) carry or are involved in the change process. The scale starts with only one actor involved (stage 0) and expands to only internal actors involved (stage 1), to internal and external actors of the same (stage 2) and of different nature (stage 3) involved. Participation is a core principle of a WIA (Holst, 2022) as it increases inclusion, democratization, and thus also the ownership of the process. The more (different) actors are included, the higher the complexity of relationships and stakeholder management. But the number and kind of actors involved in the change process also show how deeply change is interwoven in the organization.

Reference to papers of this dissertation:

In this dissertation, Ferrer-Balas et al.'s (2008) framework was used as input for operationalizing the depth of integration (see Chapter 3.4.1) in the "SHEI Analytical Framework".

2.4. Driving Factors of Change

Organizational and institutional change may occur due to different driving factors – which of these are analyzed and considered important depends on the theories that scientists build on. E.g., social-cognition-based theories of change acknowledge the individual recognition of the need for change; political theories see clashing belief systems and their representatives behind change (Kezar, 2011). While organizational change theory emphasizes the role of people as change agents, institutional theory emphasizes broader socio-cultural factors (Greenwood et al., 2015). This closely relates to the question of whether driving factors emerge from the environment (i.e., externally, exogenously) or at the individual actor level (i.e., internally, endogenously) (Haunschild & Chandler, 2008).

Concerning institutional learning (i.e., the change of values, norms, formal regulation, and voluntary standards), Greenwood et al. (2015) differentiate "reflexivity", i.e., the ability to challenge existing logics and come up with alternatives, and "theorization", i.e., the ability to legitimatize new logics. Reflexivity as a starting point can occur (a) as agents react to external shocks, (b) due to contradictions, or (c) out of agents' initiatives "*driven by the need to get things done*" (ibid., page 328). Shocks and incomplete institutionalization, i.e., contradictions, are also mentioned by Haunschild and Chandler (2008) as an external force – they add the search for legitimacy on the field level as an external factor. As endogenous forces, they name interest, agency, and institutional entrepreneurs – the focus of the following chapter. Moreover, Haunschild and Chandler (ibid.) argue that analyzing internal and external factors of change does not account for the whole picture. They add institutional-level learning as a third kind of factor. It arises as an (unintended) consequence of, e.g., changes in the organizational field or societal/political changes, deliberate action, imperfect copying, or due to unlearning of organizational routines. Many of these institutional learning processes derive from changes in the organizational field or directly related partner organizations (e.g., networks).

Many driving factors described in the SHEI body of literature are also described as barriers – depending on how they are configured: people, e.g., can be both supporters and inhibitors. Policies and government regulations are also called drivers and barriers (Ávila et al., 2019). Incentives, funding, and infrastructure to support sustainability behavior (Aleixo et al., 2018; Verhulst & Lambrechts, 2015) are external drivers as they arise from the government, other HEIs, and other funding organizations. Conversely, their absence can impede change.

In line with the literature on institutional change, peer-pressure from other universities and HEI-networks are mentioned as important drivers of change (Dlouhá et al., 2018). Moreover, regional and national stakeholders and business partners, suppliers, and communities can be named external actor groups (Barth, 2013; Dlouhá et al., 2018). Deleye et al. (2019, table IV) highlight 16 opportunities for sustainability transitions in Flemish HEIs as potential drivers. Many of them build on the currently predominant characteristics of HEIs, like using internationalization or sustainability as a quality criterion or sustainability labels and rankings. Change agents can utilize them as potential starting points for their endeavors. The next chapter focuses on the role of change agents, more specifically.

Reference to papers of this dissertation:

RQ2.1 focuses on why change happens, i.e., which internal and external factors drive change. In Papers 1 and 2, we differentiate between internal and external factors that drove change in Austrian universities. As all case study universities are members of the Alliance of Sustainable Universities in Austria, the role of this network is investigated in Papers 1 and 2. Networks play an important role in institutional-level learning.

2.5. Change Agents

The term "change agent" in this dissertation refers to similar terms such as leadership, championship, policy entrepreneur, frontrunners, the human factor, or (internal) stakeholders. While actors only participate in change, change agents can prescribe behavior and thus drive change (Otto et al., 2020) and have a sense of problem ownership as they actively address the issues (Wittmayer & Schäpke, 2014). The term strongly relates to agency, i.e., the "*capacity of individual and collective actors to change the course of events or the outcome of processes*" (Otto et al., 2020, page 1), which can be assumed individually or collectively, in a daily context or politically/strategically planned (ibid.).

The question of agency and the role of change agents are also widely discussed concerning institutional change. Institutional change agents are actors who change institutions, i.e., create new

ones, alter, strengthen, or weaken existing ones, according to their interests (Battilana, 2016; Haunschild & Chandler, 2008; Mayntz & Scharpf, 1995; Sotarauta & Pulkkinen, 2011). Their ability to change institutions and break with existing rules depends on their (material or human) resources and willingness. Battilana (2016) focused her research on the individual, institutional change agent and suggested that it is primarily the individual's social position that enables actors to become institutional change agents, i.e., their status within the organization and the organizational field.

An important theoretical debate regarding the role of change agents is the so-called "paradox of embedded agency". It refers to the question of why and how change agents perceive the need to change institutions – given the assumption that the institutions form our social environment and how we see reality (Haunschild & Chandler, 2008). Battilana (2016) states that this paradox mainly derives from the underrepresented role of human agency in theoretical discourse. Linking the individual level (of change agents) with the organizational (field) level can help to overcome this paradox.

In the SHEI body of literature, the term "change agent" denotes both individuals (e.g., in Caldwell, 2003; Hesselbarth & Schaltegger, 2014; Lozano, Ceulemans, & Scarff Seatter, 2015; Warwick, 2016) as well as organization (e.g. universities as change agents in (Jorge et al., 2019; Leal Filho et al., 2019; Niedlich et al., 2019; Peer & Stoeglehner, 2013; Stephens et al., 2008). **In the context of this dissertation, the term is only used for individuals who intentionally initiate and drive change toward SHEI from within the organization.** Deleye et al. (2019) address change agents as persons who manage to deal with the challenges and opportunities and make the way free to solutions, as "*they can locate the necessary funds, know important actors and build networks, they know where, when and by whom decisions are made, and they know how they can put pressure on the existing regime*" (ibid., page 1112). As these change agents are often researchers or administrative staff, they have to follow a double role: perform within the current system while trying to change it. The situation is different for HEI-internal sustainability coordinators, who are specifically in charge of fostering sustainability. Moreover, students act as agents in initiating change processes in many universities (Barth, 2013), although they are quite a fluid group.

SHEI scholars point out that people and their underlying worldviews and value systems within HEIs can oppose change or thus hold up the status and make change difficult (Akins II et al., 2019; Blanco-Portela et al., 2017; Ruiz-Mallén & Heras, 2020a). But people also act as important drivers of change, as they act as "committed", "creative" or "enthusiastic" "champions" (Deleye et al., 2019; Hoover & Harder, 2015; Kemp & Scoffham, 2022) that take over leadership. What might also affect this divergent perception of people is what Hoover and Harder (2015) criticize as "power pointing", i.e., the tendency of people to see others as barriers to change instead of recognizing one's possibilities to drive change.

As status and power critically influence the ability of people to act as change agents (Battilana, 2016), the high internal differentiation of people in HEIs has to be considered. The main internal actor groups are students, faculty (i.e., professors, academic staff, researchers, lecturers), top-management (i.e., rectorate and other high-level leadership positions), and staff (i.e., service personnel, (technical) administrators, non-academics) (e.g., Akins II et al., 2019; Aleixo et al., 2018; Deleye et al., 2019; Niedlich et al., 2019). Groups differ regarding tasks, values, power, culture, and status (cf. multiple power and authority structures, or professional and administrative values in Kezar, 2011).

Reference to papers of this dissertation:

Change agents play a fundamental role in this dissertation, as interviews with change agents build the basis for all three publications. While Papers 1 and 2 examine who are the change agents within SHEI change processes in Austrian universities, Paper 3 also includes change agents of Austrian universities in the research to collaboratively elaborate on tensions they experience in their work and on strategies to deal with these tensions. For this dissertation, change agents are defined as people who take a leading role in their universities' sustainability-change process. They are mostly delegated by their

rectorate to be part of the so-called expert group of the Alliance of Sustainable Universities in Austria. While some acted out of their position within the university, some started as actors of bottom-up initiatives (see Papers 1 and 2).

2.6. Challenges and Barriers of Change

Many SHEI publications elaborate on barriers reported in case studies or interviews regarding what hinders and slows down change. It is striking that many barriers are defined negatively, i.e., as missing (pre-)conditions. Often, the wording "lack of" is used to denominate barriers.

Ávila et al. (Ávila et al., 2019; Ávila et al., 2017), e.g., present a long list of "lack of"-items that were compiled from an online survey with international respondents (rectors, green office managers, and SHEI researchers). Their top 10 items are:

1. Lack of planning and focus on the topic
2. Lack of environmental committee
3. Lack of applicability and continuity of innovation and sustainability actions
4. Resistance to changes in behavior
5. Lack of commitment toward innovation and sustainability
6. Lack of training and collaboration
7. Strong culture and conservatism between people involved parties
8. Lack of research and development (planning, projects, research)
9. Lack of awareness and concern (both staff and faculty)
10. Lack of building with appropriate sustainable performance

Blanco-Portela (2017) extracted various barriers from 26 original research papers and sorted them by area of influence: (a) internal structure of the institution, e.g., lack of interdisciplinarity, the competitive environment, etc.; (b) external factors to the institution, e.g., lack of pressure from society or future employers, lack of government regulations, and (c) stakeholders, e.g., lack of training, cultural barriers, lack of academic interest, (d) institutional framework (e.g., lack of action plan, lack of clarity, lack of institutional criteria; and finally, (e) resources (e.g., lack of financial resources, incentives, available working hours).

These long lists of barriers give a good impression of what change agents experience in their daily work. The categorizations help to find overarching topics or to identify the levels where these barriers appear. However, they do not help to understand interactions and mutual influence or changes over time (Niedlich et al., 2020; Verhulst & Lambrechts, 2015).

Several SHEI scholars have called for further elaboration on barriers, contradictions, and underlying tension. Hoover and Harder (2015) and Bien et al. (2020) mention the need to deal with hidden contradictions and tensions that lead to barriers to change as one requirement for successful organizational change management for sustainability in higher education institutions. Also, Ruiz-Mallén and Heras (2020a) call for a "*deep and critical reflection of the worldviews, contradictions and tensions in the discourses and practices*" to build common pathways toward sustainability. Therefore, gaining a more fundamental understanding of the contradictions associated with SHEI is essential.

Reference to papers of this dissertation:

Paper 3 starts from challenges mentioned by change agents in the interviews to further investigate tensions that might be the underlying reason for them to hinder and slow down SHEI processes.

2.7. Contradictory Tensions and Logics

Organizational and institutional changes toward SHEI, like the ones described in the previous chapters, trigger a number of contradictory logics between current logics of HEIs and SHEI, as deeper and truly transformative changes put fundamental assumptions of HEIs to question.

Although there are different concepts behind a "transformative university" that differ regarding theories and concepts of university-society-relationships, forms of knowledge acquisition, research modi, level of research, etc. (Bien et al., 2017), some similar issues are highlighted as divergent logics (Bien & Klußmann, 2021; Giesenbauer & Müller-Christ, 2020; Loorbach & Wittmayer, 2023) between the traditional, predominant logics and sustainability-driven logics:

- the controversy between scientifically excellent research and socially relevant research;
- the controversy between disciplinary research and transdisciplinary research;
- linearity in education and research versus co-creative approaches;
- the role of science as an objective observer outside of society versus the role as a co-designer within society;

Especially regarding transdisciplinarity and sustainability science that need the interaction of various disciplines, knowledge-types, and stakeholders (e.g., Irwin et al., 2018; Kates et al., 2001), these controversies are widely discussed, as these requirements contrast predominant disciplinary compartmentalization or evaluation and career systems (Krainer & Winiwarter, 2016). Moreover, sustainability questions universities that follow the ideal of value-free research (see e.g. the debate in GAIA following Strohschneider (2015): responses by Grunwald (2015), Rohe (2015), Schneidewind (2015), Wissel (2015)). Besides these theoretical discussions about SHEI-related contradictions, they could be shown in concrete research cases: Gratzer et al. (2019) e.g., describe structural and thematic challenges that the Agenda 2030 and its Sustainable Development Goals pose at life-science universities, including the tension between regionally relevant knowledge and globalized scientific research, or the tension between a certain dependency on industry partners and the need to criticize mainstream actors.

Deleye et al. (2019) scrutinized predominant logics and sustainability-related approaches for the Flemish university system. They identified 21 predominant characteristics that partly support SHEI (e.g., societal relevance, education as a problem solver), while others rather preserve the status quo (e.g., market logic and competition, positivism). In parallel to these predominant characteristics, they identified alternative approaches that relate to sustainability. These resemble many topics mentioned in Chapter 2.2: greening the campus, addressing complexity and normativity in research and education, a shift to more egalitarian roles, experimental sustainability education, and contributions to local challenges. Deleye et al.'s (2019) multi-level perspective very nicely shows how the interplay of broader societal trends, predominant characteristics of HEIs, and alternative approaches within HEIs creates internal contradictions (e.g., the difficulty in acknowledging complexity while relying on monodisciplinary) but also how lock-ins (e.g., the predominant structural compartmentalization of HEIs) make change difficult.

Hoover and Harder (2015) built on a meta-ethnographical study to come up with fundamental tensions in SHEI processes – tensions they describe as inherent to SHEI and that cause barriers to change (ibid., page 184):

- *enhancing competition vs. collaborative work*
- *reward and support for individuals vs. institution-wide effort needs collective action*
- *identify leaders and experts vs. support for grassroot involvement and knowledge*
- *territories and turf need protection vs. sustainability goes across and beyond boundaries*
- *rational and pragmatic university cultures vs. environmental and holistic individual worldviews*
- *rigid or (institutionally) defined roles vs. dynamic or self-assigned roles*

- *structures that enhance territoriality, rigidity vs. flexible and human centered structures*
- *thinking outside of the box is dangerous vs. new ideas are welcome*

These fundamental contradictions focus on HEI-specific characteristics which build underlying factors that hinder or slow down change. According to Hoover and Harder (2015), the roots of these issues are often hidden by the complexity of change processes, but it is necessary to identify these fundamental contradictions to overcome barriers to SHEI. They relate to paradox theory in their work, which was also used for this dissertation.

Reference to papers of this dissertation:

These fundamental contradictions form the basis for the issues raised in Paper 3. The theoretical argument behind dealing with tensions is that deeper lying contradictions or paradoxical tensions cause challenges and barriers observed in SHEI processes.

2.8. Paradox Theory to Approach Challenges

Paradox theory provides a specific way to think about contradictions. Paradox theory has evolved as a meta-theoretical perspective within organizational theory (Lewis & Smith, 2014). This approach focuses on paradoxical tensions, which are defined as fundamental conflicts that derive from two (or more) contradictory poles that "*exist simultaneously and persist over time*" (Smith & Lewis, 2011, page 382).

While early organizational theories and contingency theory tried to solve such tensions by asking which pole is more effective (under what condition), a paradox perspective on tensions accepts that tensions cannot be "solved" by deciding for one or the other pole (Smith & Lewis, 2011). As they are interrelated, both exist in parallel and have their right to exist, their advantages and disadvantages. Deciding on one of the poles would lead to a situation where the neglected pole would inevitably resurface the tension after some time and might lead to a vicious circle (ibid.). Thus, the question of how to engage both poles simultaneously comes to the fore in paradox theory (Smith et al., 2010; Smith & Lewis, 2011).

Therefore, a paradoxical approach toward tensions builds on accepting the tension in the first place. Only then can continuous and wise management lead to a virtuous circle, i.e., a positive way of dealing with them. Starting from accepting the paradox and "working through" it, the opposing poles can be spatially/structurally or temporally separated, or a synthesis/integration can be sought for. Accordingly, management strategies are differentiated between acceptance, separation, and synthesis (see Figure 5). The ability to deal with tensions in a paradox way – either on an individual or organizational level, is also called "ambidexterity" (Gibson & Birkinshaw, 2004; Hahn et al., 2015a; Raisch & Birkinshaw, 2008; Schnellbächer et al., 2019).

Such paradox approaches have already been applied in business contexts to change processes toward sustainability, where – similar to SHEI as described before – a stronger focus on sustainability within corporate social responsibility (CSR)-initiatives evokes contradictory logics. One of the leading scholars of paradox theory, Wendy Smith, brought paradoxes between business values, goals, norms and identities and those of social enterprises to the fore (Smith et al., 2013). Van der Byl and Slawinski (2015) showed e.g., that the increasing importance of sustainability issues in corporations leads to tensions between traditional organizational objectives and sustainability goals, as well as within the latter. In a similar vein, Hengst et al. (2020), differentiate tensions that (a) arise between sustainability goals on the organizational level and ways to implement them in practice and tensions (b) that arise between sustainability and mainstream logics. Tura et al. (2019) identified economic, structural, psychological, and behavioral tensions of sustainable business practices.

Regarding tension management, Van der Byl and Slawinski (2015) found four types of approaches toward CSR-related tensions: win-win ("*avoidance of tensions by focusing on those areas where alignment exists"*), trade-off (*"forcing a choice"*), integrative (*"bringing together elements holistically"*), and finally a paradox approach (contending that *"there is benefit to acknowledging the coexistence of tensions"*). They found that a win-win approach with an instrumental logic on profit maximization is dominant in literature, leaving out opportunities that a paradox approach could offer in finding creative solutions. Also, Hahn et al. (2015a) dealt with the instrumental and moral rationale behind strengthening sustainability in firms. They argued that firms achieve higher levels of CSR through ambidextrous approaches that simultaneously pursue instrumentally and morally driven social initiatives. He and colleagues showed that managers who pursue a paradoxical frame develop more comprehensive interpretations of sustainability issues (Hahn et al., 2014), as they – by embracing instead of avoiding contradictions – can address divergent goals regarding the economic, environmental and social dimensions of sustainability.

In 2015, Hahn et al. (2015b) presented an integrative framework to analyze tensions that derive from a) different understandings of the three sustainability dimensions (economic, environmental, social) across the individual, organizational, and systemic levels[4], b) different views on the change process needed, and c) different views on the relevant temporal and spatial context. For a graphical representation of the framework see Figure 4.

These authors repeatedly stressed the advantage of addressing contradictions with paradox theory. According to Hahn et al. (2018), a paradox approach toward the contradictions within organizational change toward sustainability "*creates leeway for superior business contributions to sustainable development because it regards environmental and social concerns as an end in themselves, not just as a means to the end of profit maximization*" (Hahn et al., 2018, page 235).

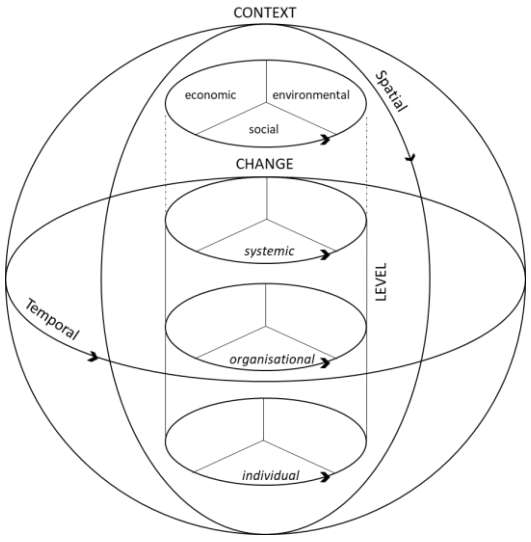


Figure 4: Framework of Hahn et al. to analyze tensions in corporate sustainability (Hahn et al., 2015b)

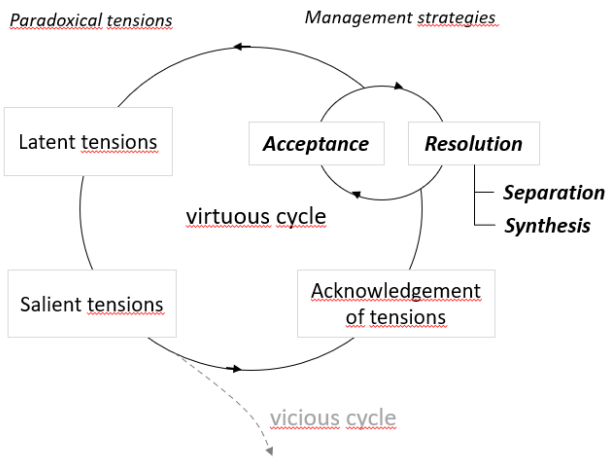


Figure 5: Tension management based on Smith and Lewis' (2011) dynamic equilibrium model and Hahn et al.'s (2015) classification of managerial responses; Figure from Paper 1

[4] In this framework, the systemic level is usually referred to as the organizational field level, except in the context of Hahn et al.'s (2015b) framework who uses the term "systemic level".

Within the SHEI body of literature, Hoover and Harder (2015) (see Chapter 2.7) – in accordance with paradox theory – argue that recognizing tensions and contradictions is essential to stop perpetuating barriers to SHEI. A more recent publication dealt with contradictory tensions in sustainability change processes at universities: Lattu and Cai (2020) used a phenomenological approach to find out which tensions relate to Finnish universities' social and economic sustainability aspects. They found six tensions that relate to the systemic and organizational level, reflect characteristics of HEIs organizational field and mainly arise between economic and social sustainability (adapted from Table 1 in Lattu and Cai, 2020):

- Effective, centralized management vs. collegial, democratic academic management
- Regional resilience vs. effective and excelling national university system
- Short-termism of political system vs. long-termism of universities
- Wellbeing of academics and creativity vs. need for efficiency
- Autonomy and academic freedom vs. research relevant for economic growth
- Development of universities vs. overruling of universities by competitors

Kemp and Scoffham (2022) also built on paradox theory to identify two central tensions in SHEI: a) the tension between superficial versus deep-going, radical system change (c.f. Chapter 2.3) and b) the tension between a slow pace of change through education versus fast responses through a more activist approach.

Reference to papers of this dissertation:

This dissertation builds on paradox theory to further analyze barriers and challenges in SHEI processes. While there is a vast literature on paradox research and tension management in organizational studies and increasing research on tensions and paradoxes in CSR processes, a paradox approach toward challenges in SHEI processes is rarely taken. Paper 3 (Bohunovsky et al., 2023) takes a paradoxical approach to discuss challenges and underlying tensions that are experienced by change agents in Austrian SHEI processes. It also discusses where paradox theory has been taken up by SHEI scholarship.

3. Research Design and Methods

This section describes the methodological approach of this dissertation. After a general introduction, it presents the research context of (Austrian) universities (chapter 3.1), and then it reflects on the specific situation of a transformative, inside-researcher approach (chapter 3.2). Subsequently, an overview (chapter 3.3) and details (chapter 3.4.) of the research process are presented.

SHEI scholarship has repeatedly been criticized for presenting too many siloed case studies that are rather descriptive, atheoretical, and storytelling than critical, heuristic, explanatory analyses with deep insights that can support others in their transformative endeavors (Corcoran et al., 2004; Kyburz-Graber, 2015). This work responds to this criticism by building on insights from SHEI processes and SHEI change agents from, in total, 17 Austrian universities and thus presents a multiple-case study that covers a majority of the 22 Austrian universities (see subsequent Subchapter 3.1) and a theory-based, multi-step analysis.

Case study research has proven valuable if the research focuses on *why* and *how* questions, i.e., aims at analyzing and explaining what is happening and explores barriers and drivers. Moreover, they are recommended for contemporary phenomena if there is only a poorly developed data basis available and if they are highly complex and influenced by the people who are part of the case (Corcoran et al., 2004; Kyburz-Graber, 2015; Yin, 2014). As SHEI is a highly relevant topic of our time, with HEIs as socially highly complex and fluid organizations in the center of interest, case study approaches are common in this research field. Moreover, as this dissertation aims at understanding how and why organizational and institutional change toward SHEI has taken place in Austrian universities and as it is the first study to explore SHEI processes in Austrian universities with no data on these present processes available, case study research seemed most suitable.

The unique condition of the Alliance of Sustainable Universities in Austria (see Chapter 3.1.) as a network that covers a large part of Austrian universities provided the possibility to set up a multiple-case study to explore all these cases in parallel, draw comparisons, and build on insight from divergent change agents that are driven by a common aim: to make their universities more sustainable. A multiple-case study offers more robust and reliable proof and more significant analytical outcomes than a single-case study. This is especially the case when these studies are based on gathering information from various sources, which helps to confirm and support the findings (Yin, 2014).

Case study research does not provide clear methodological strategies, but methods must be chosen depending on the research focus (Kyburz-Graber, 2015). For this dissertation, a multi-step, mixed-method design has been followed. Employing varied methods in a coordinated way allows for investigating different aspects of a problem and thus answering "*broader, deeper and more comprehensive research questions than a mono-method design, and it is specifically suitable for complex phenomena, such as sustainability in a HE system*" (Deleye et al., 2019, page 1113). As the aim is to understand SHEI processes and ask why and how the change occurred, the approach is mainly qualitative (Kyburz-Graber, 2015). Likewise, qualitative methods are also recommended for addressing tensions as they are more suitable than quantitative methods, as the latter tend to mask paradox tensions rather than uncover them (Schad et al., 2016).

Moreover, this dissertation follows a transformative approach. Transformative research, i.e., research that supports sustainability transitions, is characterized by process orientation and participation (Loorbach & Wittmayer, 2023; Wittmayer & Schäpke, 2014). It comprises different methodologies and approaches, e.g., transdisciplinarity, sustainability science, action research, citizen science, transition research, and post-normal science (Loorbach & Wittmayer, 2023). Participatory approaches involving key university actors can develop an emancipatory character, i.e., support participants to develop transformative strategies and foster professional learning among academics that can lead to broad organizational learning in HEIs (Cebrián et al., 2012). In line with a critical paradigm, such research

approaches aim not only to analyze but also to change reality (ibid.). Co-production of knowledge, i.e., building and capturing the plurality of knowledge from different actors, is an essential common point of reference for these approaches (Loorbach & Wittmayer, 2023). Tendencies on key assumptions of these research approaches differ fundamentally from traditional forms of research (c.f., Table 3 in Fazey et al., 2018).

The involvement of experts from the case universities and the author's co-engagement for a joint aim (i.e., making the universities more sustainable) is an important characteristic of this dissertation. However, direct action was not the focus of this work. The author's approach and roles are further discussed in Chapter 3.2.

3.1. Research Context and Cases

The thesis builds on insights from a nationwide, multiple-case study covering most Austrian public universities. The following paragraphs highlight the specific characteristics of (Austrian) universities as research cases.

First, **HEIs in general** display specific features that cannot be compared with firms or other public service organizations. This must be considered when analyzing organizational change of HEIs (Musselin, 2007). For example, educational organizations are "loosely coupled systems" (Weick, 1976), where strategic plans, agreed-upon goals, division of labor, etc., only work to a limited degree. Strategic change management only works if plausibility is demonstrated through success (Berthold, 2011). This also has to do with the multiple power structures, i.e., HEIs strongly build on expert power, but coercive power, charisma, or system-based authority also play a role. Decision-making in HEIs is, therefore, referred to as "organized anarchy" (Kezar, 2011) or described with the "garbage can model" (Cohen et al., 1972). The unique culture of academia also displays divergent values, especially between faculty and the administration (Kezar, 2011). These and further unique features (see Kezar, 2011) make change processes at universities differ from change processes toward sustainability in firms or other public service organizations.

Second, focusing on **Austrian public universities** implies a specific legal and organizational framework. In Austria, the term university ("Universität") is used specifically for HEIs that fall under the Austrian University Act of 2002 (UG (University Act), 2002). University Colleges of Teacher Education ("Pädagogische Hochschulen") and Universities of Applied Sciences ("Fachhochschulen") are HEIs, but they are not called universities[5]. Thus, "HEI" in Austria is a more general term than "university". As the body of literature usually refers to HEIs, and the differentiation between universities and HEIs differs from country to country, both terms are used in this dissertation. The term "HEI" is used in general contexts. In contrast, the term "universities" is primarily used to refer to the specific cases of this dissertation or concerning specific characteristics of universities (e.g., a focus on research).

The 22 Austrian universities are diverse in focus, size, and history (Bundesministerium für Bildung, 2023). Universities are independent legal entities and focus on basic research and teaching – providing teaching and research excellence at the highest level[6]. 64-97% of the universities' budget is federally funded (unidata, 2021, own calculations) based on 3-year performance agreements with the

[5] Moreover, there are private universities („Privatuniversitäten") which fall under the „Bundesgesetz über Privatuniversitäten (Privatuniversitätengesetz – PUG)". They are not addressed in this dissertation.

[6] The focus on research excellence differentiates them from other HEIs: Austrian "Fachhochschulen" (Universities of Applied Science) "*focus on a scientifically rigorous professional education at higher education level*", Austrian "Pädagogische Hochschulen" (University Colleges of Teacher Education) "*provide scientifically-based vocational continuing education and training in all areas of teaching, specifically for teachers*" (Quote from https://www.bmbwf.gv.at/en/Topics/Higher-education---universities.html).

Table 1: Overview of case study universities and participants in the interviews, online survey, and focus groups.

University (English Name)	Short Names	Characteristics	Alliance Member Since	*Participants in*		
				Interviews	**Survey**	**Focus Groups**
Academy of Fine Arts Vienna	BILD	art university	2020	--	1	1
Danube University Krems[7]	DUK	university for continuing education	2017	1	2	2
Graz University of Technology	TUG	technical university	2012	2	2	1
Johannes Kepler University Linz	JKU	4 faculties: engineering & natural sci., business & social, law, medicine	2018	2	2	3
Medical University of Graz	MUG	medical university	2012	--	2	1
Montanuniversität Leoben	MUL	university of mining	2018	1	2	1
Mozarteum University	MOZ	art university	2018	1	2	1
University of Applied Arts Vienna	ANG	art university	2019	--	4	2
University of Graz	KFU	full university	2012	1	3	2
University of Innsbruck	UIBK	full university	2012	1	1	1
University of Klagenfurt	AAU	4 faculties: technical, economics, humanities, social sciences[8]	2012	1	2	4
University of Music and Performing Arts Graz	KUG	art university	2012	1	1	1
University of Music and Performing Arts Vienna	MDW	art university	2017	1	1	2
University of Natural Resources and Life Sciences Vienna	BOKU	life science university	2012	1	3	2
University of Salzburg	PLUS	4 faculties: catholic theology, cultural/social, natural sciences, law	2012	1	2	1
University of Veterinary Medicine, Vienna	VET	veterinary medicine	2019	--	3	2
Vienna University of economics and business	WU	economics	2012	1	3	2
Participants (total)				**15**	**36**	**29**
Participants from faculty				9	18	10
Participants from universities' top-management				5	7	5
Participants from administrative staff				1	9	7
Other participants				0	2	7
Number of Universities represented (total)				**13**	**17**	**17**
Alliance members (in the year of research)				14 (2018)	17 (2020)	17 (2020)

[7] Since 2020, the University has been called University for Continuing Education Krems.

[8] Social science faculty: since 2023; before: interdisciplinary faculty (IFF)

Federal Ministry of Science and Research, with hardly any tuition fees for students from the European Union[9]. The University of Continuing Education Krems has a slightly different background: it is co-owned by the state of Lower Austria, and its budget is also tuition-based (50% tuition, 33% federal funds) (unidata, 2021).

Third, all universities included in this dissertation's research are members of the **Alliance of Sustainable Universities in Austria** (in the following: "Alliance"). The Alliance is an informal network of universities funded in 2012 that committed themselves to developing university-specific sustainability strategies and that – through their joint efforts – aim to promote sustainability issues in Austrian universities and thus contribute to a more sustainable society. The members of this informal network committed themselves to a joint memorandum of understanding that refers to a whole-institution approach and a comprehensive, global, and intergenerational understanding of sustainability, stressing ethical aspects, as well as the environmental, social, economic, and cultural dimensions of sustainability (Allianz Nachhaltige Universitäten in Österreich, 2023). It claims that universities must contribute to a societal transformation and discuss and fundamentally change the modes of research, education, and societal engagement.

Besides diverse working groups that work on specific topics like education for sustainable development (ESD) or carbon neutrality, the main board of this informal network is the so-called expert group ("Expert*innengruppe"). These experts are delegates of their respective member university. Most of them are driving sustainability issues at their home universities on a day-to-day basis and can be considered as main change agents. Besides their roles as change agents, they belong to faculty, staff (administration), or the top-management (rectorate) – and thus differ regarding their status within the university's hierarchy. The expert and working groups aim to exchange good practices and experiences and provide mutual support.

In 2018, when the research for this dissertation started, 14 universities were members of the Alliance. Since then, it has grown considerably, and by now (fall 2023), 19 of 22 Austrian public universities are members of this network, with about 50 experts in the expert group. Table 1 provides an overview of the case study universities and indicates the number of participants in the participatory steps of the case study research, i.e., the initial interviews, the survey, and the focus groups.

3.2. The Author's Approaches and Roles

I (the author of this dissertation) took over my current position at BOKU University of Natural Resources and Life Sciences in 2013. My responsibility focuses on developing and coordinating the BOKU sustainability strategy and coordinating the Alliance of Sustainable Universities in Austria. This position is provided in-kind to the Alliance by BOKU. In 2018, I also became deputy head of the Center for Sustainability and Global Change at BOKU. My situation thus touches on two critical assumptions made by Fazey et al. (2018) regarding transformative research, i.e., accepting normativity and accepting that researchers "*are not independent from that which is studied and scientists are interveners*" (ibid., page 57). These two assumptions contradict traditional first-order research (Loorbach & Wittmayer, 2023; Wittmayer & Schäpke, 2014). Therefore, this situation deserves a deeper going reflection.

As discussed above, this dissertation follows the idea of transformative research, i.e., my aim within this research was to better understand organizational change and tensions for myself but also to support social and organizational learning processes among members of the Alliance and thus to contribute to a sustainability transformation of (Austrian) universities. In this process, I was a co-

[9] Students have to pay tuition fees of about 360-720 € if their study period exceeds the period stated in the curriculum by more than two semesters or if they are, e.g., non-EU citizens.

learner and co-researcher (Cebrián et al., 2012) with a normative aim. While value-free research and neutrality are often esteemed as guaranteeing the credibility of research and research institutions, Fragnière (2022, page 23) states that "*recent developments in the philosophy and sociology of science show that such an ideal is not only unattainable, but also undesirable*". Therefore, he argues for objectivity, scientific ethics, and transparency of values (ibid). I understand my role as a researcher for sustainability exceeding a simple analytic-descriptive approach, but taking over responsibility and thus co-creating not only new knowledge but also a new – more sustainable – reality (Cebrián et al., 2012; Wittmayer & Schäpke, 2014).

Inside researchers do research within one's own organization, which is partly also the case for this dissertation, as I am a member of the Alliance and one of its universities. Inside researchers also have "*a personal stake and substantive emotional investment in the setting*" (Brannick & Coghlan, 2007, page 60). Although I am not an inside researcher of each Alliance's member university, I have good insights into the activities of each university and good relations with most of the interview partners. Thus, I could build on a certain basis of trust and mutual knowledge and understanding in the research process.

As an inside transformative researcher, it is particularly important to be self-reflexive on the situation (Brannick & Coghlan, 2007; Fazey et al., 2018), to consider opportunities (e.g., primary access, preunderstanding), but also threats (e.g., danger of assuming too much; thinking to know the answer instead of inquiring), and to be aware of potential role conflicts as well as to consider political issues on the process. Wittmayer and Schäpke (2014) differentiate five roles of researchers in sustainability science depending on the activities in the research process and addressing critical issues such as ownership over "*the problem, the process, its outcomes and its possible continuation*" (ibid., page 485), the normativity of sustainability, power issues among participants, and finally the action-orientation of sustainability science. Following their approach, I took the role of a:

- change agent when I, e.g.,
    - actively engaged for organizational and institutional change toward SHEI at BOKU or within the Alliance;
    - motivated my colleagues from the Alliance to take part in the interviews, the survey, and the focus group;
    - initiated the research for this dissertation;
    - networked with stakeholders outside the group of participants, i.e., completed my role as coordinator of BOKU's sustainability strategy and the Alliance, participated in the Alliance's and BOKU's activities toward SHEI;
- reflective scientist, when I, e.g.,
    - analyzed the results from participatory steps (qualitative content analyses);
    - interpreted challenges based on paradox theory and came up with potential underlying tensions;
    - shared my knowledge about institutional & organizational change as well as on tension management and paradox theory within the Alliance (e.g., in the video preparing for an online survey)
- self-reflexive scientist, when I, e.g.,
    - reflected on my roles in the process;
    - reflected on my assumptions and pre-understandings in interpretative and participatory steps of the research process;
    - reflected on possible impacts of my research in the Alliance's expert group and member universities;

- knowledge broker, when I, e.g.,
    - supported experts in reflecting on the process of organizational and institutional change at their university during the interviews;
    - provided space for critical reflection on challenges and tensions in the focus groups and adjacent process steps;
- process facilitator, when I, e.g.,
    - initiated the participatory parts of the research;
    - selected participants and invited them to participate;
    - guided interviews;
    - facilitated the focus groups (together with my research colleagues and supervisors)

By being aware of my different roles and the normativity of my research project, and by repeatedly reflecting on these changing roles, I tried to combine both a) responsibility, i.e., the personal engagement with values and practices, social preferences and expectations, and b) accountability, i.e., following acknowledged methodological approaches (Felt et al., 2013).

3.3. Research Process

Figure 6 illustrates the research process differentiating between (a) (participatory) steps of data collection and (b) analytical & interpretative steps, as well as depicts the outcomes of each step and the respective research questions. The whole process was accompanied by literature analysis. The process is described in two parts. Part I comprises the analysis of the status of organizational and institutional change toward SHEI (RO1) and the how and why of the change process toward SHEI (RO2). The results of this part were published in Papers 1 and 2. Part II focuses on tensions that hinder or slow down change processes (RO3); results were published in Paper 3.

Part I

The research process started with guided interviews with change agents from Alliance universities that focused on the kind (type, area, activities) of change, and driving factors (internal and external actors) behind sustainability at each university and the question of how sustainability was integrated into the university along a timeline. Moreover, change agents were asked about challenges and obstacles that they experienced or knew about.

A first qualitative content analysis of the interview transcripts aimed to deductively code organizational changes along the categories operationalized in the "SHEI Analytical Framework" (Figure 7, RQ 1.1), i.e., type and area of change, year of implementation (start), as well as the actors driving these changes, were recorded. Findings from this qualitative content analysis were complemented with findings from an analysis of strategic documents (mainly development plans) and websites.

Preliminary results were presented and discussed in one of the expert group's meetings of the Alliance sent to the interview partners and the student unions of each university for validation. The final results (outcomes) after this validation process included new empirical knowledge about (a) depth and type of changes: answer RQ1.2, (b) drivers of changes: answer RQ 2.1, and (c) years of changes used to develop a timeline & graphical illustration of changes: answer RQ 2.2.

Part II

In 2019, the transcripts of the interviews from 2018 were subjected to a second qualitative content analysis. This inductive analysis focused on the challenges observed during the SHEI change process. The identified challenges served as a basis to uncover potential tensions underlying them. This interpretative step drew upon paradox theory literature as a research heuristic.

This interpretative step resulted in 15 potential tensions (see Table 3 in Paper 3) presented to change agents in an online survey. The survey aimed to gather feedback on the elaborated tensions and to have them ranked according to change agents' perceived (a) personal relevance and (b) relevance to the university as a whole.

This survey resulted in six highly relevant tensions that were further elaborated and described to be discussed in two following focus group meetings with change agents. The aim was to (a) have a discussion of the elaborated tensions and thus have them validated (RQ 3.1) and (b) learn how change agents (might) deal with these tensions. At the end of each focus group meeting, participants were asked to complete a short online survey to give feedback on the approach to discuss the tensions, the "Tension Reflection Path" (RQ3.3). The transcripts of the focus groups were used for a third (inductive) qualitative content analysis that focused on management strategies (RQ 3.2) that were either already applied by the change agents or that they considered potentially valuable.

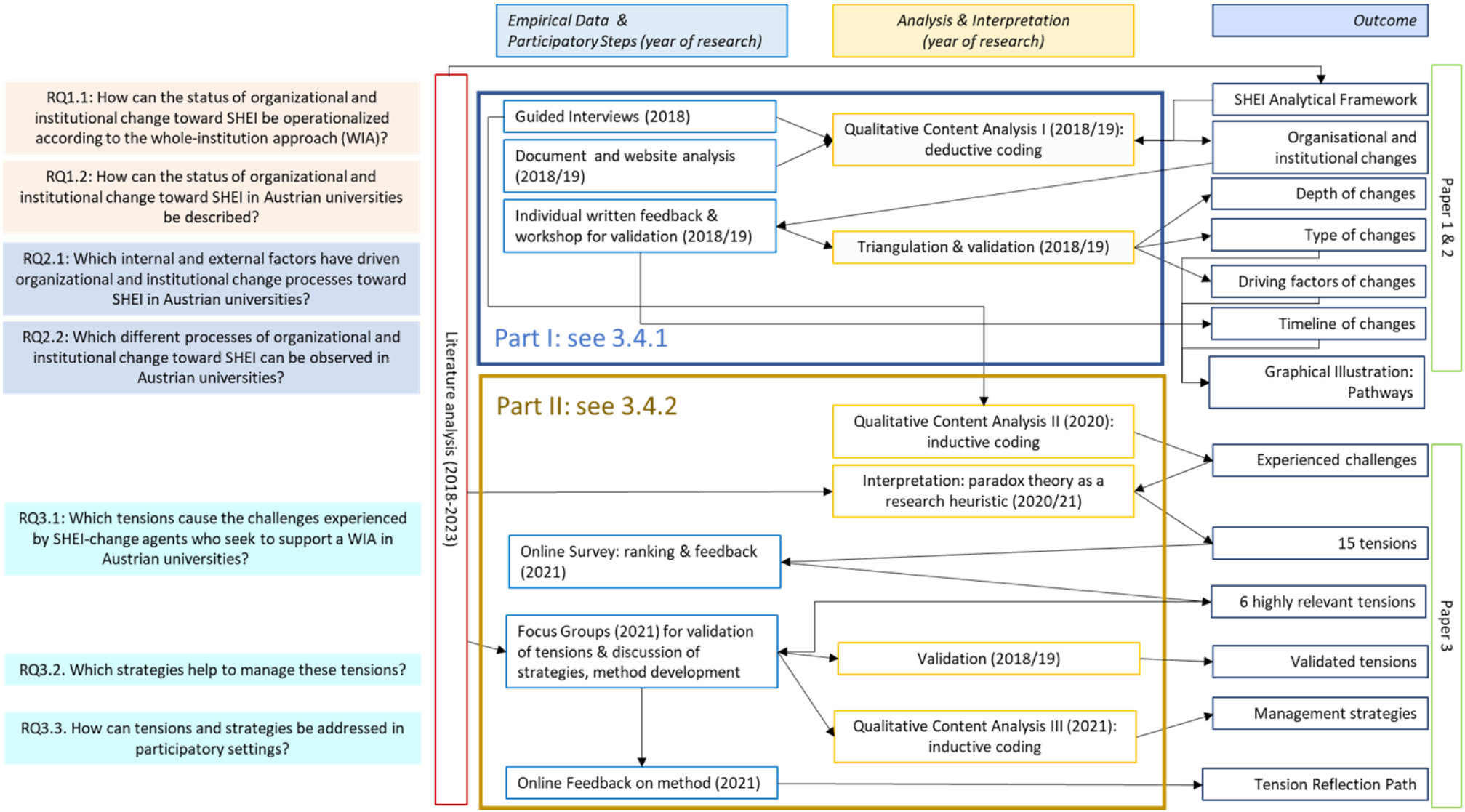


Figure 6: Research steps and methods referring to the research questions of this dissertation and split into empirical data collection and participatory steps, analytical and interpretative steps, and diverse outcomes. Year of analysis in brackets.

3.4. Research Steps and Methods

3.4.1. Part I: Inquiring about the Status and Process of SHEI in Austrian Universities

Guided Interviews, Document and Website Analysis

Experts from all (at that date) 14 members of the Alliance were invited for guided interviews. Except for one university, whose experts did not respond, members from 13 universities agreed to be interviewed. In two cases, experts preferred to be interviewed in pairs, as they covered different aspects of the SHEI process in their universities. In two cases, members of the rectorate accepted the invitation and represented their university's experts. Thus, interviews with 15 experts took place in person and online via Zoom between March and September 2018, lasting 50 to 90 minutes. They were led by the author of this dissertation, partly together with her co-supervisor. Interview partners were invited by e-mail and informed about the guiding questions (translated from German). Table 2 summarizes the guiding questions and the rationale behind them.

The interviews were taped and subsequently transcribed verbatim by the author, co-workers, and a professional transcriber. Interviews were complemented with findings from documents and website analyses.

Table 2: Guiding questions for interviews and rationale

Interviews' guiding questions	**Rationale**
What triggered the processes of engagement with sustainability in your university?	Learn about the initial factors of change and change agents.
How is sustainability structurally anchored at your university (in teaching, research, third mission, governance, and operations)? When did these changes take place?	Learn about the type, area, characteristics, and timeline of individual changes.
What are/were the challenges in embedding sustainability at your university?	Learn about factors that slowed down or inhibited change (challenges and obstacles)
How is your university's commitment to sustainability communicated internally and externally?	Gain additional insights into the university's understanding and framing of SHEI.
What does the university expect from its commitment to sustainability?	
What do you see as indicators that sustainability has arrived at your university?	

Qualitative Content Analysis I and Application of SHEI Analytical Framework

The material was deductively analyzed in a qualitative content analysis (Mayring, 2010) using Atlas.ti focusing on institutional and organizational changes. The codes for this analysis derived from literature and are summarized in the "SHEI Analytical Framework" (Figure 7).

Each change was coded as a **type of change** according to Pflitsch and Radinger-Peer (2018).

- new organizational units: establishment of new independent organizations or departments within an existing organization characterized by assigned responsibilities, competencies and / or rule systems;
- working groups: loosely coupled groups of independent actors with a common interest, usually non-hierarchical and without own resources;

- projects that initiate new structures: temporary events that follow a specific purpose over a limited time[10];
- memberships in a (new) organization: commitment and support of a network or organization and its goals;
- institutional change, i.e., a change in rules, norms, and cognition related to sustainability.

Moreover, the **driving factors of change** were analyzed, i.e., each change was attributed either as an external driving factor (policies (incl. government, ministries), academic networks, or others (e.g., business partners, suppliers, etc.)) or as one of the four internal actors' groups in the analysis: faculty (i.e., professors, academic staff, lecturers), staff (i.e. administrators non-academics), top-management (rectorate & high-level leadership positions), students – or the change was categorized as overarching if more than one group was driving it. Thus, internal and external factors of change (see Chapters 2.4 and 2.52.4) were analyzed.

Furthermore, to derive at a timeline of change, each change was linked to the **year** when the change took place or started.

To analyze the **depth of change**, each change was assessed according to (a) the characteristics of change along the scale of optimization, improvement, or a real renewal (Ferrer-Balas et al., 2008) of the system (L-Dimension), (b) the degree of diffusion (i.e., initiated, progressively practiced, or mainstreamed within the organization) (F-Dimension), and (c) the number and kind of different persons (groups) that are involved in the change process (A-Dimension). This assessment formed the basis to attribute changes within each university to a stage between 0 and 3 according to the FLA framework (see Table 3 in Paper 1). Note that the stages 0-3 do not directly correspond to the stages used by Ferrer-Balas (2008) but were adapted to the material.

The results of the analysis were depicted in three different formats for each university:

a) excel-sheet (for an example, see Figure 8)
b) written pathway descriptions (for an example, see edge strip on the right)
c) graphical mapping (for an example, see Figure 9 and Figure 10)

Moreover, the overview of organizational and institutional change in the 13 case universities was aggregated in Table 3 of Paper 1.

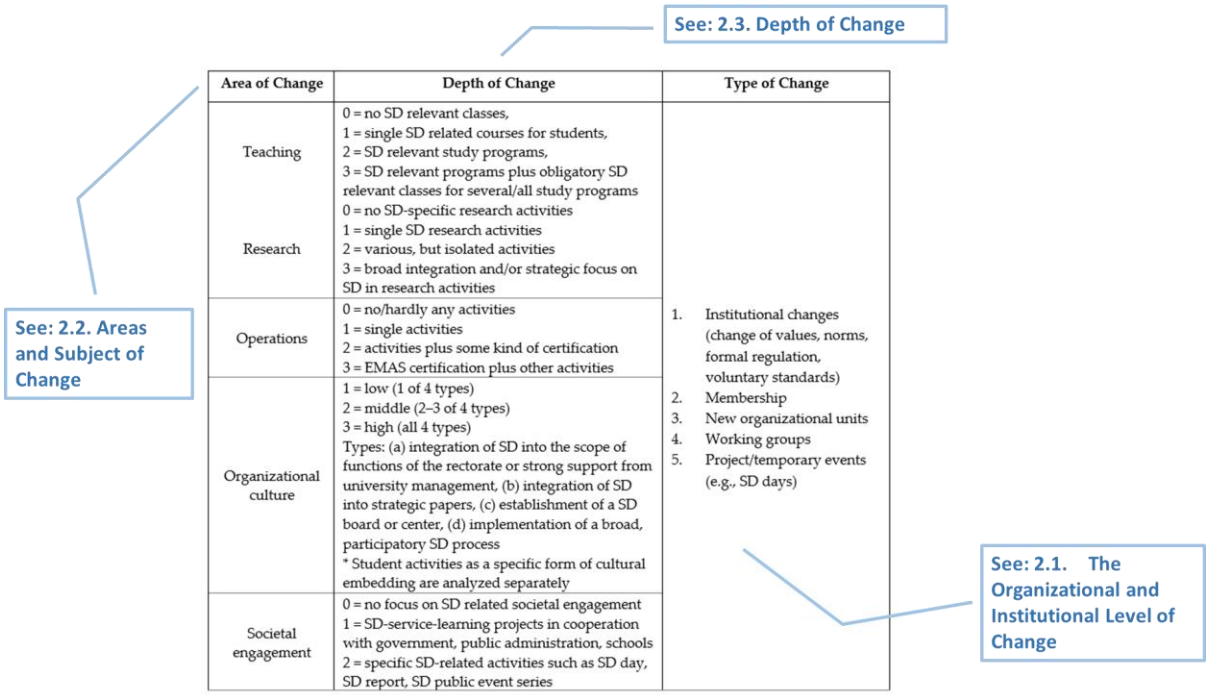
Example of a written pathway description (anonymized):

Empowered by the then rector who asked all employees of the university for their suggestions for the future university, one single person – out of a personal motivation – initiated the sustainability engagement of the university. From her position as an administrative assistant, she initiated several sustainability projects, but also the membership of the university in the Alliance, the participation in the UniNEtZ-project and a cross-university sustainability working group. The projects have mainly covered operational issues (use of eco-paper, label for "green" meetings, etc.), but she has also motivated members of academia, the students' union, and individual students to participate in projects that are related to sustainability in a wider sense. In a relatively short time span, she motivated several other persons to participate in an environmental working group. With a new rectorate she got stronger support from the management. The environmental group meanwhile got a dedicated budget for their activities and resource efficiency (not sustainability as a more general goal) is one of the current strategic goals of university.

Characteristics: one focal point in the person of an engaged administrative assistant spreads the idea through various projects and gains support from the university management.

- Main actors: administration
- Timeframe: starting 2012 – ongoing

[10] Short-term projects that did not lead to any lasting change were excluded from the analysis.



Area of Change	Depth of Change	Type of Change
Teaching	0 = no SD relevant classes, 1 = single SD related courses for students, 2 = SD relevant study programs, 3 = SD relevant programs plus obligatory SD relevant classes for several/all study programs	1. Institutional changes (change of values, norms, formal regulation, voluntary standards) 2. Membership 3. New organizational units 4. Working groups 5. Project/temporary events (e.g., SD days)
Research	0 = no SD-specific research activities 1 = single SD research activities 2 = various, but isolated activities 3 = broad integration and/or strategic focus on SD in research activities	
Operations	0 = no/hardly any activities 1 = single activities 2 = activities plus some kind of certification 3 = EMAS certification plus other activities	
Organizational culture	1 = low (1 of 4 types) 2 = middle (2–3 of 4 types) 3 = high (all 4 types) Types: (a) integration of SD into the scope of functions of the rectorate or strong support from university management, (b) integration of SD into strategic papers, (c) establishment of a SD board or center, (d) implementation of a broad, participatory SD process * Student activities as a specific form of cultural embedding are analyzed separately	
Societal engagement	0 = no focus on SD related societal engagement 1 = SD-service-learning projects in cooperation with government, public administration, schools 2 = specific SD-related activities such as SD day, SD report, SD public event series	

Figure 7: The "SHEI Analytical Framework" presented in Paper 1 and reference to the respective theoretical chapters in this dissertation.

N	change	area	short name for pathway	Type	Year	actors from
1	Project Zukunft now	overarching	Zukunft now	Project	2012	overarching
2	SD person	organisational culture	P7.1	Actor	2012	administration
3	Website Green University	operations	green university	Project	2012	administration
4	vice-rectorate	organisational culture	VR	Actor	2015	management
5	strategic goals ressources	organisational culture	strategic goals	Instititional Change	2016	management
6	environmental group	operations	env.group	Working Group	2016	overarching
7	Alliance of Sustainable Universities in Austria	network	Alliance	Membership	2017	administration
8	UniNetZ preparatory work	research	UniNEtZ	Project	2017	overarching
9	FairAnstalten	operations	FairAnstalten	Project	2017	administration
10	Working Group of Art Universities	network	AG Art	Working Group	2018	administration
11	Viennese Eco-Business Plan	operations	Eco Business	Project	2018	administration

Figure 8: Example of an excel-sheet summarizing changes of a university (anonymized)

Graphical Pathways

For a graphical depiction, the changes extracted in the first qualitative content analysis were mapped according to their type (see chapter 3.4.1., symbols used for change), the year of implementation (timeline as y-axis), and the factors driving the change (x-axis) to get illustrations of pathways that universities had taken so far. The graphical pathways were oriented to the transition topology of Strambach and Pflitsch (2018) and Pflitsch and Radinger-Peer (2018). Two exemplary pathways are shown in Figure 9 and Figure 10; further examples can be found in Paper 2.

These pathways led to the identification of four types of organizational and institutional change processes toward sustainability and thus contributed to answering RQ2.2 (Which different processes of organizational and institutional change toward integrating sustainability can be observed in Austrian universities?).

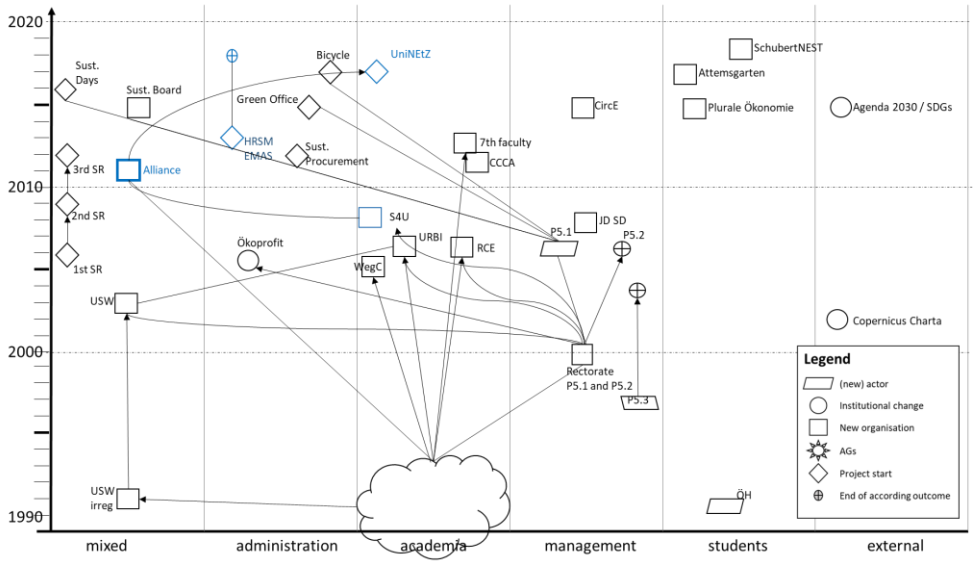


Figure 9: Example of a pathway of a frontrunner university

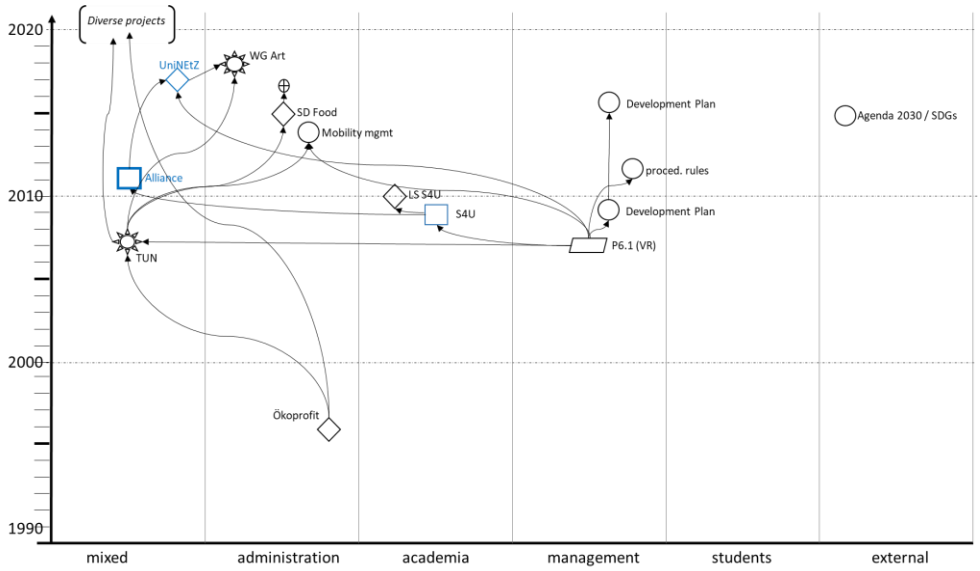


Figure 10: Example of a pathway of an art university

Validation of Data

Preliminary results of the qualitative content analysis I, i.e., the illustrative pathways and the qualitative descriptions, were validated by (a) presenting and discussing them in the Alliance's expert group meeting on November 9th, 2018; (b) sending them for comments to the interview partners; (c) sending them to the student unions of each university asking for feedback. Moreover, the results were triangulated with information from documents and online resources. After validation, the results were prepared and published in Papers 1 (focus on status and factors of change) and 2 (focus on pathways).

3.4.2. Part II: Inquiring Tensions

Qualitative Content Analysis II

The transcript material of the original exploratory interviews was again analyzed to learn more about the challenges that interview partners encountered or observed. This second qualitative content analysis (II) consisted of inductive coding of challenges that change agents identified, again using Atlas.ti. This step was informed by a certain pre-understanding of challenges known from the SHEI body of literature. In total, 29 challenges were identified in this second analysis.

Interpretation: Paradox Theory as a Research Heuristic

For each of the 29 challenges, first assumptions were made about potential underlying tensions. These potential tensions were further described, categorized, repeatedly restructured, discussed with supervisors, and related to comparable reports in the paradox and SHEI body of literature in several iterative steps. The increasingly accurate elaboration of the tensions contained:

- categorization based on
    - categories of organizational tensions (Lewis, 2000; Smith & Lewis, 2011, page 383): learning, belonging, organizing, performing
    - levels in Hahn et al.'s (Hahn et al., 2015b) framework
    - the nature of the paradoxes Schad et al. (2016, table 2, p25f)
- main messages of respective citations from the interviews
- exemplary verbatim citations from interviews
- supporting literature citations, comparable description of tensions from literature
- brief description of the underlying poles (dilemma)
- area of university amending change in Hahn et al.'s (Hahn et al., 2015b) framework: research, education, societal engagement, organizational culture, campus operations
- verbal description of tensions
- possible management approaches from interviews and / or literature

As a result of this step, 15 tensions were identified. A short summary of them is published in Paper 3 (Table 3 in Paper 3, see also Chapter 4.3 of this framework). The number of tensions was not predetermined but emerged empirically from interview transcripts and was interpreted from the perspective of paradox theory. A summary of each tension was presented for the next step in a PowerPoint presentation following a uniform layout (see Figure 11).

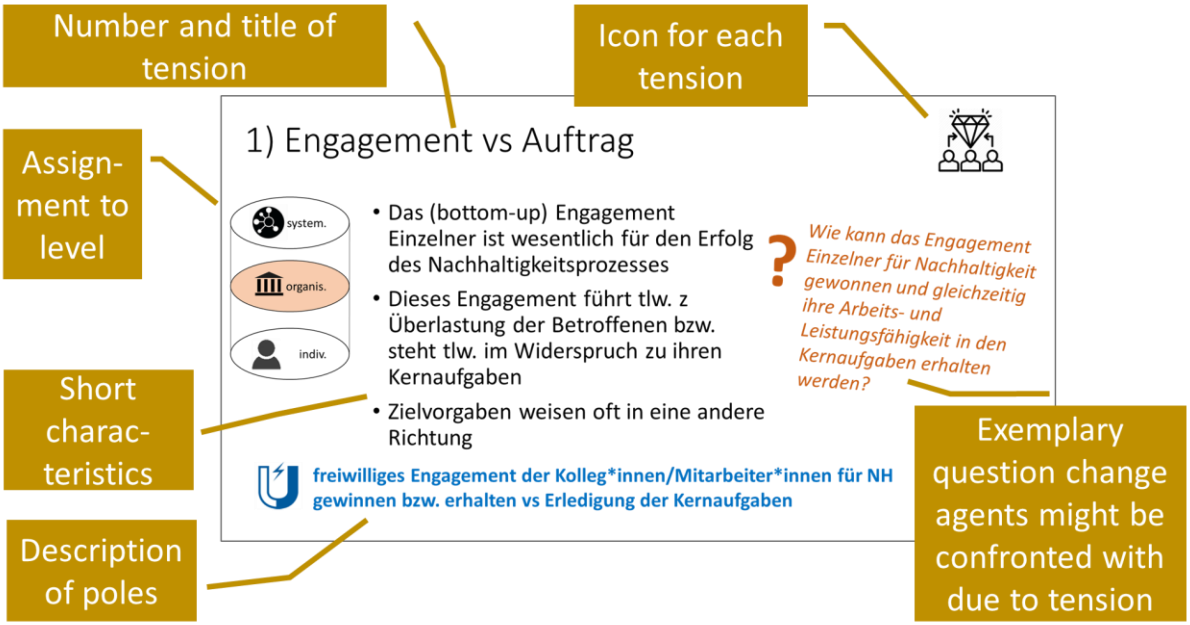


Figure 11: Example of a German slide (uniform layout for all tensions) presenting the tension "commitment vs mandate"; English overlays for explanation in orange.

Online Survey

The next step aimed at validating and ranking the tensions according to their relevance for change agents and their universities. 43 change agents from the Alliance's expert group were invited via e-mail on February 9, 2021, to participate in the online survey and the subsequent focus groups: 3 did not respond, 3 declined, and 37 took part. The survey was finished on February 16, 2021. The survey was not anonymous (the name and the position of the participant at the university were asked for), as the answers were used to form homogenous groups for the subsequent focus groups. Still, the relation between data and person was deleted after the formation of the focus groups. A short video explaining the survey's aim and the subsequent focus groups was provided to give the participants a short introduction.

The participants were asked to rate the tensions along two scales: (a) relevance to them personally and (b) relevance for their university (with 0=not relevant to 5=highly relevant) (see Figure 12). Moreover, they were asked to comment on them. Finally, participants were asked if they observed further tensions and for any further feedback on tensions or in general.

The rating results were analyzed with descriptive statistics (arithmetic mean, standard deviation, box plots) to determine three tensions from each of the two scales (i.e., a total of six). The selection was based on high rankings (mean between 4 and 5 on a six-point scale), a narrow distribution (standard deviation, box plots) in ratings, and the topics to cover a range of tensions faced by SHEI change agents. Comments on the tensions made by change agents were integrated into the selected description.

Figure 12: Screenshot from the online survey: lines = tensions; columns = double 6-point scales plus an option for “no answer” for evaluating perceived personal relevance (left side) and relevance for the university (right side)

Focus Groups

The selected tensions were further discussed in two focus groups, each focusing on three tensions. Participants in the online survey were invited to participate and assigned to one of the two groups depending on their time availability and thematic suitability. For preparation, they were sent a one-page description of the tensions discussed in the focus groups (included in Appendix B). These written descriptions followed the idea of polarity maps (Johnson, 2014), i.e., they described positive aspects of each (extreme) pole of the tension, as well as negative aspects and worries associated with each pole. Moreover, the role of change agents within the tension was referred to. A short summary of these descriptions was published in Paper 3 (Table 4 in Paper 3). Two individual pretests with participants who could not participate in the focus groups were done to test the question design.

The focus group meetings took place online on March 16 and March 23, 2021, for 2,5 hours each with 15 or 14 participants, respectively. Due to the COVID-19 pandemic, the meetings took place online via Zoom. The focus groups aimed to (a) have a discussion of the elaborated tensions and thus have them validated and (b) learn about strategies that are or could be used by change agents to deal with these tensions. The first focus group dealt with the three tensions selected for their high ratings in the survey regarding respondents’ perception of personal relevance, and the second focus group with tensions selected for their high survey ratings for respondents’ perceived relevance regarding the university. Participants were assigned to the focus groups depending on their survey rankings and professional backgrounds.

In the focus groups, after introducing the research questions and the preparatory work of the research group (including information about the results of the preceding online survey), participants were

assigned into sub-groups of 5-6 individuals – again depending on their rankings in the survey. Each group focused on one of the six selected tensions and was facilitated by the author or one of the two supervisors. In the end, the results of the sub-groups were shortly presented to the plenum to allow for feedback from participants from other sub-groups. For a timeline of the focus groups, see Appendix C.

The discussions in the focus groups were recorded and in the following transcribed verbatim by the author. A report on the preliminary results of the focus groups in German was sent to the participants. This report also includes a one-page description of each selected tension (see Appendix B).

The guiding questions of the focus groups ("Tension Reflection Path") are presented in the following subsection as they form an essential contribution to RQ 3.3.

Tension Reflection Path: A Methodological Contribution

The "Tension Reflection Path", i.e., guiding questions for the focus groups, were elaborated building on (a) questions suggested by Lüscher and Lewis (2008) in their work on paradox tension in Lego-company and (b) on Sparrer and Varga von Kibéd's (Sparrer & Varga von Kibéd, 2000) reframing of dilemmas as tetralemmas. Combining these two works is a novel approach that allows for a participatory reflection on paradoxical tensions. Table 3 gives an overview of the questions guiding the focus group discussions.

Table 3: Tension Reflection Path: Questions guiding focus group discussions consistent with Lüscher and Lewis' (2008) "Collaborative Process of Working Through Paradox", as well as Sparrer and Varga von Kibéd's Tetralemma (Sparrer & Varga von Kibéd, 2000). Source: Table 2 from Paper 3

Objective	Questions	Background
Starting reflection, problem definition	- Would you like to correct or add anything in this presentation in advance to be able to start the discussion? - What questions do you have in relation to this tension, to facilitate your understanding?	Linear questioning: common understanding of pole A and B, Tetralemma-position THE ONE & THE OTHER
Recognizing different perspectives	- Could someone else view this tension, with its respective positive and negative aspects, differently?	Circular Questioning: Further exploration of polarities
Surfacing possible actions and their implications	- If you want this tension to intensify at your university and the negative aspects of both poles to come to light, what could you do as a change agent to make this happen?	Reflexive questioning: unexpected context-change question, paradox intervention
	- Conversely, if you want to strengthen the positive aspects of BOTH perspectives, what could you do as a change agent to achieve this goal?	future-oriented reflexive question/Tetralemma-position BOTH
	- Assuming you could simply ignore this tension, i.e., pretend that this tension does not exist, what would that mean for your work as a change agent?	Tetralemma-position NEITHER
	- What are some completely different possibilities of action that you can engage in as a change agent in relation to this tension?	Tetralemma-position 'NOT ALL OF THIS AND NOT EVEN THAT!'

NOTE: The original German questions, incl. facultative additional questions, can be found in Appendix C (Focus Group Schedule).

The idea of a tetralemma (Sparrer & Varga von Kibéd, 2000) is to widen the perception of a dilemma by guiding people to consider more than the two poles of the dilemma. Besides looking at "the one" and "the other" pole of a dilemma, it adds the position "both" poles, as well as "neither" pole, and the option "not all of this and not even that". For each pole, it asks what it could look like and which consequences could be expected.

Lüscher and Lewis (2008) supported the process of reflection about paradox tensions in their case study with Lego-middle managers to support them to move from what they refer to as a "mess" (i.e., challenges and underlying tensions are unknown) to ultimately "workable certainty" (i.e., strategies

to manage uncovered tensions). It starts with linear questioning, encouraging actors to define the problem and start reflecting on it. The further process to dilemmas and paradoxes was supported by circular and reflexive questioning, respectively. Circular questions support actors recognizing other perspectives, while reflexive questioning aims to surface actions' implications. Finally, strategic questions challenge simplistic solutions and motivate ongoing experimentation. This kind and sequence of questions originated in family therapy (Tomm, 1988) and were further taken up by Lüscher and Lewis (2008) for the questions' excellent fit to elaborate on paradoxes.

The Tensions Reflection Path can be used as a guide to discuss tensions with those actors who are affected and who seek possible strategies to deal with them. In preparation, it needs a first description of the tensions to be discussed (c.f., the one side description prepared for the focus groups or a slide summarizing the main points of the tensions' poles), which serves as a starting point for the discussion. The focus groups took two hours, with 70 minutes for the discussion along the "Tension Reflection Path". See Appendix C for the detailed timeline and additional guiding questions.

This novel approach was developed as a possible answer to RQ 3.3. "How can tensions and strategies be addressed in participatory settings?".

Online Feedback

Directly after each focus group, the participants were asked to complete an anonymous online survey to give feedback on the methodological approach, i.e., the "Tension Reflection Path". The feedback questions allowed for an evaluation on a 6-point scale (with 0="not at all" to 5="very stimulating" or "very helpful"). As only a small part of the answers was published in Paper 3, the feedback questions and means of responses are given in Table 4. Detailed results regarding questions 2-5 are published in Paper 3 (Figure 2 in Paper 3), and detailed results for questions 1 and 6-11 can be found in Figure 13 and Figure 14.

Table 4: Questions of online feedback and mean of responses (n=28) on a 6-point Likert-scale (with 0="not at all (helpful/stimulating)" to 5="very (helpful/stimulating)"), SD=Standard Deviation

N	Feedback Question	Arithmetic Mean (SD)
1	How helpful did you find today's discussion for your work as a change agent?	4,0 (0,8)
	Did the discussion help you to...	
2	...explore alternative perspectives on the discussed tensions?	3,9 (1,0)
3	...broaden your own perspective on the discussed tensions?	4,0 (0,8)
4	..."defuse" the discussed tensions for you personally?	3,4 (1,2)
5	...develop ideas on how you can deal with the discussed tensions in the future?	3,8 (1,0)
	How stimulating or not stimulating did you find the discussion on the following questions?	
6	Could someone else see this tension, with its positive and negative aspects, in a different way?	3,6 (1,2)
7	If you want to intensify this field of tension at your university and bring out the negative aspects of both poles, what could you do as a change agent to make this happen?	3,9 (1,2)
8	Conversely, if you want to strengthen the positive aspects of both poles, what could you do as a change agent to make that happen?	4,1 (0,9)
9	Suppose you could simply ignore this tension - in other words, act as if it did not exist - what would that mean for your work as a change agent?	3,4 (1,2)
10	Why is this field of tension important at all? Could you just ignore it?	3,7 (0,9)
11	Are there completely different options for you as a change agent in relation to this tension field?	3,6 (1,0)
12	To what extent were your expectations for the event met?	3,6 (1,4)

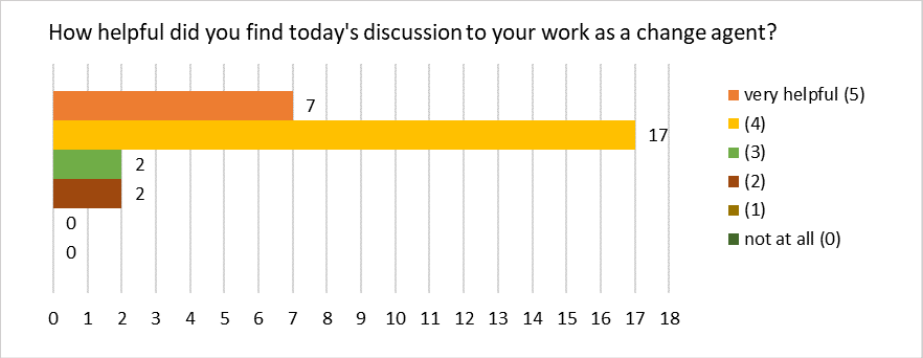


Figure 13: Number of study participants (n=28) who selected the closed-ended response option (with 0="not at all helpful" to 5="very helpful") to the anonymous survey question “how helpful did you find today’s discussion to your work as a change agent?”. Questions translated from original German.

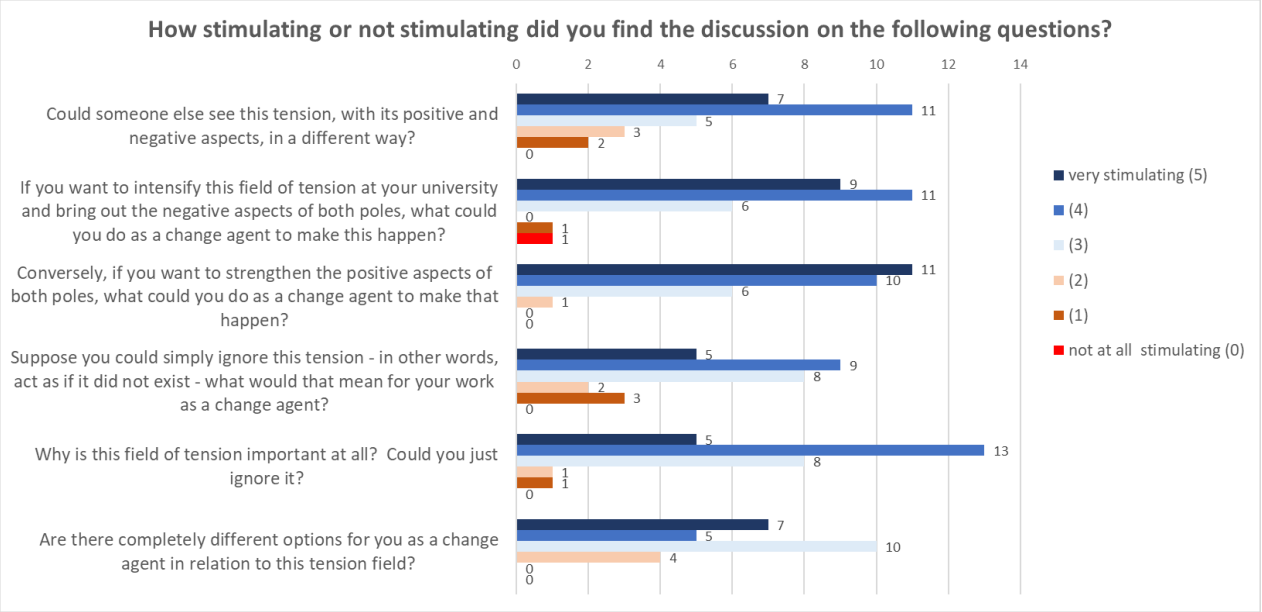


Figure 14: Number of study participants (n=28) who selected the closed-ended response options (with 0="not at all stimulating" to 5="very stimulating") to the anonymous survey questions about the research process and outcomes. Questions translated from original German.

Qualitative Content Analysis III

The transcripts of the focus groups were analyzed in a third qualitative content analysis focusing on management strategies, again using Atlas.ti. The lack of evidence from the SHEI body of literature regarding tensions in SHEI change processes suggested an inductive coding. The emerging codes were clustered around similar topics to build management strategies. These strategies were again clustered in accordance with the three types of management strategies from paradox literature, i.e., acceptance, separation, and synthesis strategy. The results were published in Paper 3 (see Table 5 in Paper 3).

4. Results / Contributions

4.1. Paper 1

Bohunovsky, L., Radinger-Peer, V., & Penker, M. (2020). Alliances of Change Pushing Organizational Transformation Towards Sustainability across 13 Universities. Sustainability, 12(2853). https://doi.org/10.3390/su12072853

Objectives of the Paper & Research Questions Addressed

In this paper, we comparatively analyzed the status and process of organizational and institutional change toward SHEI in thirteen Austrian universities. To do so, we built an analytical framework ("SHEI Analytical Framework") that allows for the analysis of the area, type, and depth of SHEI as well as internal and external factors of change. By linking the timeline of these changes to actors and drivers, we take a dynamic perspective and contribute to the understanding of SHEI change processes and their driving forces.

Methods

Building on a multiple-case study (13 of 22 Austrian universities), we followed a mixed-methods design combining document analysis, transcripts of semi-structured interviews (n=15) with data validation by interviewees, and additional document and web analysis. The qualitative content analysis focused on events that constituted or led to organizational or institutional change toward SHEI (structural embedding) and main factors of change (cf. Chapter 3.4.1).

Insights

The "SHEI Analytical Framework" developed in this paper (answer to RQ1.1) integrates various aspects of a WIA: (a) the areas (sub-systems) of the university included, (b) the depth of integration regarding actors involved and the level of change, i.e., optimization, improvement or renewal of the system, and (c) the type of change, i.e., organizational or institutional change, and (d) drivers of change (see Figure 7). The application of the "SHEI Analytical Framework" to comparatively analyze transcripts of interviews with 15 experts from 13 Austrian universities (answer to RQ 1.2) shows that the breadth, depth, and type of change vary among the case-study universities but that universities integrated sustainability in at least three of five areas. Faculty members were found to be the main internal change agents, who often initiated SHEI processes out of their personal conviction and without a formal mandate. We also showed a need for interplay between the top-management and bottom-up engagement for broad and deep change. Exchange on good practice and mutual support in the networks are important external factors of change – reflected by two peaks of changes in the year of the foundation of the Alliance and the CCCA[11] and the start of the UniNEtZ project[12]. Moreover, the coercive power of the Austrian Federal Ministry of Science and Research resulted in a third peak (answer to RQ2.1).

Originality

By developing and testing an analytical framework ("SHEI Analytical Framework") that builds on evidence from SHEI scholarship and integrates various aspects of a WIA (depth, breadth, type, drivers

[11] The Climate Change Center Austria (CCCA) is a research network that promotes climate research and climate impact research, fosters collaboration in and among these fields and provides society and policymakers with scientifically sound information and advice on climate-relevant topics.

[12] UniNEtZ (Universitäten und Nachhaltige Entwicklungsziele) is a project that the Alliance initiated. The partner institutions take on (co-)sponsorships for one or more SDGs and compile knowledge and activities throughout Austria on the respective SDGs to support the Austrian government in implementing the Sustainable Development Goals. It forms a network of Austrian universities and researchers working on SDGs. Further information: https://www.uninetz.at/en

of change), the paper especially addresses the research gap of lacking theoretical frameworks in SHEI scholarship and delineates an extensive concept of SHEI. The "SHEI Analytical Framework" proved helpful for the comparative analysis of 13 universities, thus going beyond siloed single-case studies and providing a critical analysis. Its application provides a first comparative analysis of SHEI in 13 Austrian universities.

Author's Contributions (see also page viii)

Co-development of the "SHEI Analytical Framework" and research questions, theoretical and methodological approach, conceptualization with supervisors; preparation and conduct of interviews (partly with co-supervisor), preparation of preliminary results for validation process; data analysis and interpretation; co-writing of Paper 1;

sustainability

MDPI

Article

Alliances of Change Pushing Organizational Transformation Towards Sustainability across 13 Universities

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Abstract: Universities are expected to play a leading role in developing and maintaining sustainability. To contribute to a systemic and dynamic understanding of organizational change that is necessary in order to play such a role, we comparatively analyzed processes of organizational changes towards sustainability across thirteen universities in Austria. This comparative analysis is based on data from guided interviews and document analysis and on validation of preliminary results via group discussion and individual comments. The results show that all universities embedded sustainability in most of their areas of activity (research, teaching, operations, organizational culture, societal engagement), but the depth of integration and the type of structural embedding varies. Especially for early changes dating back to the 1990s, academics working in the broader field of sustainability studies were those agents of change, who—without formal mandate—skillfully and proactively initiated and drove organizational transformations following an idealistic and intrinsic motivation. A timeline analysis illustrates peaks of sustainability-related changes in the years of the foundation of inter-university networks in 2011 and 2017, which acted as alliances of change. Ministry intervention in 2015 helped to bring sustainability on the agenda of those universities with less change agency. In summary, sustainability transformations across the fields of teaching, research, operations, organizational culture, and societal engagement were driven by a fruitful interplay of change agency and change alliances and to a minor degree by top-down interventions.

Keywords: universities; organizational change; higher education for sustainable development (HESD); sustainability transitions; SD; alliances

1. Introduction

The important role of universities as active stakeholders to support a paradigm shift towards sustainable development (SD) has been stressed both on the policy level and in the scientific discourse (e.g., [1]).

The contribution of universities to sustainable development is seen, for example, in developing strategic long-term visions and goals [2], in bridging different types of knowledge through inter- and transdisciplinary approaches [3,4], as well as assuming a boundary spanning role between science and society [5]. The role as 'change agent' [6,7] comes not without challenges. In order to fulfil this role, universities need to rethink their current organizational structures and societal purposes, leading to a structural transformation towards sustainability [8,9]. These processes of organizational change are expected to contribute to overarching political agendas (e.g., Education for Sustainable Development,

Sustainable Development Goals) and involve all areas of activity: learning and teaching, operations, external societal engagement, and research.

Much research has been undertaken regarding the *what* of organizational transformation, including (1) the integration of sustainability in university management practices [10,11]; (2) corporate social responsibility, sustainability reporting, and accounting [12–14]; (3) teaching and education for sustainable development [15–17]; (4) generation and advancement of scientific knowledge and other forms of knowledge [18,19]; (5) boundary spanning, participation in regional sustainability initiatives, and networking [2,5,20]; and (6) applying sustainability as an overall concept for universities as in, for example, the 'sustainable university' [4,9].

At the same time relatively little is known about *how* processes of organizational change towards SD take place [21,22]. Insights into the *how* of organizational change towards SD support the understanding on how to orchestrate, push, and/or support organizational change processes in universities. Furthermore, it supports the understanding on how, why, and when diverse internal and external factors influence these change processes towards SD. Understanding the *how* of organizational change means taking into account the deep structure and inter-personality of a university, its sub-systems, facilities, units, and departments, including their interdependencies in a systemic and dynamic understanding [23] as well as the universities' cultural orientations [24].

This makes the process of transformation particularly complex, and those who have researched or engaged in sustainability initiatives or change processes often characterize these as long, progressive, and challenging, and characterized by resistance, barriers, and contradictions [11,25,26].

The subsequent aspects have been derived from the literature to enlighten the *how* of universities' organizational change towards SD [8,9,21,22,26–28]:

- Structural transformation and entrance of SD into universities organizational structures;
- Decision making processes, leadership strategies, and strategic planning dynamics;
- Role of internal factors (e.g., institutional culture, strategic agency, relationships and power on campus);
- Role of external factors (e.g., funding/regulative bodies, networks, other higher education institutions);
- Focus on organizational learning, to explicitly investigate the process of change.

Apart from these content wise perspectives, there is a need to investigate organizational change from a systemic and dynamic perspective [23]. Thus far, only few scholars have looked at all fields of activity from an integrative perspective and on *how* questions of university change processes towards SD (e.g., [27,28]) besides more theoretical work to conceptualize organizational change (e.g., [21,29]). These seminal works enfold that there is no common path for universities towards SD, but different paths driven by diverging factors. Whereby some attention has been paid to internal and external drivers of change, there is yet a lack of (a) understanding how SD entered the respective universities and what are the influencing factors behind, (b) a detailed conceptualization of what is meant by organizational change in the context of universities (an exception states [28]), and (c) a dynamic perspective on organizational change.

The present paper aims to contribute to these research gaps by investigating the *how* question of organizational change processes towards sustainability by scrutinizing the organizational change process of 13 Austrian public universities since the 1990s. In doing so, we explicitly focus on processes of structural transformation and embedding. The authors take a dynamic perspective to address two research questions: (a) How have the 13 universities implemented SD into the universities' organizational structures? (b) How have these changes been driven by internal and external factors? The paper is empirically based on in-depth interviews with selected stakeholders form each university as well as a complementary analysis of strategic papers, visions, and guidelines. We present long-term cross-organizational evidence from 13 universities in Austria and operationalize organizational change as the depth of integration as well as the type of structural embedding. We further enlighten the question

on internal and external factors spurring organizational change processes. In doing so, the valuable contribution of the present paper is to (a) clearly define and operationalize organizational change in the context of universities and sustainable development, (b) take a dynamic perspective which enlightens change processes over the last decades, and (c) present data from multiple case studies which offer potential for generalization.

Section 2 presents the main elements of the analytical framework. Section 3 focuses on the methodology and the research context. Section 4 presents the results structured along the analytical framework outlined in Section 2. Section 5 discusses the results in light of the current academic debate and leads to the conclusions in Section 6.

2. Analytical Framework

The process of embedding sustainability into universities is discussed as a multi-faceted process of organizational learning and change, which leads to a structural transformation towards sustainability and asks for a whole-institution approach [8,29,30]. To ensure consistency and credibility, this structural change must involve all the areas of a university including research, teaching and learning, societal engagement, campus estates, and operations [28,31]. Our analytic framework—in line with the two research questions of the paper—provides (a) an operationalization and definition of organizational change, taking into account the depth of integration and types of change and (b) a conceptualization of the internal and external factors for spurring these organizational change processes.

2.1. Organizational Changes—Depth of Integration and Types of Change

When talking about organizational change, we focus on structural change, i.e., change that is embedded in universities' practices and institutions. By doing so, we set aside projects or activities that are run by an individual or a very limited number of persons and have no major organizational impact after their end. According to Ferrer-Balas et al. [28], the question of how far reaching an organizational change is, can be seen as a question

(a) of how many different persons (groups) carry or are involved in the change process and
(b) if the change is an optimization, improvement, or a real renewal of the system and
(c) if changes are only initiated or also mainstreamed within the organization.

We refer to these aspects as depth of integration and operationalize them as outlined in Table 1. The scales of the depth of organizational change thus reflect the number of persons or groups that are involved in the processes described and their distribution within the universities, but also signs of mainstreaming or system-improvement/renewal, such as e.g., university-wide integration, uptake in strategic papers, setting of new standards. Thus, changes by single actors that only affect a small group of persons are ranked lower than changes carried by a variety of actors in different entities of the university or even changes mainstreamed within universities and thus affecting all its members. Moreover, the size of the 'target groups' was taken into account, e.g., changes that affect all students were ranked higher than changes that affect only a particular group of students.

Table 1. Operationalization and definition of organizational change (own illustration).

Area of Activity	Depth of Integration	Type of Structural Embedding
Teaching	0 = no SD relevant classes, 1 = single SD related courses for students, 2 = SD relevant study programs, 3 = SD relevant programs plus obligatory SD relevant classes for several/all study programs	1. Institutional changes (change of values, norms, formal regulation, voluntary standards) 2. Membership 3. New organizational units 4. Working groups 5. Project/temporary events (e.g., SD days)
Research	0 = no SD-specific research activities 1 = single SD research activities 2 = various, but isolated activities 3 = broad integration and/or strategic focus on SD in research activities	
Operations	0 = no/hardly any activities 1 = single activities 2 = activities plus some kind of certification 3 = EMAS certification plus other activities	
Organizational culture	1 = low (1 of 4 types) 2 = middle (2–3 of 4 types) 3 = high (all 4 types) Types: (a) integration of SD into the scope of functions of the rectorate or strong support from university management, (b) integration of SD into strategic papers, (c) establishment of a SD board or center, (d) implementation of a broad, participatory SD process * Student activities as a specific form of cultural embedding are analyzed separately	
Societal engagement	0 = no focus on SD related societal engagement 1 = SD-service-learning projects in cooperation with government, public administration, schools 2 = specific SD-related activities such as SD day, SD report, SD public event series	

A further aspect which has to be considered under the frame of organizational change within universities is the type of structural embedding. In our work, we differentiate five sub-categories of structural embedding (adapted and extended from Pflitsch and Radinger-Peer [32]) that also relate to the question of how far reaching the change is:

1. Changes in the institutional framework, which reflect changes in rules, norms, and cognition related to SD, such as the implementation of a new formal regulation or the official announcement of new voluntary standards, which legitimize new social practices in favor of sustainability or delegitimize unsustainable behavior.
2. Memberships in a (new) organization mean the commitment and support of a network or organization and its goals. The membership in an organization does not necessarily mean structural changes within a university, but in its best sense can lead to learning processes initiated by this membership.
3. New organizations understood as establishment of new independent organizations, new study programs, or departments within a university. They are characterized by assigned responsibilities, competencies, and/or rule systems and have their own administration, technical, and/or financial resources. Thus, they are seen as relatively stable and deeply embedded in universities' structures.
4. Working groups, which are loosely coupled groups of independent actors with a common interest, usually have a non-hierarchical form and no own resources. They are thus more fluid than formal organizations, but can initiate learning processes, especially if their members come from different parts of the university who spread the ideas.

5. Projects are institutionalized temporary events, which follow a specific purpose over a limited time, but might lead to a new structure (organization/working group). Due to the large number of SD-related activities and actors, the study does not claim to give a comprehensive overview but focusses on those activities that were reported as having led to structural changes. Especially, it does not include single classes, single research projects, or other projects that were started and ended without a structural effect.

In order to understand how these changes are initiated, the likewise influence of internal as well as external factors has to be taken into account [27,29]. Among the university-internal factors, leadership [27,33] and champions as agents of change [28,34] are ranked first in various studies. Regarding external factors, the influence of funding and regulatory organizations but also inter-organizational networks for initiating organizational change of universities towards SD are pointed out.

2.2. Internal Factors—Institutional Agency and Leadership

Institutional agency defines an actor's ability to make an impact on the social order, changing the rules, relational ties, or allocation of capital within an organization. Such actors serve as agents of legitimacy who support the creation of new institutions and reform existing institutions in ways that they deem to be appropriate and aligned with their interests. So-called 'champions' and 'frontrunners' are deemed essential for any transition to sustainability [35]. They are often characterized by holding key positions at the university (e.g., rector, study program manager, head of institute) which allow them to take agency and precipitate organizational and institutional change within the university [32,36]). Commitment, leadership, and support by those 'higher-up' in universities are crucial to progress and embed sustainability [37] because it means that new structures, incentives, and funding are put in place [38]. The role of leadership is seen in guaranteeing the mainstreaming of SD-related organizational changes in contrast to mere 'cosmetic reforms' [27].

At the same time, literature on leadership argues that leadership is not just centralized but is also dispersed in the sense that leadership opportunities are available to any member of an organization, no matter what the rank [39]. Thus, leadership can come from any corner of an organization, from senior officials to students, from academia to administrative staff [22,40]. Thereby top-down and bottom-up activities interact with and reinforce each other [22]. Hoover and Harder [26] detect in their cross case synthesis that especially in sustainability initiatives 'pointing at power' is a frequent phenomenon, that means, people tend to perceive sustainability work as someone else's responsibility. "Opportunities for leadership and possibilities for change have more to do with how one sees oneself within an institution and in relation to others there than the position one holds" [25] (page 5). Therewith, the presence and the perception of power has an important role in constructing how change takes place, and who gets involved. For analyzing the university internal factors, each organizational change reported in the interviews is attributed to agency and/or leadership of one of four groups of actors in the analysis: academia, administration, management, or students, as shown in Table 1.

2.3. External Factors—The Universities' Environment

Modern universities may be referred to as open systems, where complex and dynamic reactions between the organization and its environment mediate through its structural operations [41]. For universities, the following elements are part of their environment: (a) government as funding/subsidizing organization, (b) other higher education institutions (and the cooperation or concurrence with them as well as a role model effect) [41,42], as well as inter-organizational networks.

Universities' activities are often driven by their sources of funding [28], therefore the government as the main funding organization but also the focus of third-party funds exerts influence on universities' organizational change processes, especially also with regard to SD.

Apart from dependence-relations, which exist between university and their funding organizations, relationships and networks are highlighted rather often in the literature as having an influence on

organizational change processes of the university towards SD [26]. Interpersonal relationships and networks both appear to have a strong influence on the nature and development of initiatives on campus [43]. Networks fulfil different functions: they transmit data, information, and knowledge, facilitate the coordination of decisions [44], they support innovation [45], and can contribute to meta-effects through steering and self-organizing processes [46]. Networks can furthermore enable individuals without specific interpersonal connections to get involved, and bridge boundaries within and between institutions. On the other hand, they also have the potential to exclude people or groups and therewith influence who has access to power in the change process [26]. Based on their international study, Ruiz-Mallen and Heras [47] point out that university networks influence the sustainability discourse as well as practice at universities. In our analysis of external factors, we focus on incentives or pressures from government/funding organizations on the one hand and other universities and networks.

The presented analytical framework comprising organizational changes as well as internal and external factors of change built the basis for the further analysis of the empirical findings.

3. Methods and the Research Context

The study follows a case study approach which is recommended if the research focusses on *why* and *how* questions, if the researcher has only little control over participants' behavior, if the focused phenomenon is relevant to present time and if there is only a poorly developed data basis available [48–50]. They provide answers to *how* and *why* questions by conducting a detailed contextual analysis of underlying conditions, behavior patterns of individuals, and their relationships [51]. As single-case studies are often criticized regarding their unique conditions surrounding the specific case, multiple case studies are considered to provide more compelling and more robust evidence and more substantial analytic results, particularly if they are based on the triangulation of evidence from different sources [48] (pp. 103–119). Therefore, we opted for a multiple case and mixed methods design combining the analysis of documents, transcripts of semi-structured interviews with feedback loops of interviewees, and additional key-informants.

The case study covers 13 of 22 Austrian public universities, all of them members of the Alliance of Sustainable Universities in Austria ('Alliance'). By February 2020, 16 universities are members of the Alliance. The case study covers 13 of the 14 universities that were members in 2018. The 14th university did not respond to our request for interview. The Alliance is an informal network of universities that was founded in the beginning of 2012 and aims at promoting sustainability issues in Austrian universities. The member universities cover a spectrum of different types of universities. Table 2 gives an overview and lists the short names used in the following text. BOKU university hosts a coordination position for the Alliance, which is held by the first author. The main body of exchange and collaboration is the so-called expert group, which consists of persons who are nominated by the rectorates and usually have a major role in SD activities in their universities. The lead for joint activities and working groups is distributed among the members.

All case universities are subject to the Austrian university law of 2002 and are publicly funded. A slightly modified legal situation applies to DUK as a university of continuing education with an additional legal basis, the state of Lower Austria as a co-owner, and fee-based study programs. Studying at all other Austrian public universities is largely free of charge and for most study programs without restrictions to admission. The budget for universities is negotiated with the Austrian Federal Ministry of Education, Science and Research (BMWFW) every three years and is based on the so-called performance agreements. Public funding covers on average across the 22 public universities about 74% of the total budget [52], the largest part of the rest comes from external project funds.

Table 2. Universities covered by the study, background of interview partners.

ID	English Name	Short Names	Characteristics	Alliance Member Since	Interview with Member of [1]
1	University of Klagenfurt	AAU	4 faculties: technical, economics, humanities, interdisciplinary faculty (IFF)	2012	academia
2	University of Natural Resources and Life Sciences	BOKU	life science university	2012	academia
3	Danube University Krems	DUK	university for continuing education	2017	management *
4	Johannes Kepler University Linz	JKU	4 faculties: engineering & natural sci., business & social, law, medicine	2018	academia (2 IP)
5	University of Graz	KFU	full university	2012	management
6	University of Music and Performing Arts Graz	KUG	art university	2012	management
7	University of Music and Performing Arts Vienna	MDW	art university	2017	non-scientific
8	Mozarteum University	MOZ	art university	2018	management
9	Montanuniversität Leoben	MUL	university of mining	2018	management *
10	University of Salzburg	PLUS	4 faculties: catholic theology, cultural/social, natural sciences, law	2012	academia
11	Graz University of Technology	TUG	technical university	2012	academia (2 IP)
12	University of Innsbruck	UIBK	full university	2012	academia
13	Vienna University of economics and business	WU	economics	2012	academia [2]

[1] Academia = scientific staff; management = (vice-) rectors and staff in university management; non-scientific = persons working within administration or other non-scientific position; all interview partners except those marked with * are member of the Alliance's expert group; (2 IP) = interview with 2 persons in parallel; [2] the interview partner has in the meantime left WU.

Guided interviews with at least one representative of each of the above-mentioned universities were held between March and September 2018, with a duration of 50 to 90 min each. The interview partners were mainly members of the Alliance's expert group and were thus supposed to have a good overview over SD activities as well as the SD history of their university.

The interviews were led by the first author, partly together with the second author. The former, as coordinator of the Alliance, has good insights into the activities of each university and good relations to most of the interview partners, thus the interviews could build on a certain basis of trust and mutual knowledge and understanding. The interviews focused on the process of each university (and not the Alliance), which allowed the interviewer to remain in a neutral position, as she was not involved in these internal processes. BOKU university is an exception, as all three authors are affiliated there and are to different extents also involved in SD activities. Nevertheless, it is not possible to rule out the possibility that Alliance-related activities were mentioned to a higher extent as they represented the common point of reference for both the interviewer and the interviewees.

The interviews focused on the causes, processes, and main actors behind SD at the university and the question of how it was (historically) integrated at the university.

The interviews were recorded, transcribed, and analyzed with Atlas.ti, as shown in Figure 1) (data analysis). The aim of the qualitative content analysis [53] was to extract organizational changes along the categories operationalized in the analytic framework, as shown in Table 1, and list them according to the

- Area of activity;

- Year of implementation;
- Actors driving these changes.

As the background and institutional position of the interviewees differed, a certain bias regarding the change process reported cannot be precluded. Validation of preliminary results was sought by (a) presenting and discussing them in one of the Alliance's expert group meetings; (b) sending them for comments to the interview partners; (c) sending them to the student unions of each university. Moreover, the results were triangulated with information from documents and online resources. The last step of data analysis included the attribution of each change to one of the areas of activity, the year of implementation, and the persons or groups that were involved.

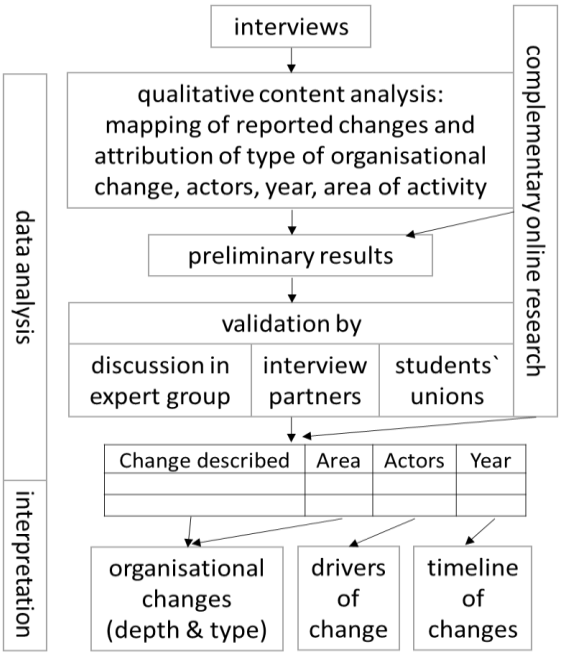

Figure 1. Process of data collection, analysis, and interpretation.

The interpretation of the empirical findings focused on comparatively analyzing the depth of integration and the type of structural embedding according to the analytic framework, as shown in Table 1. Addressing the second research question on factors of change, each organizational change reported in the interviews was attributed to agency and/or leadership of one of four university-internal groups of actors (academia, administration, management, students) and the timeline of changes is interpreted against events in the organizational field (external factors), as shown in Table 1.

4. Results

The first part of the results, Section 4.1, presents results on the how questions, i.e., we present evidence showing that all 13 universities embedded sustainability in research, teaching, operations, organizational culture, and/or societal engagement, and we interpret these changes in regard to their depth (Section 4.1.1), as well as in regard to types and structural effects of these changes (Section 4.1.2). The second part (Section 4.2) analyzes the second research question on internal and external factors. Moreover, the timeline of changes is interpreted along the appearance of influencing factors.

4.1. Organizational Changes in the Case Study Universities

The results show that universities made changes towards SD in at least three out of five areas of activities, thus SD is embedded in the whole institution. Nevertheless, changes vary in regard to the question of how deep these changes are structurally embedded. About half of the universities

show deep or quite deep integration in all areas (AAU, BOKU, KFU, WU, PLUS, TUG, UIBK – short names according to Table 2), i.e., changes that are built on a broad basis of involved or affected persons. Others show lower levels of integration, often combined with one or two areas of activities with no integration—usually universities that only recently became members of the Alliance or also art universities. Furthermore, in regard to types of change, i.e., changes in the institutional framework, memberships, new organizations, working groups or projects, it can be observed that most of them play a role in the universities, but their relevance in regard to structural embedding varies.

4.1.1. Depth of Integration

The analysis addressed the question on how and how deeply the 13 universities have organizationally embedded SD into their five areas of activity, i.e., research, teaching, operations, and also activities in regard to organizational culture and societal engagement. Many case universities embed SD in most of these areas and therewith follow integral approaches. Nevertheless, these organizational changes differ in regard to the depth of structural embedding. Aggregated results according the 0–3 scale of the analytical framework, as shown in Table 1, are shown in Table 3. In the following, we argue the results by giving evidence on integration within the 13 universities.

Table 3. Embedding of sustainable development (SD) in different areas of activity of the case universities. The numbers represent the depth of integration—for details see Table 1.

ID	University	Teaching	Research	Operations	Organizational Culture [1]	Societal Engagement
1	AAU	2	3	3	2 + s	1
2	BOKU	3 *	3	3	3 + s	2
3	DUK	2	2	0	2	1
4	JKU	2	3	0	1	0
5	KFU	2	3	3	2 + s	2
6	KUG	1	1	2	2	0
7	MDW	0	1	2	2	0
8	MOZ	0	1	1	2	0
9	MUL	2	2	0	2	0
10	PLUS	1	2	3	2 + s	1
11	TUG	1	2	2	2 + s	2
12	UIBK	2	2	1	2 + s	1
13	WU	3	2	3	3	2

* BOKU moreover has an ESD working group, [1] 's' means additional student activities.

The results in the area of teaching show that only two universities (BOKU, WU) deeply integrated changes towards SD in their teaching area, whereas other universities show only limited changes in this field.

By deep integration, we mean e.g., that WU established a SD class which is obligatory for (almost) all students in their first years ('Sustainable Economics'). Thus, students are at least confronted once in their studies with SD. Or BOKU, that has SD inputs in obligatory introductory classes for three study programs and established a working group on Education for Sustainable Development (ESD) in order to promote sustainability issues in teaching. Therewith, these two universities have undergone the deepest structural change, although the depicted changes are to a large extent on a project or working group level only and therefore can be considered as improvement of the current system rather than a renewal. Although a single course during a study program cannot come up to profound education for sustainable development (ESD), it can be considered as an important step in addressing

all students regardless of their program. Both universities also offer SD study programs (e.g., WU on Socio-Ecological Economics and Policy, BOKU on Environment and Bio-Resources Management), as well as single SD-relevant learning opportunities for students. Less deep forms of change are voluntary extension curricula on sustainability or student-organized classes for students of all study programs (e.g., AAU) or study programs for a limited number of students. The latter can be differentiated in study programs with a system approach on SD (AAU, KFU, and UIBK) and more focused study programs with an SD relation (DUK on sustainable buildings, JKU and MUL on energy). As these changes affect only a small part of the students, they are assigned a lower depth of organizational integration.

Changes in the area of research (such as the establishment of SD-relevant institutes, departments, or professorial chairs, internal sustainability research networks, research activities related to SD) exist in all research-oriented universities but they remain isolated in most universities, i.e., they are based on the commitment of few actors and have no specific support from university management. Art universities form an exception, as they participate in the UniNEtZ project (see below), but have no further research activities in regard to SD. Only four universities (BOKU, KFU, AAU, JKU) have a broader and more strategic SD focus in this area of activity. They name sustainability as one of their research priorities in their strategic papers—reflected by a higher rating in regard to the depth of integration. At BOKU, KFU, and AAU this strategic focus is moreover reflected in internal networks and cross-sectoral organizational entities covering various disciplines and approaches, which might be seen as another sign of relatively deep integration, but a fundamental change in structures and cultures still has to be proven.

One research activity that unites all except one university is the participation in the UniNEtZ project [54], a joint project of the Alliance universities, which officially started in 2019, but intensive preparatory work dates back to 2017. All case study universities except WU participate in this project. The project's aim is to elaborate an option report which supports the Austrian government to implement and reach the sustainable development goals. Although started as an informal activity of some Alliance universities, it quickly gained momentum and (a) led to the integration of 16 universities and more than 200 researchers, (b) achieved the embedding of SD into the performance agreements of all participating universities with the ministry, and (c) encouraged many universities to join the Alliance. The global initiative of the Sustainable Development Goals (SDGs) and the corresponding UniNEtZ project led to changes in the universities' environment. At the same time, it also has the potential to lead to system renewal as the project follows a fundamental shift towards "research guided to the 2030 Agenda" [55] (p. 113) and includes a great number of researchers who have the potential to spread this shift in their universities.

Changes in 'operations' refer to activities with regard to operational management, such as procurement, mobility, organization of meetings, etc. Changes in operations are not necessarily linked to teaching and research but are often seen as important in order to achieve consistency between universities' fields of action. In regard to the depth of integration, the existence of some kind of certification was considered as an important indicator. This contributes to a deeper structural effect as it is based on official standards and monitoring and thus affects the university's everyday life and therewith all university members. If taken seriously, implementing such schemes requires revision and redesign of routines, leading to substantial change towards SD. Moreover, it was found that changes in this area can either be the entrance point for a wider orientation towards sustainability (e.g., KUG and MDW) or are the logical consequence of changes in other areas, like research or teaching. The latter holds true for five universities that reported no or very little focus on sustainable operations before their membership in the Alliance but are strengthening such initiatives in the meantime.

In detail, five universities (AAU, BOKU, KFU, PLUS, and WU) undergo external certification of activities in this field according to the European Eco-Management and Audit Scheme (EMAS). Although usually focusing on operational issues, e.g., AAU and KFU also report on their SD research and teaching activities within EMAS, which gives the certification an even wider scope. EMAS and its international counterpart ISO 14001 are interpreted as the deepest form of integration as they require

reporting on and improvements in a wide range of topics covering energy, material resources, etc. Other universities follow more regional schemes like Ökoprofit (KUG) or the Viennese Eco-Business Plan (MDW), or schemes on a specific topic (e.g., TUG with ISO 50001 on energy management).

Changes within 'organizational culture' were categorized in four types, as shown in Table 1. As it is difficult to rank these different types of changes, the 4-degree scale reflects the assumption that the depth of integration depends on the amount of cultural changes. The more forms were observed in a university, the higher the depth of integration as well as the effect on university members. Again, BOKU and WU show the deepest integration of SD in their organizational culture as they implemented all types of organizational change in this area. Most other universities show at least two different types of changes and were ranked in the middle scale. Students' initiatives were analyzed separately, as they are often limited in time and it is difficult to say whether they have a long-lasting effect, although they definitely have a huge potential for inducing change. At about half of the universities, SD-related student initiatives were established.

In particular, one change that applies to almost all universities is the integration of SD into the scope of functions of the rectorate or strong support from university management (type a). This underlines the finding that support from actors of the university management is important at some point of the process (see below, Section 4.2.1). By integration of SD in strategic papers (type b), we mean e.g., the formulation of SD research priorities or stressing SD in the development plan (e.g., AAU, DUK, JKU, KFU, MDW). Type c covers the establishment of SD centers (i.e., new organizations with financial and personnel resources, with the explicit task to strengthen SD in the university, applicable for BOKU and WU) or SD boards (i.e., persons from different university entities are assigned to these boards, but no special financial and personnel resources, applicable for KFU, MOZ, PLUS, TUG). The latter is a more decentralized form of organizational change in this field. BOKU and WU also initiated a broad participatory SD process (type d), which was as well interpreted as a change of the organizational culture, as these lead to a stronger perception and acceptance of SD in the whole university. At JKU, it is mainly the research strategy with SD as one of three research priorities that gives a hint to a change in the organizational culture.

The area of 'societal engagement' includes changes that promote the interaction with society in regard to SD. Within the expert interviews, this area of activity was reported only fragmentary and these activities are difficult to research online, as societal engagement often is a side-product of other activities and thus difficult to differentiate from societal engagement without relation to SD. Therefore, the results in this area are least comprehensive and a simple scale to capture the depth of integration was applied.

Based on this limited information, four universities were ranked relatively high ('2') as they have specific SD-related communication formats that address a larger target group—mainly annual SD days, where students, staff, and the public are invited to learn about and celebrate SD at the universities; but also SD reporting and several public SD events were reported. Another four universities were ranked with '1', as they gave accounts of projects that are conducted by single research groups with a limited range within the universities, e.g., SD service projects, i.e., projects in cooperation with the government, public administration (ministry, country administration), or schools with a strong service component for these partners. Moreover, DUK was subsumed in this category where societal engagement is a central element of their work as their students usually are in employment and directly apply their knowledge at work—but a specific SD focus is missing.

4.1.2. Types and Structural Effects of Changes

Five types of change were differentiated in the analysis (see conceptual framework) to better understand the how-question of organizational change towards sustainability. In the following, we present examples for each of these types and draw conclusions on their relevance in regard to structural embedding of SD.

Changes in the institutional framework, such as the integration of sustainability in strategic papers, can be observed in all universities. They are either implemented top-down from the university management, or they are a consequence of bottom-up engagement. Especially if implemented top-down, they might, but do not necessarily lead to changes in real-life [56]. This can, for example, be observed in the case of DUK, where SD is a focus of strategic papers, but a broad integration into the university's structures and university-members' activities is still missing. Nevertheless, these changes in the institutional framework can be the starting point for further changes and are important steps towards deep and lasting institutionalization of bottom-up initiatives.

Like changes in the institutional framework, memberships in organizations do not necessarily result in real-life changes, but in some cases they did. Especially the membership in the Alliance of Sustainable Universities and the participation in its UniNEtZ project often were reported as a starting point for further organizational changes. Besides the Alliance membership, the Graz-wide network 'Sustainability4U' and the Climate Change Centre Austria (CCCA) play important roles. The latter is a research network that promotes climate research and climate impact research and fosters collaboration in and among these fields, as well as provides society and policymakers with scientifically sound information and advice on climate-relevant topics. Furthermore, the universities take part in more specific networks like the 'Responsible Science initiative' or the 'Principles for Responsible Management Education' network. As SD-relevant memberships were not systematically researched, the list is not comprehensive and only relies on these memberships reported by interviewees during the interview.

The foundation of new organizations usually is reflected in formal documents, i.e., the institutional framework. Moreover, they are mostly equipped with financial and/or personnel resources. New organizations comprise the foundation of research institutes or departments, study programs, EMAS, but also students' organizations. All universities, except two art universities, have founded some kind of new organization. TU Graz has founded a new SD organization recently. In two cases, special organizational SD entities at the university, i.e., SD competence centers, were founded to deal with SD at and beyond the university. Such competence centers play a specific role in embedding SD in universities. The two competence centers of the case study (BOKU and WU) started broad sustainability processes and took a leading and coordinating role. Therefore, they are perceived as role models by other universities.

Despite the fact, that organizations are usually equipped with financial and personnel resources and are usually reflected in the institutional framework, changes in strategic orientations of the university management can also destabilize such structures. In one case (AAU) institutes of an interdisciplinary, SD-oriented faculty were transferred to other universities following a decision from the rectorate. Due to the same reason, AAU left the Climate Change Centre Austria. Furthermore, due to changes in strategic decisions of the rectorate, the competence center for sustainability at WU shifted the focus of the center to sustainability-related research.

In contrast to new organizations, working groups and/or projects, as more short-term and informal forms of SD integration, can also be found at all universities. Interestingly, there are no SD-related working groups at those three universities (DUK, JKU, MUL) that only recently started with their SD activities and where this process was initiated rather top-down.

4.2. Internal and External Factors of Organizational Change

In order to answer the second research question on internal and external factors, (1) each organizational change was attributed to agency and/or leadership of one of four groups of actors in the analysis: academia, administration, management, and students, and (2) the timeline of changes is interpreted against changes in the organizational environment and the therewith presumed influences. Here, we show that academics working in the broader field of sustainability studies often were agents of change, who skillfully initiated and drove organizational changes. They mainly acted proactively without formal mandate, but out of personal interest and conviction. Furthermore, a timeline analysis (in Section 4.2.2) illustrates peaks of sustainability-related changes in the years of the foundation of

inter-university networks, which acted as alliances of change, and ministry intervention, which helped to bring sustainability on the agenda of those universities with less change agency.

4.2.1. Internal Factors—Agency and Leadership by Various Actor Groups

The results show that all four actor groups play a decisive role for organizational change processes at universities, although their power and agency differ. The most prominent group in all but art universities is academic actors—numerous individual, fragmented activities from scientists in the area of environmental science and sustainability in teaching and research date back to the early 1990s and form the nucleus for later changes. The key academic institutional actors are professors, department heads, or study program managers who work in disciplines that have a proximity to SD (e.g., geography, meteorology, biology, system science) and seem to have the necessary agency and leadership abilities to initiate the alignment towards sustainability via the foundation of new institutes (e.g., AAU, JKU, UIBK), the foundation of competence centers (BOKU, WU), as well as new study programs or new specialization areas (KFU, TUG, UIBK). Based on the empirical material, the motivation of these academic actors seems to be a mixture of personal motivation and conviction, as well as their understanding of their position and power.

Nevertheless, at some point bottom-up initiatives from researchers need the support from management. At two universities (BOKU, WU), the interplay and reinforcing of academia and management was key to the initiation of comprehensive organizational change processes. Highly motivated and engaged academics, as well as a rectorate that fully supported these initiatives via new structures and additional funding, characterize these processes. Although the management's commitment and support are needed in order to successfully embed SD structures in universities, it shows that only few changes can directly be attributed to this actor group (KUG, MOZ, DUK).

The art universities show a different pattern. There, actors from management and administration have taken the lead. As there are no faculty members with a disciplinary proximity to SD at art universities, members of administration who have a strong personal connection to SD issues either take the lead and motivate the management (MDW) or they closely collaborate with—also personally motivated—members of the management.

Differences can also be detected in regard to students as a further internal actor group. At BOKU, KFU, AAU, and UIBK, they form a kind of sparring partner for institutional change agents from academia, by mutually supporting activities and by collaborating for change. On the contrary, art universities, the DUK as a continuing education university, as well as MUL and JKU, do not show strong student engagement—which might be due to a tighter timeframe of studying and/or less affinity to the topic. The lack of student support reported for MUL and JKU might be a bias from interviewees selected from faculty and management. However, students' unions were also asked for feedback to the results and only took the opportunity in a few cases (AAU, KFU, TUG, UIBK)—which might be another indicator for less engagement.

4.2.2. External Driving Factors and Their Influence on the Timeline of Changes

The analysis of the coincidence of organization change and external factors shows interesting patterns when looking at the timeline of changes, as shown in Figure 2. Changes were only singular and few until the mid-2000s. Then, a steady increase of changes can be observed until 2011, when a first peak of activities can be detected for a period of 2 years (2011–2012). This peak of changes is due to activities of seven of the universities and correlates with the foundation of the Climate Change Centre Austria (CCCA) in 2011 and the foundation of the Alliance of Sustainable Universities in Austria in the beginning of 2012—going hand-in-hand with the raising importance of SD topics in the context of universities. Especially, the Alliance was often reported as a driver of change. One of the main purposes of this network is to exchange good and best practice experiences and to support SD-related changes in its member universities.

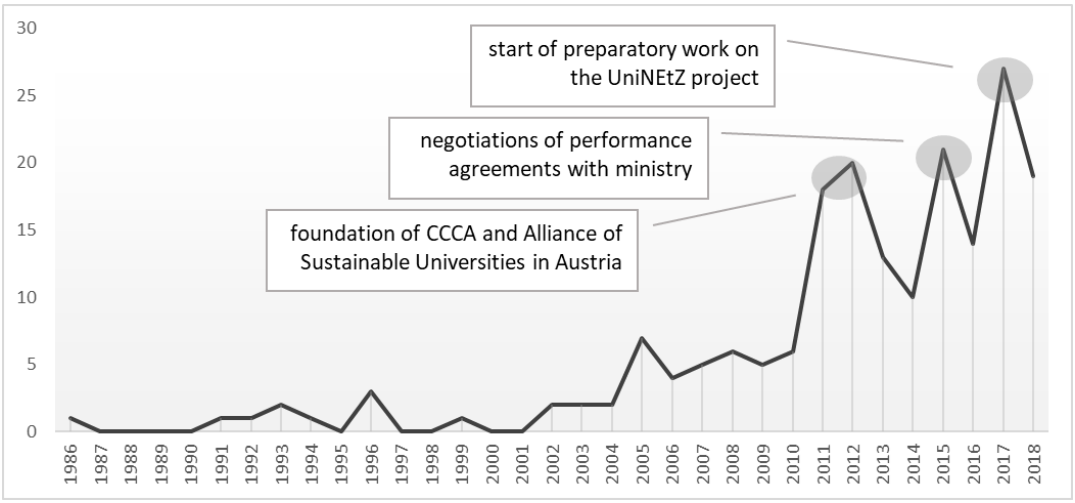

Figure 2. Number of reported changes per year excluding memberships in Alliance and Climate Change Centre Austria (CCCA), and contributions to UniNEtZ; total for all case universities.

A second peak of organizational changes towards SD in the investigated universities occurs in 2015. It correlates with the timeframe for the negotiations of the performance agreements with the ministry. The therewith template prepared by the ministry included a new aspect of the universities' contributions towards SD. Although the ministry cannot directly impose SD on a university, it can stress the topic's importance by including it in the reporting forms that universities use. This happened in 2015, and although not explicitly mentioned in the interviews, the increasing number of changes from 2015 on might be attributed to this.

A further external driver for changes was the Agenda 2030, published and agreed on by all UN member states in 2015. By signing the Agenda, Austria obliged itself to accomplish the Sustainable Development Goals and called on its institutions to support this endeavor. The call was taken up by scientists from the Alliance. They started the UniNEtZ project, which again boosted many SD-relevant changes at the universities and led to the accession of four further universities to the Alliance.

5. Discussion

Based on the detected research gaps, the present paper aims to investigate how universities implemented organizational change towards sustainability and how these organizational changes have been driven by external and internal factors. The scientific insights gained are compared with the scientific state-of-the-art in this section.

The results show that all 13 analyzed universities have implemented SD in most or even all areas of activities, i.e., research, teaching, operations, organizational culture, and societal engagement, and thus come up to the call for an integrative approach (e.g., [21,27,28,31]), although the depth of integration varies. While Lozano [57] stated in 2015 that "in general, the implementation of SD in HEIs [Higher Education Institutions] has been compartmentalized and not holistically integrated throughout the institutions" (p. 14), most of the analyzed universities follow an integrative approach. Some of the reported changes only affect small aspects of a university, but the fact that the universities show efforts in most areas of activity indicate that the ideas are integrated holistically. Moreover, the depth of integration was taken into account—operationalized by the number of persons involved, signs of mainstreaming, or system renewal—building on Ferrer-Balas [28]. Some universities show deep changes in all areas of activity, such as AAU, BOKU, KFU, UIBK, and WU. Those universities that show lower levels of intensity and a stronger focus on single areas are, on the one hand, art universities that lack research with a proximity to the topic, or on the other hand, universities that have started the process recently and rather top-down from the university management. Nevertheless, all universities show structural embedding in at least three of the five analyzed areas of activity.

The driving forces behind these changes can be observed in many internal and external factors. Our study reveals academic staff as a major driver for change in about half of the cases—single actors who initiated changes based on their personal motivation and engagement. This adds an important aspect to Barth [27], who differentiated between student-, operations-, and unique selling-point-driven implementation processes of SD and saw the role of academic staff rather as transmitters than as factors of change. Through the intrinsic personal motivation of single researchers, in combination with their position and decision-making power, processes of structural embedding were initiated—not only in the area of research. Thus, they acted as institutional change agents [36] who make the university management support their endeavors and not vice versa [26,32]. In many cases, a certain awareness for environmental and sustainability issues was already established, though fragmented, which formed the seedbed for organizational change (foundation of new institutes, centers, new university courses or study programs).

Nevertheless, it needs a good interplay between bottom-up engagement and the university management—at least at some point of the process. Ideally, the management's endeavors are backed and supported by incentives from funding organizations. On the downside, missing or withdrawn support can end changes quickly. In this sense, our results support the findings of Heck [40] and Lozano [11] that a strong interplay of bottom-up engagement with top-down support leads to a broad embedding in various areas of activity of the university. Within all universities the university management and rectorate played a decisive role to bring SD on the agenda at some point of the process. We interpret these developments in the Austrian case as consequences of the organizations' environmental influence—in 2015 the ministry included SD into the template of the performance agreement and from 2017 reinforced its intention to extend universities' participation in the Alliance and the UniNEtZ project. This gentle pressure changed the regulative framework and induced organizational change processes in the mentioned cases. The support of the rectorate/leadership is essential to ensure continued existence of new organizational structures. Several times new developments (towards or away from) SD go hand in hand with changes of leadership on the top-management level. On the contrary, the loss of leadership support or changing strategic orientation in the university management also led to a weakening of established structures (see the example of the AAU SD faculty).

Students have a very specific role in SD processes [22,58]. First, they as a main 'target/stakeholder group' of universities have the legitimacy to call for changes towards sustainability. It is their generation that will be affected most by an un-sustainable development, which adds another form of legitimacy and an intrinsic motivation to call for changes. Nevertheless, not all students seem to have a personal motivation and interest in the topic, which seems also to depend on the study program in which they are enrolled. Second, they are very fluent groups as they usually only stay for a couple of years, which makes it difficult to provide continuity to their actions. Third, they are "easy to motivate, but difficult to organize" [58] (page 112), as their calendars and time management differs from university staff. These differences can also be seen in the results—universities with study programs related to SD tend to have more active students. In the case of PLUS, it was even them who initiated changes by proposing them to the rectorate—but then the group of students dispersed quickly.

Usually, universities started their process from one area of activity—with a further diffusion to other areas. Although it is difficult to attribute these broadening patterns simply to the membership in the Alliance, the exchange between actors from different universities, continuous confrontation with new ideas, and a certain normative pressure from within the network seem to have supported these developments. Those universities that started from engagement in operations, show similar patterns as observed by Barth [27], by focusing on changing daily routines. The initial factor varies, from single actors with or without a leading position to isomorphism [59], trying to copy a path that was taken by similar universities before. The latter holds true for art universities. Nevertheless, these universities broadened their activities incrementally (broader embedding of SD in strategic papers or in research activities, etc.). Universities starting from research activities also show a pattern towards broadening,

as they usually started with single actors, lectures, research topics, and later started with activities in operations, teaching, etc.

Apart from institutional agents and leadership, we further detect the following influencing factors in the universities' environment, which initiated structural changes towards SD: networks and alliances, and the ministry (regulative environment). The reported and observed effects (increase in changes towards SD) support the assumption that the Alliance and similar networks strengthen institutional change agents by making SD a relevant topic at the university and by enabling the learning from others of how to initiate, accelerate, and mainstream change. These findings are in line with Ruiz-Mallen and Heras [47] who emphasize that these type of (university) networks influence the sustainability discourse as well as practice at universities. Accordingly, our results reveal a correlation between the foundation of the Alliance, the CCCA, and the start of the UniNEtZ project and the number of SD-related changes at the member universities (see also Section 4.2.2). The functions of networks in transmitting information, knowledge, support of innovation, and steering processes described in the literature [44–46] is in accordance with the observed reasons for universities to join the Alliance—interest to support this topic combined with a search for support and guidance. For some universities, the membership in the Alliance stood in the beginning of their endeavors (like the participation in the UniNEtZ project), for other universities it was a logical consequence of already ongoing SD activities—but still seeking to increase effectiveness through networking.

The UniNEtZ project functioned as another re-enforcing mechanism. Initiated by the Alliance, it soon gained strong support from the ministry, which then called on other universities to join the project before and during negotiations of the performance agreements. The participation in the project made many universities also join the Alliance.

While the network of the Alliance exerts mimetic and normative influence [59] on universities, the Austrian Federal Ministry of Education, Science and Research exerts coercive power via the performance agreements, which are the basis for the negotiations between the university and the ministry. Other influencing factors with a normative effect are international/global developments such as Agenda 2030. Via this international discourse, the topic of SD got extra attention and momentum.

Before summarizing the general implications of our research, the following limitations have to be taken into account. The study focuses on public universities in Austria, as the Alliance network until now is limited to this type of higher education institution. Furthermore, the background and institutional position of the interviewees differed, therewith a certain bias regarding the change process reported cannot be precluded. Although our investigations have a dynamic perspective, even more in-depth interviews with actors from various backgrounds, inside and outside the university would be necessary to explore the processes of change in detail at each university.

Nevertheless, the following findings can be generalized to other (semi-)autonomous public universities. First, organizational change processes towards SD in universities are complex and characterized by numerous parallel developments, a diverse range of actors involved, and are influenced differently by internal and external factors. It became also evident that various development paths can be taken leading to organizational transformations towards SD. Second, the important role of individual (often, but not only academic) actors, which due to their motivation and position, enact change towards SD has to be pointed out. If single actors or single actor groups manage to act skillfully within the opportunities given by networks, university management, and, ideally, funding organizations, they can exert a huge changing power. Third, the university management and rectorate have an important enabling role, providing windows of opportunity, funding, or other types of support (e.g., foundation of new organizational units, personnel, or financial resources, incorporation into university strategies). The universities with the most comprehensive and advanced organizational transformations towards SD are those where a fruitful interplay between the rectorate and the individual (academic) actor has taken place. Fourth, the role of inter-university networks is crucial to start the dialogue on certain (SD) topics, to provide room for discussion, as well as joint-action. These SD-focused networks initiate mimetic and normative influence and state important

platforms for change agents. We hope that our findings inspire more scientific investigations on whole-institution organizational change processes towards SD, especially focusing on other national and international settings. While we operationalized organizational change as depth of integration and type of structural embedding, further research could pay more attention to how these changes are legitimized and institutionalized. Moreover, experiences from other countries and also diverse higher education institutions could further enrich the current academic discourse.

6. Conclusions

The comparative analysis illustrates thirteen Austrian universities' organizational change processes towards sustainability in the areas of teaching, research, operations, organizational culture, and societal engagement. Academics working in the broader field of sustainable studies were change agents, who skillfully and proactively initiated and drove organizational change. A timeline analysis illustrates peaks of sustainability-related changes related to the years of the foundation of three inter-university networks. These alliances of change, in a fruitful interplay with academic change agents, have further pushed organizational change towards sustainability. Management and rectorates, as well as ministry, played an important role in bringing sustainability on the agenda of those universities following later. In a nutshell, the thirteen universities have implemented organizational change towards sustainability by an interplay of intra-university change agency and inter-university change alliances, complemented by more coercive management and ministry interventions pushing sustainability transformations in the group of late followers.

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4.2. Paper 2

Radinger-Peer, V., & Bohunovsky, L. (2021). Strukturelle Einbettung von Nachhaltigkeit an Österreichischen Universitäten. In A. Pausits, R. Aichinger, & M. Unger (Eds.), Rigour and Relevance: Hochschulforschung im Spannungsfeld zwischen Methodenstrenge und Praxisrelevanz (Vol. 2). Waxmann Verlag. https://www.waxmann.com/index.php?eID=download&buchnr=4459

The paper results from a presentation of Verena Radinger-Peer (Radinger-Peer, V; Bohunovsky, L; Penker, M: Strukturelle Einbettung von Nachhaltigkeit an Österreichischen Universitäten) at the 2nd Conference of the Netzwerk Hochschulforschung "Rigour and Relevance – Hochschulforschung im Spannungsfeld zwischen Methodenstrenge und Praxisrelevanz“, May 22 - 23, 2019, Vienna, Austria.

The paper is editor-reviewed.

Objectives of the Paper & Research Questions Addressed

For this paper, we further elaborated on results from Paper 1, focusing on processes and types of change. We thus contributed to the answer of research question 2.2.

Methods

Paper 2 builds on methods and results from Paper 1. Additionally, the results from the first qualitative content analysis were depicted in graphical pathways, i.e., changes were mapped according to their type (different symbols used for types of change), the year of implementation (timeline as y-axis) and the actor group(s) driving the change were differentiated along the x-axis (cf. Figure 9 and 10).

Insights

Paper 2 shows four different pathways that were taken by Austrian universities. Type A includes two frontrunner universities that show many sustainability-associated changes, and changes in all university areas starting from the early 2000s. Different actor groups were driving the changes – above all, faculty members. Type B includes five universities, showing fewer changes and a later start (mid-2000s). Similar actor groups than in type A were driving the changes, although they were smaller in number. Type C encompasses three art universities, again showing fewer changes and different start years. In contrast to types A and B, change in this type was mainly driven by actors from administrative staff and top-management. Type C includes three universities with a more recent start; therefore, it remained open how these universities would further develop. Actors from faculty and top-management mainly drove change processes in these universities. In contrast to other types, no activities with overarching actors could be identified. Despite different paces and different starting positions, the universities managed to integrate sustainability in their universities in different areas of their organization.

Originality

The paper takes a dynamic perspective and contributes to the understanding of SHEI change processes by illustrating different pathways taken by Austrian universities. It thus addresses the research gap of little comprehensive overviews of change processes.

Author’s Contributions (see also page viii)

Co-development of research questions, theoretical and methodological approach, conceptualization with supervisors; development and preparation of graphical pathways; data analysis and interpretation; identification and description of types of change processes, co-writing of Paper 2;

Strukturelle Einbettung von Nachhaltigkeit an österreichischen Universitäten

Verena Radinger-Peer & Lisa Bohunovsky

1 Einleitung

Der Nachhaltigkeitsdiskurs und die Rolle der Universitäten darin geht auf die 1990er Jahre zurück. Ausgelöst durch den Brundtland Report „Our common future" im Jahr 1987 thematisierte die Taillores Declaration (1990) erstmals die bedeutende und führende Rolle von Universitäten, um eine nachhaltige Entwicklung der Gesellschaft voranzutreiben. Vor allem der Universitätsleitung wird die Verantwortung übertragen, diese führende Rolle der Hochschulen zu fördern und interne Ressourcen bereitzustellen sowie externe Unterstützung wahrzunehmen (z. B. in den Leistungsvereinbarungen, durch interuniversitäre Kooperationen, Mitgliedschaften). Dem folgten einige weitere Deklarationen im Hochschulbereich (e.g. Copernicus Charter, Kyoto Declaration, Global Higher Education for Sustainability Partnership (GHESP) (Lozano et al., 2013) welche einerseits die gesellschaftliche Erwartung gegenüber Hochschulen für eine nachhaltige Entwicklung zum Ausdruck bringen und andererseits das Selbstverständnis derselben.

In Österreich wurde 2002 die Nachhaltigkeitsstrategie der Bundesregierung „Österreichische Strategie für Nachhaltige Entwicklung" (NSTRAT, 2002) verabschiedet, welche die Zielebenen „Lebensqualität", „dynamischer Wirtschaftsstandort", „Lebensräume" und „Österreichs Verantwortung" thematisiert und die Verantwortung unter anderem von Bildung und Forschung in diesem Prozess betont. Auf internationaler Ebene wurde im Jahr 2005 durch die Vereinten Nationen die Dekade „Bildung für nachhaltige Entwicklung (2005–2014) ausgerufen, womit die zentrale Rolle der Bildung für eine nachhaltige Entwicklung der Gesellschaft hervorgehoben wird. Um einen Bewusstseinswandel in Richtung Nachhaltigkeit bei Lernenden und Lehrenden in allen Bildungsbereichen zu unterstützen, wurde im Jahr 2008 die „Österreichische Strategie zur Bildung für Nachhaltige Entwicklung" beschlossen. Als „Agenten des Wandels" (Stephens et al., 2008; Zilahy & Huisingh, 2009) bezeichnet, nehmen Hochschulen über Lehre, Forschung, Third Mission, Betrieb und Governance eine Vorbildfunktion ein, um Veränderungsprozesse sowohl nach innen (z. B. Strukturen, Werthaltungen, Anreizsysteme) als auch nach außen (z. B. Mission, Interaktion und Kooperation mit anderen Stakeholdern) aktiv mitzugestalten und Multiplikatoren (z. B. Absolvent*innen) hervorzubringen (Pausits, 2015). Insbesondere wird der Beitrag von Universitäten in der Entwicklung von strategischen langfristigen Visionen

und Zielen (Stephens et al., 2008; Zilahy & Huisingh, 2009) im Überbrücken interdisziplinären Wissens (Caniels & van den Bosch, 2011) und in der Brückenfunktion zwischen Stakeholdern aus Praxis und Wissenschaft (Pflitsch & Radinger-Peer, 2018) gesehen. Forschungsarbeiten zum Beitrag von Hochschulen zur nachhaltigen Entwicklung fokussieren a) auf die Integration von Nachhaltigkeit in organisationsinterne Managementprozesse (Arbo & Benneworth, 2007; Lozano, 2006), b) auf die Inkorporation von Nachhaltigkeit in die Lehre (Cortese, 2003) und Forschung (Waas et al., 2010) als auch c) auf gesamtuniversitäre Konzepte wie die „Nachhaltige Universität" (Adomssent et al., 2007; Velazquez et al., 2006).

Während das „Was" bei vielen dieser Untersuchungen im Vordergrund steht, liegt bisher in der Literatur noch kaum Evidenz darüber vor, „wie" das Thema Nachhaltigkeit an eine Hochschule „gekommen ist", das heißt, wie sich der Prozess der strukturellen Einbettung darstellt (Hoover & Harder, 2015) und welche Akteure hierbei maßgeblich mitwirken. Diese strukturelle Einbettung stellt einen vielschichtigen Prozess organisationalen Lernens (Cebrian et al., 2013; Tilbury, 2011) als auch von institutionellen und organisationalen Veränderungen dar. Dem gegenständlichen Beitrag liegt ein sozialwissenschaftliches Verständnis von Institutionen zugrunde, welches sich auf die Regeln und Muster bezieht, die das Verhalten und Zusammenleben der Menschen steuern (Scott, 2001). In diesem Verständnis beziehen sich Institutionen *nicht* auf Organisationen oder physische Strukturen, sondern werden unterteilt in regulative (z. B. Rechtsrahmen, Gesetze und Richtlinien, formalisierte Standesregeln/Berufsregeln), normative (informelle gesellschaftliche Normen wie Werthaltungen, „richtiges" Benehmen/Verhalten aber auch das persönliche (berufliche) Rollenverständnis) sowie kulturell-kognitive Institutionen (z. B. Paradigmen, mentale Modelle). Im gegenständlichen Beitrag steht „institutioneller Wandel" im Sinne von regulativen, normativen und kulturell-kognitiven Veränderungen, die auf eine nachhaltige Entwicklung Einfluss nehmen, im Vordergrund. Dies bezieht sich beispielsweise auf neue formelle Regelungen oder die Ankündigung von neuen freiwilligen Standards, welche gewisse Praktiken zugunsten von Nachhaltigkeit gegenüber den Universitätsangehörigen, aber auch dem universitären Umfeld legitimieren oder nicht nachhaltiges Verhalten delegitimieren.

Das Verständnis von organisationalem Wandel beinhaltet im gegenständlichen Beitrag (in Anlehnung an Pflitsch & Radinger-Peer, 2018):

a) das Gründen neuer Organisationseinheiten mit eigener Administration, technischen und/oder finanziellen Ressourcen;
b) Arbeitsgruppen als lose gekoppelte Einheiten von unabhängigen Akteuren ohne eigene Ressourcen;
c) Projekte, welche als institutionalisierte temporär befristete Events einen speziellen Zweck erfüllen und zu neuen Strukturen führen,
d) die Mitgliedschaft in Organisationen/Netzwerken, die sich dem Thema Nachhaltigkeit verschrieben haben.

Diese institutionellen und organisationalen Wandelprozesse verstehen wir als strukturelle Veränderungen, die zur Einbettung von Nachhaltigkeit an Universitäten beitragen. Die Literatur verweist auf die Rolle von Strukturen als Vehikel, um Wandel durch individuelle und kollektive Prozesse zu erreichen (Baker-Shelley et al., 2017, Hoover & Harder, 2015). Zugleich sind Strukturen mannigfaltig und reichen von rigid bis flexibel sowie von formell bis informell. Während es formellen Strukturen häufig an Flexibilität mangelt, fehlt informellen Strukturen oft die Anerkennung (Hoover & Harder, 2015). Dieser Beitrag geht anhand von ausgewählten Fallbeispielen – Mitgliedern des Netzwerkes Allianz Nachhaltige Universitäten in Österreich – den Fragen nach:

a) Welche unterschiedlichen Prozesse der strukturellen Verankerung von Nachhaltigkeit (organisational und institutionell) an Universitäten können beobachtet werden?
b) Welche Akteure sind maßgeblich involviert?
c) Zeitlicher Verlauf der Entwicklungen: Gemeinsamkeiten und Unterschiede, Zusammenspiel von organisationaler und systemischer Ebene.

2 Untersuchungsgegenstand und Methode

Untersuchungsgegenstand sind 13 von 22 öffentlichen österreichischen Universitäten, welche Mitglied der Allianz Nachhaltige Universitäten in Österreich sind.[1] Die Allianz Nachhaltige Universitäten in Österreich wurde Anfang 2012 als informelles Netzwerk mit dem Ziel gegründet, universitätsübergreifende Aktivitäten durchzuführen, Erfahrungen auszutauschen und Synergien zu nutzen. Des Weiteren bestand auch die Möglichkeit, Synergien zu den Verhandlungen der Leistungsvereinbarungen für den Zeitraum 2013–2015 und zur Erstellung des Hochschulplans zu nutzen und beispielsweise universitätsübergreifende Aktivitäten zu verankern, sowie als Vorzeigeinitiative des BMWF im Rahmen Rio+20 aufzutreten. Ein wesentlicher Teil dieses Netzwerkes ist der Austausch in der sogenannten Expert*innengruppe, welche aus vom Rektorat gewählten Vertreter*innen der jeweiligen Universitäten besteht, sowie über themenspezifische Arbeitsgruppen und Projekte. Alle Mitgliederuniversitäten verpflichten sich, ein Nachhaltigkeitskonzept für ihre Universität zu erarbeiten. Tabelle 1 listet die Universitäten mit ihren Eckdaten und Kurzbezeichnungen auf. Zwischen März und September 2018 wurden leitfadenbasierte Interviews mit einem Vertreter bzw. einer Vertreterin jeder der angeführten Universitäten geführt. Die Interviewpartner*innen waren großteils Vertreter*innen der o. g. Expert*innengruppe. Damit kann davon ausgegangen werden, dass sie einen guten Überblick über Nachhaltigkeitsaktivitäten als auch die Geschichte der Nachhaltigkeit an der jeweiligen Universität haben.

1 In der Zwischenzeit sind 16 Universitäten Mitglieder dieser Allianz. Weitere Infos: www.nachhaltigeuniversitaeten.at

Die Interviews zielten darauf ab, Prozesse und Hauptakteure der Nachhaltigkeitsaktivitäten an den jeweiligen Universitäten ausfindig zu machen und den Entwicklungsprozess von Aktivitäten und neuen Strukturen der Nachhaltigkeit nachzuzeichnen. Um die Ergebnisse zu verifizieren und ggfs. auch noch zu ergänzen, wurden die in den Interviews erhaltenen Informationen und darauf aufbauenden Interpretationen a) in einem Meeting der Expert*innengruppe der Allianz Nachhaltige Universitäten in Österreich präsentiert und diskutiert; b) an alle Interviewpartner*innen mit der Bitte um Kommentare und Feedback ausgesendet; c) an die Studierendenvereinigung jeder Universität ausgesendet. Durch diese Vorgehensweise wurde die Datenanalyse und -interpretation verifiziert. Des Weiteren wurden die Ergebnisse durch Onlinerecherchen (z. B. Leitbilder, Berichte, Leistungsvereinbarungen, Informationen über neue Organisationseinheiten) ergänzt. Die Ergebnisse wurden einerseits tabellarisch, andererseits graphisch dargestellt (s. Abb. 1–3 und Tab.2)

Tab. 1: Übersicht der Interviewpartner*innen. Dabei werden folgende Interviewgruppen differenziert: Wissenschaft, Management, Administration; Alle Interviewpartner*innen mit Ausnahme jener, die mit * gekennzeichnet sind, sind Mitglieder der Expert*innengruppe der Allianz Nachhaltige Universitäten in Österreich; (2) = Parallelinterview mit 2 Personen;

ID	Universität	Abk.	Kurzbeschreibung	Allianz-mitglied seit	Interview mit einer/m Vertreter*in der
1	Alpen-Adria Universität Klagenfurt	AAU	4 Fakultäten: Interdisziplinäre Forschung und Fortbildung, Kulturwissenschaften, Wirtschaftswissenschaften, Technische Wissenschaften	2012	Wissenschaft
2	Universität für Bodenkultur	BOKU	Life Science Universität	2012	Wissenschaft
3	Donau Universität Krems	DUK	Weiterbildungsuniversität	2017	Management*
4	Universität Linz	JKU	4 Fakultäten: Technik und Naturwissenschaften, Wirtschaft und Gesellschaft, Recht, Medizin	2018	Wissenschaft (2)
5	Universität Graz	KFU	Volluniversität	2012	Management
6	Kunstuniversität Graz	KUG	Kunstuniversität	2012	Verwaltung
7	Musikuniversität Wien	MDW	Kunstuniversität	2017	Verwaltung

ID	Universität	Abk.	Kurzbeschreibung	Allianz-mitglied seit	Interview mit einer/m Vertreter*in der
8	Mozarteum Salzburg	MOZ	Kunstuniversität	2018	Management
9	Montanuniversität Leoben	MUL	Montanuniversität	2018	Management*
10	Universität Salzburg	PLUS	4 Fakultäten: Katholisch-Theologische, Kultur- und Geisteswissenschaftliche, Naturwissenschaftliche, Rechtswissenschaftliche	2012	Wissenschaft
11	TU Graz	TUG	Technische Universität	2012	Wissenschaft (2)
12	Uni Innsbruck	UIBK	Volluniversität	2012	Wissenschaft
13	WU Wien	WU	Wirtschaftsuniversität	2012	Wissenschaft

3 Ergebnisse – Typen, Akteure und zeitlicher Verlauf

Im Folgenden wird anhand von Beispielen dargestellt, wie Nachhaltigkeit an den genannten Universitäten verankert wurde. Die Darstellung konzentriert sich auf die – im Sinne einer strukturellen Verankerung – wesentlichen Aspekte und erhebt keinen Anspruch auf Vollständigkeit. Untersucht wurden Veränderungen in Richtung Nachhaltigkeit entlang der Zeitachse, wobei unterschieden wurde zwischen

a. den in der Einleitung genannten Typen organisationalen Wandels sowie institutionellem Wandel
b. den fünf Bereichen: Lehre, Forschung, Third Mission, Universitätsbetrieb, Governance. Eine Verankerung in allen Bereichen, d. h. ein whole-institution approach, gilt in der Fachliteratur als wesentliches Merkmal einer nachhaltigen Universität (siehe beispielsweise Dlouhá et al., 2017; Niedlich et al., 2020; Ruiz-Mallén & Heras, 2020).

Darüber hinaus wurde jede Veränderung einer Akteursgruppe zugeordnet, um Hinweise auf die treibenden Kräfte hinter den Veränderungen zu bekommen: nichtwissenschaftliche Akteure, wissenschaftliche Akteure, Universitätsmanagement, Studierende, externe Akteure.

Die Universitäten wurden in vier Typen mit jeweils ähnlichen Charakteristika eingeteilt. Ein Überblick dazu findet sich in Tabelle 3.

Tab. 3: Übersicht zu den unterschiedlichen Typen struktureller Verankerung von Nachhaltigkeit

	Anzahl an NH relevanten Veränderungen	Bereiche (Lehre, Forschung, Universitätsbetrieb, Organisationskultur, dritte Mission)	Akteure	Zeitachse
Typ A: BOKU, KFU	hoch	in allen Bereichen	viele, unterschiedliche Akteure, Fokus auf Vertreter*innen der Wissenschaft	Beachtliche Reihe/Anzahl von Änderungen seit der frühen 2000er
Typ B: AAU, PLUS, WU, TUG, UIBK	geringer als in Typ A	in (fast) allen Bereichen	Unterschiedliche, aber weniger Akteure als bei A; Fokus auf Vertreter*innen der Wissenschaft	Anstieg der Änderungen seit den späten 2000ern
Typ C: KUG; MDW; MOZ	Geringer als in Typ A und B	in Universitätsbetrieb und Organisationskultur verankert; Im Bereich Forschung durch das Projekt UniNEtZ	Wenige Akteure, Hauptfokus auf Administration und Management, keine aktiven Studierendengruppen	Unterschiedlich: KUG: Beginn in der Mitte der 2000er; mdw: Beginn in den frühen 2010ern; MOZ: Beginn in den späten 2010ern
Typ D: MUL, DUK, JKU	Geringer als in Typ A und B	In drei von fünf Bereichen	Starker Fokus auf Wissenschaft oder Universitätsmanagement und keine akteursübergreifenden Aktivitäten	Einzelne Veränderungen in den 2000er; zunehmend seit der Mitte der 2010er

3.1 Typen struktureller Verankerung

Typ A: Vorreiterinnen mit einer strukturell breiten Einbettung von Nachhaltigkeit

Unter Typ A fallen Universitäten, die eine Vorreiterrolle einnehmen. An diesen Universitäten gab es bereits seit den 1990er Jahren Veränderungen in Richtung Nachhaltigkeit. Bis in die 2000er Jahre waren diese bereits in allen fünf Bereichen der Universität (Forschung, Lehre, Third Mission, Universitätsbetrieb und Governance) verankert. Die Anzahl und Art der nachhaltigkeitsrelevanten Veränderungen ist dem-

entsprechend höher als bei anderen Universitäten. Darüber hinaus sind viele unterschiedliche Akteure daran beteiligt – wobei Wissenschaftler*innen eine besonders aktive Rolle einnehmen. In diese Gruppe fallen zwei Universitäten, die BOKU und KFU. Sie waren gemeinsam mit dem Wissenschaftsministerium auch maßgeblich daran beteiligt, dass 2012 die Allianz Nachhaltige Universitäten gegründet wurden – und können somit zurecht Vorreiter-Universitäten genannt werden.

Abbildung 1 zeigt exemplarisch die Verankerungen an der Universität für Bodenkultur Wien (BOKU). Nachhaltigkeitsthemen und nachhaltigkeitsaffine Studienrichtungen spielen an der BOKU aufgrund ihrer thematischen Ausrichtung sehr früh eine wichtige Rolle (baseline). Sie nennt sich selbst Universität des Lebens oder auch Nachhaltigkeitsuniversität. Die BOKU war eine der ersten Universitäten, welche die Copernicus Charter (2001) unterzeichnet hat oder eine Öko-Zertifizierung (2002) erhalten hat. Das Thema Nachhaltigkeit ist im Universitätsbetrieb (z. B. EMAS-Zertifizierung seit 2006, erster Nachhaltigkeitsbericht 2006), in der Lehre (z. B. Arbeitsgruppe „Bildung für Nachhaltige Entwicklung", Verankerung in Lehrveranstaltungen: 68% der Lehrveranstaltungen weisen eine (sehr) hohe Nachhaltigkeitsrelevanz oder Umweltbezug auf) sowie in der Forschung (z. B. Doctoral Schools zu Nachhaltigkeit) der Universität umfassend verankert. Wie aus Abbildung 1 hervorgeht, sind viele Veränderungen (z. B. Mitbegründung der Allianz, Mitbegründung des CCA, neue organisationale Einheit gW/N an der BOKU) auf die Aktivitäten eines wissenschaftlichen Akteurs zurückzuführen (P 2.1). Dies führte im Jahr 2010 mit Unterstützung des Rektorats zur Gründung der neuen Organisationseinheit „Zentrum für globalen Wandel und Nachhaltigkeit" (gW/N), dessen Aufgabe in der Vernetzung und dem Vorantreiben des Themas Nachhaltigkeit an der BOKU und darüber hinaus besteht. Wie aus Abbildung 1 ersichtlich, wurden durch diese neue Organisationseinheit (gekennzeichnet mit „C") zahlreiche andere strukturelle Veränderungsprozesse in Gang gesetzt. Des Weiteren spielte die BOKU 2011 eine führende Rolle in der Gründung des Climate Change Centre Austria (CCCA) und 2012 der Initiierung der Allianz Nachhaltige Universitäten. Die beiden Netzwerke nehmen eine zentrale Stellung bei der weiteren Verankerung von Nachhaltigkeit an den beiden Universitäten ein, was auch in Abbildung 1 deutlich wird. Alle Mitgliederuniversitäten der Allianz Nachhaltige Universitäten in Österreich haben sich in den Leistungsvereinbarungen 2013–15 dazu verpflichtet, ein Nachhaltigkeitskonzept zu entwickeln. Die BOKU kam dieser Verpflichtung 2013/14 erstmals nach und erarbeitete in einem partizipativen Prozess eine erste BOKU-Nachhaltigkeitsstrategie, welche aktuell (2019/20) überarbeitet wird. Angeregt durch die Sustainable Development Goals (SDG) wurde 2015 eine SDG-Arbeitsgruppe ins Leben gerufen, welche in das 2019 gestartete universitätsübergreifende Projekt UniNEtZ überführt wurde. Bei Letzterem handelt es sich um ein Projekt von 18 Partnerinstitutionen, welches das Ziel verfolgt, bis 2021 einen Optionenbericht zur Umsetzung der SDGs zu erarbeiten und der Bundesregierung vorzulegen (www.uninetz.at).

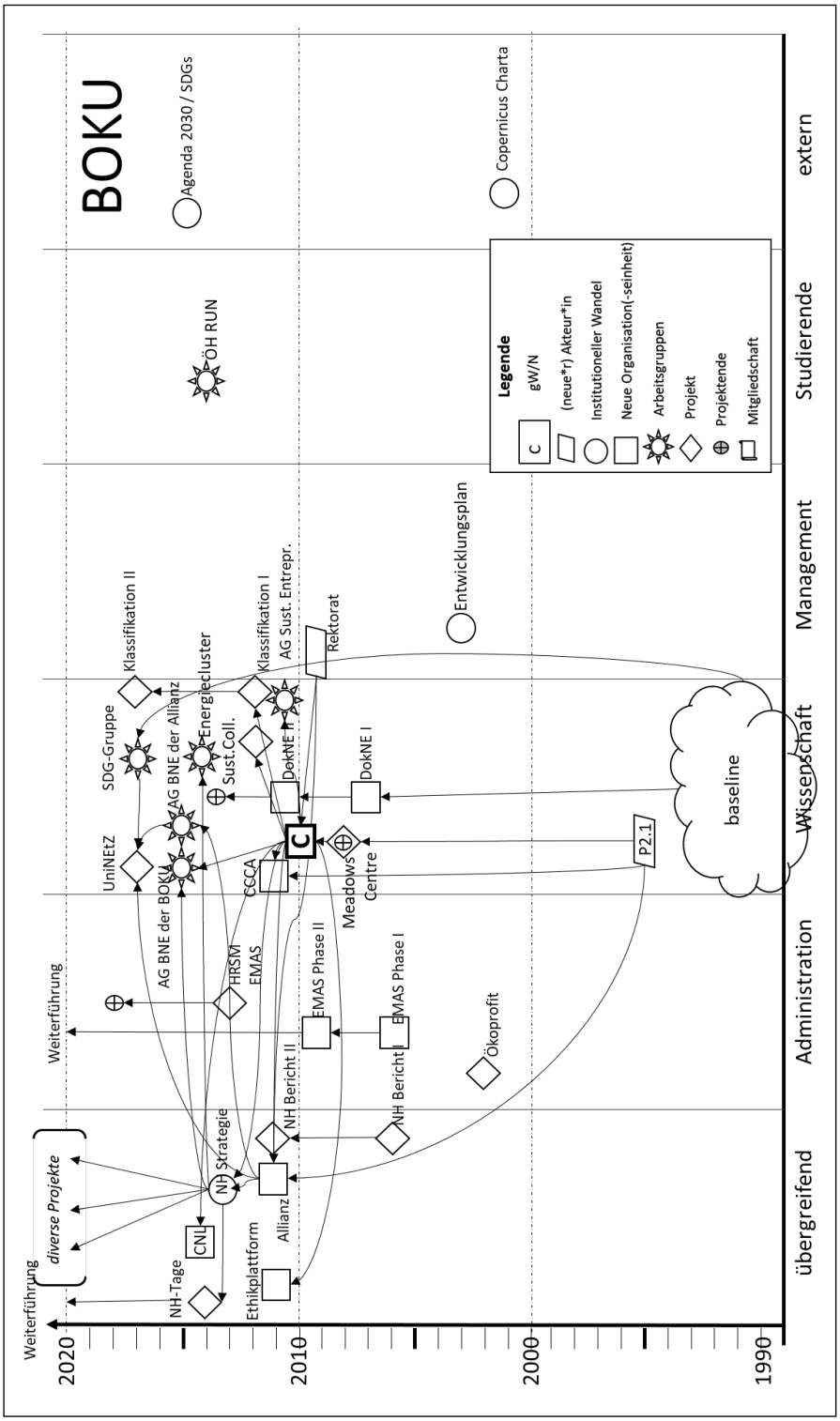

Abb. 1: Prozess der strukturellen Einbettung von Nachhaltigkeit an der Universität für Bodenkultur Wien

Die Entwicklungen an der KFU starteten ähnlich früh und waren von Anfang an breit aufgestellt. Hier seien nur einige Beispiele genannt:

- 1992 Studium „Umweltsystemwissenschaften" (USW), durch das gemeinsame Engagement von Studierenden und Wissenschaftler*innen
- 2005 Wegener Center für Klima und Globalen Wandel
- 2006 RCE Styria on Education for Sustainable Development (ESD)
- 2007 Umwelt-, Regional- und Bildungswissenschaftliche Fakultät mit dem Institut für Systemwissenschaften, Innovation und Nachhaltigkeitsforschung
- 2008 Mitinitiierung des Sustainability4U-Netzwerk aller Grazer Universitäten
- 2011 Mitinitiierung Climate Change Centre Austria
- 2012 Mitinitiierung Allianz Nachhaltige Universitäten in Österreich
- 2015 Gründung eines Nachhaltigkeitsbeirates zur Beratung des Rektorats

Typ B: Breite Einbettung von Nachhaltigkeit mit einem späteren Start, getrieben von Wissenschaftler*innen

Zu dieser Gruppe zählen fünf Universitäten mit ähnlichen Merkmalen wie die Universitäten des Typs A. Vereinzelte Veränderungen sind auch hier in den 2000er Jahren zu beobachten, zu einer stärkeren Verbreitung kommt es allerdings erst nach 2010 – wodurch sie nicht mehr zu den Vorreiterinnen gehören. Diese universitätsinternen Entwicklungen gehen Hand in Hand mit der Teilnahme an den organisationsübergreifenden Netzwerken Allianz Nachhaltige Universitäten in Österreich sowie dem CCCA. Die Anzahl der Veränderungen ist insgesamt etwas niedriger als bei Typ A. Nachhaltigkeit ist aber auch bei diesen Universitäten recht breit über alle Bereiche und auf diverse Arten organisational und institutionell verankert. Institutionell ist das Thema v. a. über strategische Papiere wie den jeweiligen Entwicklungsplänen verankert. Alle Universitäten zeigen aber auch neue Organisationseinheiten und Arbeitsgruppen, die sich mit dem Thema Nachhaltigkeit befassen. Noch stärker als im Typ A spielten Wissenschaftler*innen eine wichtige Rolle bei der Verankerung von Nachhaltigkeit an der Universität, andere Akteursgruppen sind zu einem geringeren Anteil präsent.

Exemplarisch sei hier die Entwicklung an der Alpen-Adria-Universität Klagenfurt (AAU) genannt. An der AAU war die Gründung der Fakultät für Interdisziplinäre Forschung und Fortbildung (IFF) 2004 ein bedeutender Grundstein für weitere Entwicklungen Richtung Nachhaltigkeit, welche v. a. seit 2010 stattgefunden haben. Häufig initiiert durch Mitglieder der IFF wurden Veränderungsprozesse durch die Universitätsleitung und engagierte Mitglieder des Universitätsrates (z. B. EMAS-Zertifizierung 2016, Einführung von Nachhaltigkeit als Forschungsschwerpunkt 2013) unterstützt. Veränderungen umfassen sowohl den Bereich Lehre und Forschung als auch den universitären Betrieb und werden kontinuierlich ausgebaut und fortgeführt, auch wenn Ende der 2010er Jahre durch die Abwanderung von großen Teilen der IFF an andere Universitäten und die Beendigung der CCCA-Mitgliedschaft eine gewisse

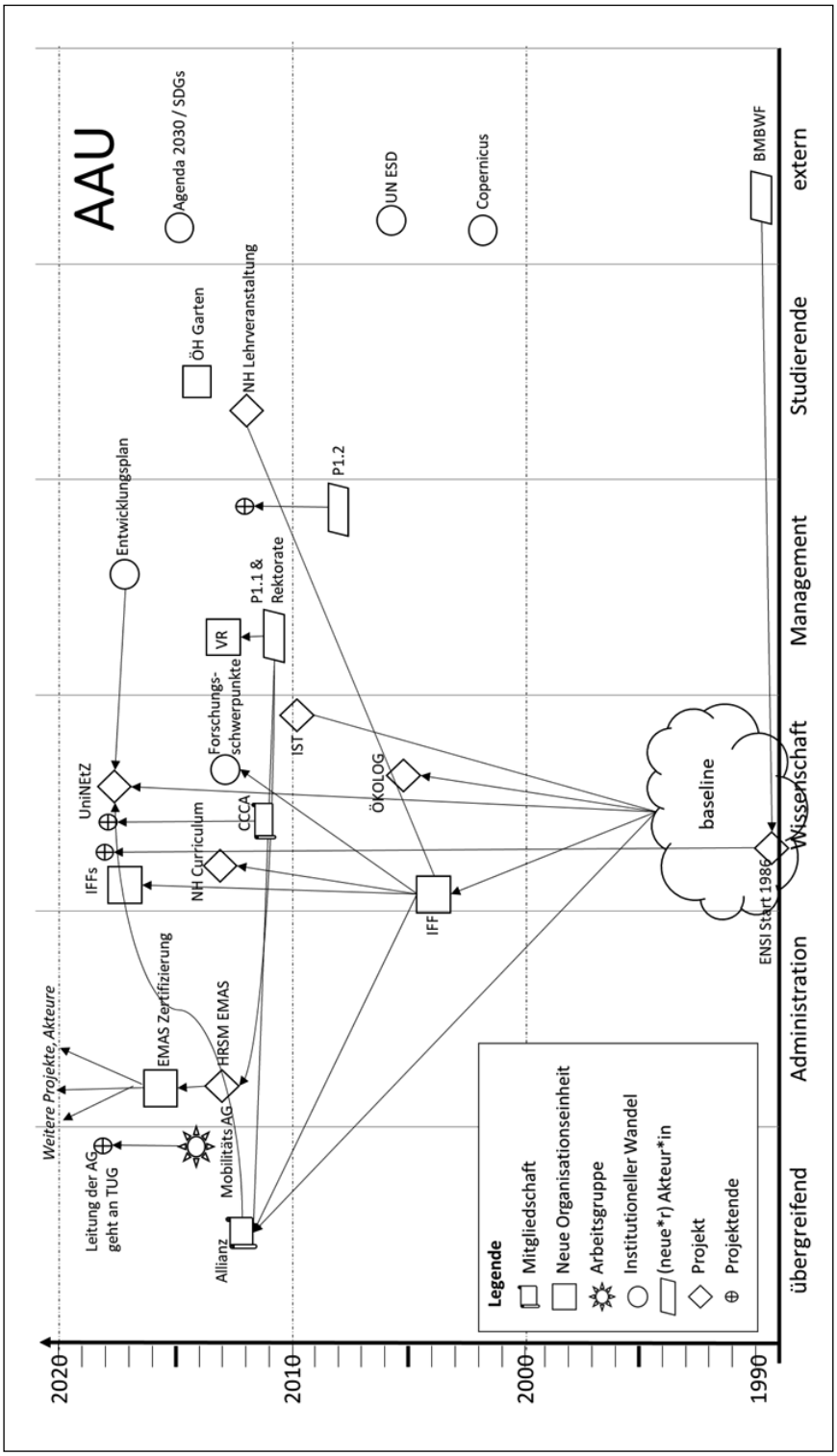

Abb. 2: Prozess der strukturellen Einbettung von Nachhaltigkeit an der AAU

Schwächung der strukturellen Verankerung zu verzeichnen ist. Die AAU ist nach wie vor Mitglied der Allianz Nachhaltige Universitäten in Österreich als auch des UniNEtZ-Projektes und engagiert sich v. a. im Rahmen der EMAS-Zertifizierung in diversen Vorhaben zu Umweltmanagement, aber auch Lehre. Abbildung 2 zeigt den Entwicklungspfad der Universität für AAU.

Von den anderen Universitäten seien wieder nur exemplarische Veränderungen hervorgehoben: An der PLUS war die Gründung der Initiative „PLUS Green Campus" (PGC) Startpunkt für die stärkere Verankerung von Nachhaltigkeit. Sie wurde ausgehend von einer studentischen Initiative „Uni nachhaltig" 2010 von einem Professor der Biowissenschaften und dem Rektorat vorangetrieben. PGC stellt seitdem das Dach für unterschiedlichste Projekte im Betrieb der Universität dar.

Auch an der WU haben vereinzelte Aktivitäten bereits um das Jahr 2000 stattgefunden. Ein wichtiger Schritt war 2013 die Gründung des Kompetenzzentrums Nachhaltigkeit, dessen Tätigkeiten z. B. die Organisation öffentlicher Events, der WU-Nachhaltigkeitstage oder die Initiierung eines Nachhaltigkeitsstrategieprozesses umfassten. Im Jahr 2016 wurde eine Umweltmanagementposition gegründet, welche von den Umweltteams der Fakultäten unterstützt wird.

Das Nachhaltigkeitsengagement der TU Graz reicht bis in die 1990er Jahre zurück, als einzelne Wissenschaftler*innen nachhaltigkeitsrelevante Themen wie Technikfolgenabschätzung, Energiesysteme oder Verfahrenstechnik aufgriffen. 2005 mündete dies in einen der ersten Nachhaltigkeitsberichte österreichischer Universitäten sowie 2008 der Mitgründung des Netzwerkes „Sustainability4U" zwischen vier in Graz ansässigen Universitäten. Neuerlichen Aufwind und breitere Verankerung bekam das Thema ab Mitte der 2010er Jahre mit der Erarbeitung einer Nachhaltigkeitsagenda und der Gründung eines Nachhaltigkeits-Advisory Boards.

An der UIBK fokussieren die Veränderungen v. a. auf den wissenschaftlichen Bereich, z. B. mit der Einrichtung einer Professur für „Angewandte Geographie und Nachhaltigkeit" 2002, dem Forschungszentrum „Globaler Wandel – regionale Nachhaltigkeit" am Institut für Geographie (2004). Erst Anfang 2010 haben sich auf Initiative der neuen Vizerektorin für Infrastruktur die auf Nachhaltigkeit ausgerichteten Akteure der UIBK vernetzt und den Auftrag bekommen, das Thema weiter voranzutreiben. In den letzten Jahren zeigte sich mit der studentischen Initiative INUI auch ein starkes Engagement auf Studierendenebene.

Typ C: Fokus auf den Betrieb und persönliche Motivation von Universitätsangehörigen (Kunstuniversitäten)

Gemeinsam ist dieser Gruppe, dass die Veränderungen sehr stark vom Bereich des Universitätsbetriebs ausgehen, d. h. Projekte im Bereich Ressourcennutzung, Mobilität u. Ä. Das Engagement im Bereich Forschung beschränkt sich bei diesem Typ großteils auf ihre – sehr engagierte – Mitwirkung im UniNEtZ-Projekt. Dieser Typ deckt die drei Kunstuniversitäten innerhalb des Netzwerks Allianz Nachhaltige Universitäten in Österreich ab. Die Anzahl an Aktivitäten ist insgesamt geringer verglichen mit

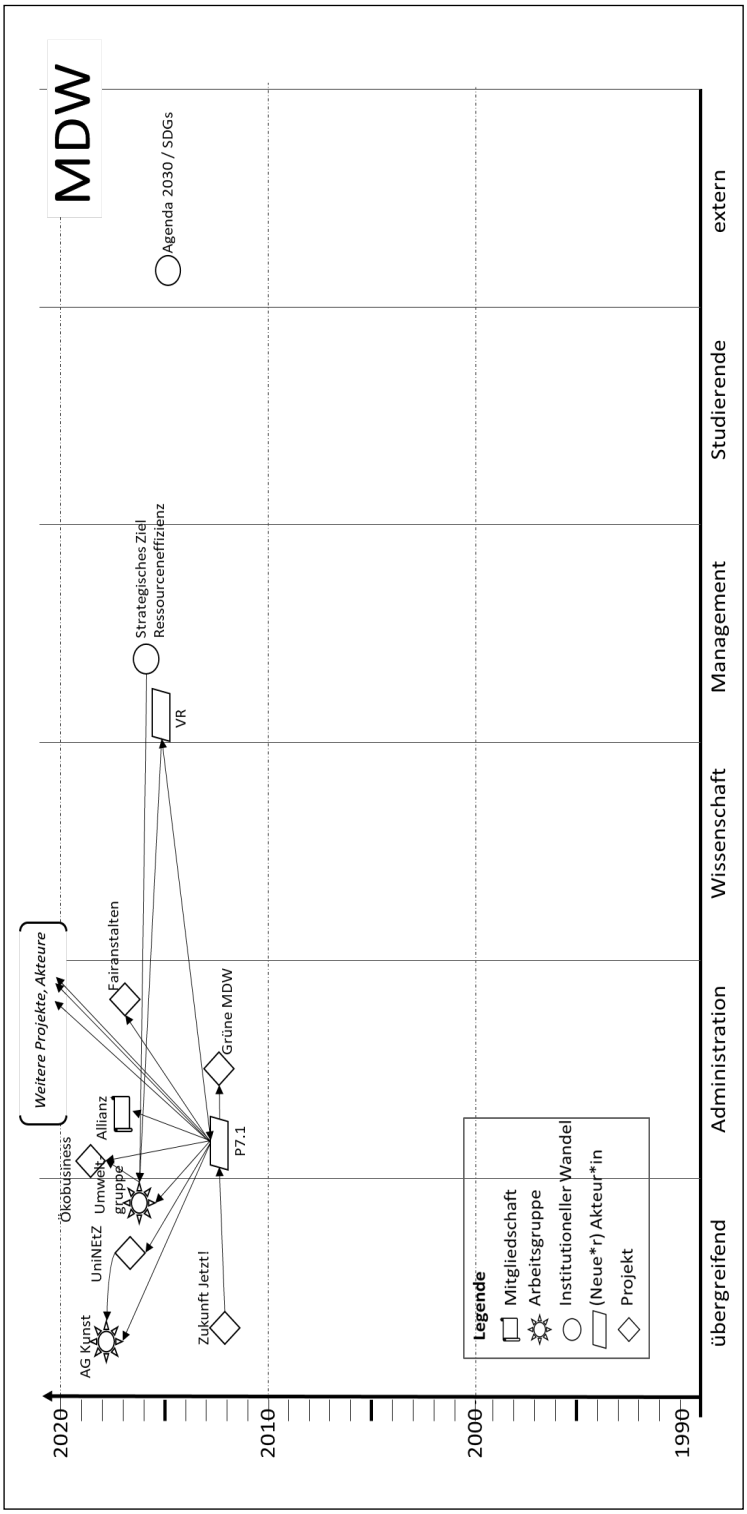

Abb. 3: Prozess der strukturellen Einbettung von Nachhaltigkeit an der MDW

den Typen A und B. Auch bei den untersuchten Kunstuniversitäten hat das Thema Nachhaltigkeit Niederschlag in strategischen Papieren gefunden. Darüber hinaus geschah die Verankerung bisher stärker auf Projektebene als im Typ A und B, es gibt kaum neue Organisationseinheiten. In Bezug auf die Zeitachse unterscheiden sich die Universitäten dieses Typs: Die KUG hat bereits in den Jahren 2000 damit begonnen, sich in gemeinsamen Initiativen mit den anderen Universitäten in Graz (Grazer Netzwerk „Sustainability4U") zu engagieren. Die MDW startete in den frühen 2010er Jahren und MOZ einige Jahre später durch das Engagement in der Allianz und im Projekt UniNEtZ.

An der MDW ging das Engagement von einer einzigen hochmotivierten Person der Administration (P7.1) aus, die im Laufe der Jahre zunehmend Unterstützung des Rektorats und aus anderen Arbeitsbereichen erfuhr. Dies zeigt sich auch sehr deutlich in Abbildung 3. Auf ihr Engagement sind mehrere Nachhaltigkeitsprojekte unter dem Label „Grüne MDW " zurückzuführen sowie die Mitgliedschaft in der Allianz und die Gründung einer MDW-Arbeitsgruppe zum Thema Umwelt, welche mittlerweile mit einem eigenen Budget ausgestattet ist. Ressourceneffizienz wurde zudem zu einem strategischen Ziel der MDW erklärt. Die MDW lancierte z. B. auch eigene Richtlinien für nachhaltige Veranstaltungen – „FairAnstalten". Die Universität engagiert sich auch im UniNEtZ-Projekt sowie einer universitätsübergreifenden Nachhaltigkeitsarbeitsgruppe der Kunstuniversitäten.

An der KUG wurde das Thema Nachhaltigkeit in den 1990er Jahren eingeführt, als – ebenfalls initiiert von einer Person aus der Administration – die Universität mit einem Ökolabel ausgezeichnet wurde. Weitere Schritte in diese Richtung sind erst 10 Jahre später zu beobachten, als der neue Vize-Rektor weiteres Engagement der KUG im Nachhaltigkeitsbereich anregte, beispielsweise die Mitgründung des Netzwerkes „Sustainability4U", die Zusammenstellung eines Nachhaltigkeitsteams an der KUG sowie die Teilnahme an der Allianz und dem UniNEtZ-Projekt.

Am MOZ startete der Nachhaltigkeitsprozess erst kürzlich mit der Teilnahme im UniNEtZ-Projekt, dem Beitritt zur Allianz sowie einigen Aktivitäten im Bereich Universitätsbetrieb.

Typ D: Kürzlich initiierte Nachhaltigkeitsprozesse (DUK; MUL, JKU)

Dieser Typ zeichnet sich durch rezente Entwicklungen im Bereich Nachhaltigkeit aus (Mitte 2010 bis 2018), dahingehend ist die Anzahl der Veränderungen, deren Verankerung und Breite geringer als bei den anderen Typen. Zurzeit ist die Verankerung noch an wenigen Akteur*innen und an strategischen Entscheidung festzumachen. Allen drei Universitäten ist außerdem gemeinsam, dass die Veränderungen noch kaum miteinander verbunden sind. Eine breite Basis, welche die Veränderungen trägt, ist noch nicht zu beobachten. Durch den im Vergleich zu den anderen Universitäten späten Start lässt sich aktuell noch schwer abschätzen, wie die Verankerung an diesen Universitäten weiter ablaufen wird und ob es sich wirklich um einen eigenen Typ handelt.

An der DUK und der MUL wird das Thema stark von der Universitätsleitung getrieben, so hat das Thema Nachhaltigkeit an der DUK mit dem Wechsel des Rektorats im Jahr 2013 sowie der Bestellung einer Professur für Systemwissenschaft und Ressourcennutzung im Jahr 2015 an Bedeutung gewonnen. Auch an der MUL wurden Veränderungen wie nachhaltigkeitsfokussierte Studienprogramme oder die Gründung eines Zentrums, welches sich im Besonderen für die Verankerung von Nachhaltigkeit in Forschung und universitärem Engagement einsetzt, vorwiegend von Seiten des Universitätsmanagements angeregt. Aktivitäten an der JKU rühren von einem hohen Engagement einzelner Persönlichkeiten her, bleiben aber über einen langen Zeitraum fragmentiert. Erst im Jahr 2018 wurde ein neuer Entwicklungsplan erarbeitet (für den Zeitraum 2019–2024), welcher Nachhaltigkeit als einen der drei Forschungsschwerpunkte der JKU ausweist. Zeitgleich wurde die JKU Mitglied im Netzwerk Allianz Nachhaltige Universitäten in Österreich und beteiligt sich am Uni-NEtZ-Projekt.

3.2 Akteure des Wandels

Die empirischen Untersuchungen zeigen, dass die Initiierung des Nachhaltigkeitsdiskurses an den jeweiligen Universitäten maßgeblich auf Akteure aus der Wissenschaft zurückgeht, wobei zahlreiche individuelle, fragmentierte Aktivitäten im Bereich der Nachhaltigkeit und Umweltwissenschaften in Lehre und Forschung bis in die 1990er Jahre zurückreichen. Eine Ausnahme hierbei bilden die Kunstuniversitäten, bei denen die Veränderungen stark aus dem administrativen Bereich kommen und vor allem den Universitätsbetrieb betreffen. Der organisationale und institutionelle Wandel geschah einerseits durch Initiativen zur Gründung neuer Institute (z. B. AAU, JKU, UIBK), Kompetenzzentren (BOKU, WU) als auch neuer Studienbereiche oder Spezialgebiete (KFU, TUG, UIBK) oder auch in Form von Arbeitsgruppen (mdw, KUG) sowie Strategien und Nachhaltigkeitsberichterstattungen. Aus den Interviews geht hervor, dass die Motivation für dieses Nachhaltigkeitsengagement eine Mischung aus persönlicher Überzeugung und dem Selbstverständnis der eingenommenen Position und den damit einhergehenden Gestaltungs- und Entscheidungsmöglichkeiten ist. In drei Universitäten (KUG, MOZ, DUK) gehen Veränderungsprozesse Richtung Nachhaltigkeit auf das Rektorat zurück. In diesen Universitäten wurde das Thema Nachhaltigkeit vor allem in strategischen Zielen, Leitbildern und Entwicklungsplänen verankert. Vor allem an der BOKU und WU war es das Zusammenspiel zwischen dem Engagement der Wissenschaft und der Unterstützung durch das Rektorat und Universitätsmanagement, welches umfassende organisationale und institutionelle Veränderungen Richtung Nachhaltigkeit ermöglichte. An dieser Stelle ist auch das BMWF (Bundesministerium für Bildung, Wissenschaft und Forschung) als einflussreicher externer Akteur zu nennen, welches einerseits über die Leistungsvereinbarungen Einfluss auf die strategische und operative Ausrichtung der Universitäten nimmt sowie über andere direkte Maßnahmen, wie beispielsweise die Unterstützung der Gründung der Netzwerkes Allianz Nachhaltige Universitäten in Österreich. An

der KFU muss zudem die aktive Rolle der Studierenden betont werden, welche sich mit Unterstützung von Wissenschaftler*innen vor Ort aktiv für die Einführung des Studiums „Umweltsystemwissenschaften" eingesetzt haben.

3.3 Zeitlicher Verlauf der Entwicklungen

An allen untersuchten Universitäten gab es bis Mitte der 2000er Jahre wenige und vereinzelte Aktivitäten im Bereich Nachhaltigkeit. In diesem Zeitraum gehen organisationale und institutionelle Entwicklungen vor allem auf das Engagement einzelner Wissenschaftler*innen zurück, welche die Unterstützung des Universitätsmanagements eingefordert haben (Hoover & Harder, 2015; Radinger-Peer & Pflitsch, 2017). An vielen Universitäten, die zu den Früheinsteigern zählen, war aufgrund von internationalen Entwicklungen bereits ein Bewusstsein für Umwelt und Nachhaltigkeitsthemen vorhanden, welches das Saatbeet für einen organisationalen Wandel in weiterer Folge darstellt. Insgesamt führt das Zusammenspiel von Bottom-up-Engagement und Top-down-Unterstützung der Universitätsleitung zu einer breiten Einbettung von Nachhaltigkeit in der universitären Lehre, Forschung, Third Mission, Betrieb und Governance.

Eine starke Zunahme der Aktivitäten im Bereich Nachhaltigkeit ist rund um das Jahr 2011 zu verzeichnen, was mit der Gründung des Netzwerkes Allianz Nachhaltige Universitäten in Österreich im Jahr 2012 und dem Climate Change Centre Austria (CCCA) 2011 korreliert. Ein zweiter Peak an Veränderungen ist ab 2015 zu beobachten, nachdem das Wissenschaftsministerium das Thema Nachhaltigkeit in die Vorlage für die Leistungsvereinbarungen mit den Universitäten aufgenommen hat und somit eine Beschäftigung mit diesem Thema notwendig wurde. Zuletzt brachten die vorbereitenden Maßnahmen auf das UniNEtZ-Projekt (https://www.uninetz.at) zusätzlich Dynamik in die Nachhaltigkeitsaktivitäten der untersuchten Universitäten.

Resümee

Die Untersuchung der strukturellen Einbettung von Nachhaltigkeit an 13 österreichischen Universitäten hat gezeigt, dass diese in unterschiedlichen Geschwindigkeiten, mit unterschiedlichen Ausgangssituationen und auf unterschiedliche Art und Weise erfolgt. Welcher Weg auch eingeschlagen wurde, er führte zu einer Verankerung und Verbreitung des Themas Nachhaltigkeit in den verschiedenen Bereichen einer Universität (v. a. Lehre, Forschung, Betrieb). Bei der Art der Veränderung wurde zwischen institutioneller Verankerung (z. B. Verankerung in strategischen Papieren) und organisationaler Verankerung unterschieden. Bei organisationalen Veränderungen sind sowohl neue Organisationseinheiten (wie z. B. ein Zentrum für Nachhaltigkeit an der Universität) als auch Arbeitsgruppen oder Mitgliedschaften zu finden. Die beschriebenen Typen der Verankerung unterscheiden sich z. B. im Zeitverlauf, den involvierten Akteuren oder der Art der Veränderung – so liegt bei Kunstuniversitäten (Typ C) der Schwerpunkt bei Arbeitsgruppen, bei Universitäten des Typs A und B

treten alle Formen auf. Da alle Typen eine zunehmend breite Verankerung von Nachhaltigkeit an der Universität aufweisen, kann nicht von dem einen zielführenden Pfad gesprochen werden, vielmehr ist festzustellen, dass jede Universität ihren Weg findet. Für weitere Ausführungen zur strukturellen Einbettung von Nachhaltigkeit an österreichischen Universitäten verweisen wir auf Bohunovsky, Radinger-Peer und Penker (2020).

Aus der Analyse der Universitäten des Netzwerks Allianz Nachhaltige Universitäten Österreich gehen nachfolgende Faktoren hervor, welche maßgeblichen Einfluss auf die einzelnen nachhaltigen Entwicklungspfade genommen haben. Es sind diese Faktoren und deren Zusammenspiel, welche den Veränderungsprozess der einzelnen Universität prägen.

An erster Stelle und aufgrund seiner Bedeutung hervorzuheben ist das Engagement von einzelnen *Universitätsangehörigen*, welche organisationalen Wandel anregen und die dafür notwendigen Ressourcen und Unterstützung von der Universitätsleitung sowie dem externen Umfeld einfordern. Diese kamen in den meisten Fällen aus dem wissenschaftlichen Bereich, aber auch Personen aus der Administration gaben an einzelnen Universitäten den Ausschlag zu Veränderungen.

Zweitens kommt der laufenden Unterstützung durch die *Universitätsleitung* eine wesentliche Bedeutung für die Institutionalisierung und Sicherstellung der neu geschaffenen Strukturen zu. Sie ist in der Position, für längerfristige Institutionalisierung und Kontinuität zu sorgen. Mehrfach gehen Entwicklungen in Richtung oder auch entgegen Nachhaltigkeit Hand in Hand mit Personalveränderungen im Universitätsmanagement. Insbesondere bei den kürzlich initiierten Prozessen der strukturellen Einbettung von Nachhaltigkeit spielen das Universitätsmanagement und die Rektorate eine entscheidende Rolle. Deren Engagement ist vielfach auch als Konsequenz der Entwicklungen im organisationalen Umfeld der Universität zu sehen: So hat die Teilnahme im Netzwerk Allianz Nachhaltige Universitäten in Österreich zu universitätsinternen Veränderungen geführt und die Rolle von universitätsinternen Nachhaltigkeitsakteuren gestärkt, was in der Folge von der Universitätsleitung aufgegriffen wurde. Auf der anderen Seite kann der Verlust von Unterstützung oder eine neue strategische Ausrichtung durch das Universitätsmanagement zu einer Schwächung/Abschaffung ebendieser neuen Strukturen führen.

Als dritter wesentlicher Einflussfaktor sind einschlägige *Netzwerke und Plattformen* (Allianz Nachhaltige Universitäten in Österreich, UniNEtZ) und deren unterstützende und einflussreiche Wirkung auf organisationsinterne Wandelprozesse zu nennen. Dies zeigt sich vor allem in der Zunahme von Veränderungen nach der Gründung der Allianz Nachhaltige Universitäten und den Veränderungen, die mit der Aufnahme der Vorarbeiten zum UniNEtZ-Projekt zusammenhängen. Hier scheint die Zugkraft von Vorreiter-Universitäten und ein gewisser Isomorphismus dazu zu führen, dass sich die Universitäten gegenseitig bei ihren Wandelprozessen anregen und unterstützen.

Viertens spielt das *Wissenschaftsministerium* eine wichtige Rolle, indem es regulative Veränderungen initiiert (z. B. durch die Aufnahme von Nachhaltigkeit in die Vor-

lage der Leistungsvereinbarungen). Des Weiteren werden Initiativen wie die Allianz Nachhaltige Universitäten oder das CCCA immer wieder finanziell und ideell unterstützt und damit auch ein normativer Wandel im universitären Umfeld ausgelöst.

Forschungsbedarf besteht einerseits darin, die Motivation dieser Akteure und den investierten und in Kauf genommenen Aufwand zu erheben. Zugleich gibt es noch wenig Wissen über die Barrieren, Stolpersteine und Zielkonflikte im inneruniversitären Veränderungsprozess Richtung Nachhaltigkeit. Auch wäre es wichtig, eingehender zu untersuchen, wie die strukturellen Veränderungen innerhalb der Universität Wirkung entfalten (bspw. Ausbreitung des Nachhaltigkeitsthemas in der Lehre und Forschung, Ausbreitung auf bisher weniger damit befasste Institute etc.) und ob sie als gemeinschaftlicher Prozess oder isoliert stattfinden.

Zusammenfassend zeigt sich, dass die verschiedensten hier aufgezeigten Wege zu einer breiten Verankerungen führen – auch wenn sich das für jene Universitäten, bei denen die Veränderungsprozesse erst in den letzten Jahren an Dynamik gewonnen haben, noch nicht endgültig verifizieren lässt. In keiner der Universitäten sind die Veränderungen nur von einer Akteursgruppe getragen. Vor allem, wenn es darum geht, Nachhaltigkeit breit zu verankern, zeigt sich, dass es das Zusammenspiel der genannten Akteursgruppen ist, das zum Erfolg geführt hat.

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4.3. Paper 3

Bohunovsky, L., Radinger-Peer, V., Zint, M., & Penker, M. (2023). Change agents under tensions: a paradox approach to strategies for transforming higher education toward sustainability. *International Journal of Sustainability in Higher Education*, *24*(9), 372-392. https://doi.org/10.1108/ijshe-12-2022-0393

Objectives of the Paper & Research Questions Addressed

Paper 3 focuses on barriers and challenges in SHEI change processes. For this work, we built on paradox theory to uncover tensions underlying observed challenges and develop management strategies. We also aimed at methodological contributions by developing a novel participatory approach to discuss tensions and their management in a participatory setting.

Methods

Starting from interview transcripts of the first research phase, a 2nd qualitative content analysis of the material focused on challenges encountered by interview partners. Potential tensions were uncovered in an interpretative step drawing upon paradox theory. An online survey (n=36) with change agents from 17 of Austria's 22 public universities was conducted to validate and rank the tensions identified. Six highly ranked tensions were further discussed in focus groups (n=29), following a new participatory method ("Tension Reflection Path", see Chapter 3.4.2). A final qualitative content analysis focused on management strategies to deal with the tensions virtuously. Online feedback on the "Tension Reflection Path" developed for the focus groups (answer to RQ3.3) was collected by focus group participants. Participating change agents were members of faculty, staff, and administrators with leading roles in their university's change processes toward sustainability.

Insights

Fifteen tensions at and between the individual, organizational, and system level addressing academic, organizational, and external stakeholder engagement aspects were revealed (answer to RQ3.1). E.g., divergent individual roles of change agents lead to tensions on the individual level. On the organizational level, tensions between central and decentral structures may arise. Six tensions were explored in-depth following the newly developed "Tension Reflection Path" to elaborate management strategies (answer to RQ3.2), building on change agents' experiences. In line with paradox literature (e.g., Hahn et al., 2015b; Schad et al., 2016), results revealed examples of acceptance (e.g., increase understanding of divergent value systems), separation (e.g., following different goals in working groups), and synthesis strategies (e.g., change assessment and evaluation criteria). Our findings support evidence from paradox theory that stresses how acknowledging tensions can result in new perspectives and diverse strategies to manage them. The guiding questions of the "Tension Reflection Path" (RQ3.3) developed for the focus groups proved helpful by participating change agents as supportive to deal with tensions.

Originality

This study combines insights from the SHEI body of literature on challenges and barriers to SHEI with paradox theory. Thus, it adds a novel perspective to SHEI and contributes to the often-criticized weak theoretical foundation of SHEI. By explicitly addressing change agents, it offers a novel perspective in research and practical insights into change agents' daily challenges. The novel methodological approach ("Tension Reflection Path") can be applied to address challenges in SHEI change processes.

Author's Contributions (see also page viii)

Development of research questions, theoretical and methodological approach, conceptualization; preparation and implementation of participatory parts, i.e., survey, focus groups, online feedback;

preparation of German preliminary results for exchange with change agents; data analysis and interpretation; writing of paper with feedback and language-check by co-authors; support of communication with editors;

Erratum

After final proofreading, a formatting error occurred in Table 3. Therefore, the six selected tensions cannot be identified in Table 3 of Paper 3. At the time of completion of this framework, the authors requested an erratum.

The table should look like this:

	Tension: level	Contradictory Poles
	Academic freedom: all levels	SD is a central societal concept and must be taken up by universities vs SD as a normative concept endangers the freedom of science and teaching
	Breadth vs focus in participation: organizational	Bring everyone along vs focus on those who bring interest and capacity
	**Commitment vs mandate (I)*: between organizational & individual level	Promote voluntary commitment of persons to SD vs clear mandate from management for SD agendas
	Control vs autonomy: organizational	Install or allow control bodies vs make autonomous decisions at university level
	Cooperation vs competition: organizational & systemic level	Cooperation vs competition within and between universities
	**(De)central SD structures (I)*: organizational level	Rely on decentralized commitment / allow decentralized initiatives vs establish central coordination offices for sustainability
	Depth of change: organizational	Quick Wins vs Systemic Change; Optimization - Improvement - Renewal
	Diversity of actor(groups) within university: organizational	Diverse poles: bureaucracy - flexibility; collegiality - hierarchy; (in)stable employment; intrinsic - extrinsic motivational systems
	**Individual roles (I)*: Individual level	Different prioritization/roles of CAs at work, and the respective value systems
	Internal vs external Goals: organizational-systemic	Goals & interests of external partners vs sustainability goals of the university
	OE's autonomy: organizational	Ensure autonomy of organizational entities (OE) vs alignment based on higher-level sustainability goals
	**Degree of autonomy (U)*: between the organization and systemic level	Autonomy of university(s) vs political frameworks that promote/demand SD
	**Resource allocation (U):* organizational level, as well as between organizational and systemic level	Use budget for core tasks vs invest in sustainability in higher education institutions (SHEI)
Table 3: Overview of the 15 tensions and their contradictory poles identified through step 2 and presented to CAs in step 3.	**Scientific performance(s) (U)*: within and between all levels	Succeeding in relation to disciplinary academic performance evaluation system vs exploring new pathways of assessing success
	Societal responsibility: organizational-systemic	Diverse poles: different expectations towards universities & different understandings of university's responsibility are in conflict
	Notes: SD = sustainable development, "Level" indicates, if the tension arises at or between the individual, organizational, or systemic level. * mark those tensions that were further elaborated on, based on their relevance to the individual (I) or the university (U) **Source**: Authors' own creation/work	

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Change agents under tensions: a paradox approach to strategies for transforming higher education toward sustainability

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Abstract

Purpose – Guided by paradox theory, the study aims to significantly advance Sustainability in Higher Education Institutions (SHEI) scholarship and inform change agents' (CAs) practices by uncovering the tensions underlying the challenges CAs face in embedding sustainability in their universities and learning about potential strategies to manage these tensions.

Design/methodology/approach – The authors conducted a multi-step, mix-methods study including interviews ($n = 15$), an online survey ($n = 36$) and focus groups ($n = 29$) with CAs from 17 of Austria's 22 public universities. Participating CAs consisted of faculty, staff and administrators with leading roles in their Higher Education Institutions' sustainability change processes.

Findings – Austrian SHEI CAs' responses revealed 15 tensions at and between the individual, organizational and system level addressing academic, organizational and external stakeholder engagement

Many thanks to the change agents from the Alliance of Sustainable Universities in Austria for participating in the research and dedicating their time for the interviews, survey and group discussions. The authors also greatly appreciate the two anonymous reviewers' thoughtful and helpful feedback.

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aspects. Six tensions were selected for more in-depth exploration including elaboration of management strategies, building on CAs' experiences. Results revealed examples of acceptance, separation and synthesis strategies.

Research limitations/implications – Based on the exploratory nature of our study, the authors do not claim to have identified a comprehensive list of tensions underlying the challenges faced by SHEI CAs, nor of all potential management strategies.

Practical implications – Although this study focused exclusively on Austrian SHEI CAs, the challenges they shared were consistent with those in the literature and, thus, insights should also support the CAs' efforts in other countries.

Originality/value – This study offers novel perspectives on how to manage the challenges to SHEI. To the best of the authors' knowledge, it is the first to describe paradox theory-informed management strategies recommended by a heterogenous group of SHEI CAs to address the barriers they face in transforming their universities toward sustainability.

Keywords Sustainability in higher education institutions, Tensions, Tension management, Change agents, Sustainable universities, Whole-institution approach, Challenges, Barriers, Paradox theory, Strategies

Paper type Research paper

1. Introduction

A growing number of higher education institutions are working to adopt a whole-institution approach to sustainable development, one which calls on strengthening Sustainability in Higher Education Institutions (SHEI) [1] holistically, i.e. taking into account social, environmental and economic aspects of sustainability in operations, research, teaching, societal engagement and organizational culture (Kohl *et al.*, 2021; UNESCO, 2021).

Extensive scholarship has been conducted on the barriers to change agents' (CAs) ability to advance associated SHEI goals. Most studies report on a range of barriers (Hoover and Harder, 2015; Lozano, 2006; Blanco-Portela *et al.*, 2017; Leal Filho *et al.*, 2017; Akins *et al.*, 2019) and some also categorize and synthesize them (Verhulst and Lambrechts, 2015; Blanco-Portela *et al.*, 2017). Recognizing that hidden contradictions or tensions (Bien and Sassen, 2020; Lattu and Cai, 2020; Ruiz-Mallén and Heras, 2020) are typically at the "root" of these barriers or challenges to change (Hoover and Harder, 2015, p. 185), some SHEI scholars have begun to dig deeper, to explore what underlies the barriers or challenges to SHEI (Hoover and Harder, 2015; Deleye *et al.*, 2019; Lattu and Cai, 2020; Lozano, 2006). Paradox theory is one of the approaches that is informing this novel SHEI scholarship.

Paradox theory has informed the study of organizations for over 30 years (Schad *et al.*, 2016), suggesting that elucidating and acknowledging tensions can result in new and more effective change strategies than focusing on barriers or challenges alone (Smith and Lewis, 2011). Focusing on paradoxical tensions, for example, has been found to be effective in advancing corporate sustainability (Hengst *et al.*, 2020; Hahn *et al.*, 2018; Van der Byl and Slawinski, 2015). So far, however, only a few, select scholars have applied insights from paradox theory to advance sustainability in Higher Education Institutions (HEIs) (Lattu and Cai, 2020; Kemp and Scoffham, 2022; Hoover and Harder, 2015).

Much of the literature on paradox theory is theoretical, observational and analytical. Few studies are available on how CAs might manage tension in their day-to-day practices. One exception is an action research study conducted by Lüscher and Lewis (2008). These authors examined a collaborative process of working through paradoxical tensions at the Danish Lego Company. Starting from a perceived "mess" (i.e. "an intricate, fluid, and fuzzy issue" [p. 227]), challenges were named and, thus, made tangible. Next, the paradoxes underlying these challenges were collectively discussed. Finally, middle managers were enabled to develop

"workable certainties" (i.e. a meaningful and actionable understanding of complex situations, p. 235) to enable them to act on the identified tensions.

Building on the nascent body of SHEI research informed by paradox theory (Lewis and Smith, 2014), we set out to identify the tensions that underlie the barriers and challenges CAs face in their daily endeavors and provide recommendations for strategies CAs can adopt to manage these tensions. As such, we sought to answer the following research questions:

RQ1. What competing tensions underlie the challenges Austrian SHEI change agents (CAs) face?

RQ2. What strategies are these CAs already using or believe they could use to manage these tensions to embed sustainability in their HEIs?

To answer these research questions, we collected data through a multi-step, mixed methods approach from SHEI CAs who work for universities that are members of the Alliance of Sustainable Universities in Austria. SHEI has a long history in Austria, with the network operating since 2012.

We believe our study is the first to engage SHEI CAs in identifying the tensions they face and the strategies they can use to accept or engage with and navigate these tensions. Because managing paradoxical tensions is pivotal to SHEI processes (Hoover and Harder, 2015), we believe such insights are key to addressing the challenges SHEI CAs face and, thus, to a whole-institution approach. It is important to note that we recognize that SHEI CAs, like the ones who participated in this study, differ in status pending their role in the organizational hierarchy as well as in their levels of power and, thus, resources. As a result, so do their options to implement various management strategies (Xiao *et al.*, 2019; Battilana, 2016). Although an analysis of the influence of these differences falls outside the scope of the exploratory work reported on in this article, many of the management strategies that will be identified can be applied by SHEI CAs regardless of their roles, power and resources.

2. Theoretical background

Paradoxes are contradictory elements (i.e. "poles") that are interrelated, exist simultaneously and persist over time (Smith and Lewis, 2011, p. 382). As such they inevitably result in "tensions" (Smith and Lewis, 2011). In organizations, paradoxical tensions are ubiquitous. They arise, for example, between stability and change, cooperation and competition or profit and purpose (Smith, 2014; Smith and Lewis, 2011; Karhu and Ritala, 2020; Schad *et al.*, 2016) and are often latent (i.e. "dormant unperceived, or ignored") (Smith and Lewis, 2011, p. 390). Plurality, change, scarcity or cognitive effort are among the ways tensions can be made salient (Smith and Lewis, 2011).

As a result of greater complexities and competitiveness, tensions will continue to increase (Smith, 2014). If CAs do not address these tensions and/or only focus on one vs both poles, they might find themselves in a vicious circle (Smith and Lewis, 2011), i.e. "reinforcing cycles that perpetuate and exacerbate the tension" (Lewis, 2000, p. 763). Radical and fast changes, for example, that erase any stability are likely to result in chaos. Alternatively, acknowledging tensions creates opportunities for three types of "virtuous" management strategies (Figure 1):

(1) *Acceptance* refers to acknowledging paradoxes and learning to live with them (Lewis, 2000). Acceptance strategies actively address poles in parallel (Poole and Van de Ven, 1989) or focus on finding ways to "work through" tensions (Schad *et al.*, 2016). Acceptance demands individual cognitive and behavioral competencies like equanimity, calm and evenness. Moreover, organizations need to be open to creativity and participation and support organizational learning (Smith and Lewis, 2011).

(2) *Separation* suggests engaging with opposing poles through different social or physical locations (i.e. spatial separation) or each one at different times (i.e. temporal separation) (Hahn *et al.*, 2015). By keeping the two poles separate, interferences and inertia are avoided as well as conflicts minimized (Schad *et al.*, 2016). At the organizational level, separating poles into different operational units can be helpful. In the context of sustainability (Hahn *et al.*, 2015, p. 305), for example, separation strategies are "permanent or temporal pockets within or outside the organisation where organisational members can pursue their personal sustainability agendas".

(3) *Synthesis* seeks "new perspectives or elements that link or accommodate the opposing poles of a paradox" (Hahn *et al.*, 2015, p. 301). Such strategies are intended to result in novel solutions by simultaneously taking both poles into account (Schad *et al.*, 2016). To make sense of two opposing poles, individuals have to shift their focus away from the two poles and find an overarching, mediating logic that provides a new perspective (Hahn *et al.*, 2015).

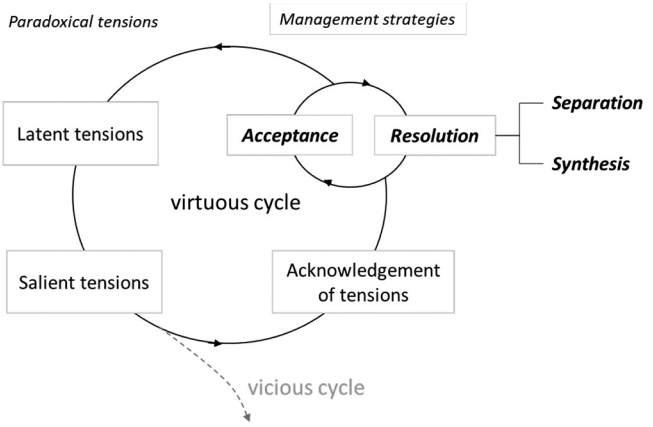
Such virtuous management strategies lead to a state of a "dynamic equilibrium", which allows for long-term success by constantly moving across tensions (Smith and Lewis, 2011).

As mentioned earlier, paradox theory has informed organizational scholarship since the late 1980s but has only more recently been applied to SHEI. For example, Hoover and Harder (2015) conducted a meta-ethnographical study of 13 qualitative SHEI studies to identify tension and contradictions inherent to SHEI including competition vs collaborative work, support for individual vs collective action, top-down leadership vs grassroot engagement, protection of territories vs boundary spanning, rational/pragmatic cultures vs holistic worldviews, rigid vs dynamic roles, rigid vs human-centered structures and new ideas as dangerous vs welcome.

Lattu and Cai (2020) focused on identifying tensions within the context of social and economic sustainability aspects in Finnish HEIs. By building on Hahn *et al.*'s (2015) framework for corporate settings and based on interviews with university leaders and officials, they identified six tensions:

(1) academic leadership vs management legitimacy;

(2) regional political tensions vs university profiling;



Source: Authors' own creation/work

Figure 1.
Tension management based on Smith and Lewis' (2011) dynamic equilibrium model and Hahn *et al.*'s (2015) classification of managerial responses

(3) political power over the university system;
(4) changing academic work and profession;
(5) academic autonomy vs state influence; and
(6) the future role of the university institution.

Although they did not collect data on strategies, they suggested a set of illustrative coping strategies as a means for managing these tensions.

Kemp and Scoffham (2022) drew on the existing literature and their own experiences to identify two main tensions in SHEI, i.e. the tension between challenging or aligning with current HEI structures to bring forward radical change and the tension between the slow pace of change through education vs fast responses such as activism. These two tensions were used to build a paradox model that allows for understanding and analyzing current SHEI.

3. Sample, material and methods

This study collected data from CAs working for 17 of the current 19 public universities part of the Alliance of Sustainable Universities in Austria (Alliance). This informal network was created in 2012 to advance the country's SHEI through exchanging insights and collaboration, and as such, to contribute to a more sustainable society. The Alliances' main "expert group" consists of delegates of their respective member universities. These individuals are highly motivated to advance sustainability and are considered their universities' main sustainability CAs. Besides their roles as CAs, they serve in other roles as well (e.g. faculty, university leaders and staff in strategic positions, supporting staff) and differ in their status within university's hierarchy (Table 1).

Over the period of time of this study, the number of universities who participated in the Alliance grew, as did the sample. In 2018, 14 universities were members of the Alliance, with 13 represented by one or two CAs in the first round of interviews (Step 1, Table 1). By 2020, there were 17 university members, all represented by CAs (Steps 3 and 5, Table 1).

The study's methods were primarily qualitative because quantitative approaches tend to mask paradoxes rather than uncover them (Schad *et al.*, 2016). We adapted our iterative data collection approach from Lüscher and Lewis (2008), to move from what they refer to as a "mess" (i.e. challenges and underlying tensions are unknown) to ultimately "workable certainty" (i.e. strategies to manage uncovered tensions). Rather than refer to the term "mess", however, we refer to "challenges" because SHEI CAs can typically identify hindrances to their work.

More specifically, our study was completed through a series of data collection and analysis steps (Table 1). The guided interviews (Step 1) took place in 2018 and covered aspects of institutionalization and associated challenges (Bohunovsky *et al.*, 2020). The first qualitative content analysis of interview transcripts (Step 2) consisted of inductively coding SHEI challenges CAs identified using Atlas.ti. These challenges were used as a starting point to identify potential tensions underlying these challenges (Table 3). This interpretative step built on paradox theory literature as a research heuristic:

- guiding questions proposed by Schad *et al.* (2016, Table 2, p. 25f) informed by their meta-analysis of paradox theory scholarship; and
- a theoretical framework synthesizing tensions faced by organizations moving toward sustainability (Hahn *et al.*, 2015).

Step	Rational for each step based on Lüscher and Lewis (2008)	Objective	Method used in/of this study	Sample, material
1	Articulate mess/challenges	Institutional change and integration of sustainable development, success factors and challenges	Guided interviews	15 CAs from 13 Austrian universities (9 F, 5 L, 1S)
2	Formulate problem and dilemma	Mapping of challenges and identification of potential tensions	Qualitative content analysis and interpretation	15 interview transcripts from Step 1
3	Validate and select dilemma	Validation and rating of relevance of tensions for CAs and universities; selection of highly relevant tensions	Online survey	36 CAs from 17 Austrian universities (18F, 7L, 9S, 2O)
4	Formulate paradoxes	Deeper understanding of selected tensions	Elaboration of six selected tensions	Responses from Step 3 and literature
5	Validate paradoxes and discuss workable strategies	Review of tensions and discussion of tension management	Two group discussions on three selected tensions each	29 CAs from 17 Austrian universities (10F, 5L, 7S, 7O)
6	Workable certainty	Elaboration of tension management strategies	Qualitative content analysis and interpretation	Transcripts of group discussion
7	Reflection sessions	Obtaining feedback on the questioning pathway and quality of group discussion	Online feedback on group discussion	28 of 29 discussion participants (Step 5)

Notes: The roles of change Agents (CAs) within universities are described as F (Faculty) = scientific staff, L (University Leaders) = (vice-)rectors and staff in strategic positions, S (Staff) = individuals working in supporting roles or other nonscientific positions, O = multiple/other roles
Source: Authors' own creation/work

Table 1.
Description of the study's objectives, methods and sample for each of the seven steps recommended by Lüscher and Lewis (2008)

Objective	Questions	Background
Starting reflection, problem definition	– Would you like to correct or add anything in this presentation in advance to be able to start the discussion? – What questions do you have in relation to this tension, to facilitate your understanding?	Linear questioning: common understanding of Poles A and B, tetralemma-position THE ONE and THE OTHER
Recognizing different perspectives	– Could someone else view this tension, with its respective positive and negative aspects, differently?	Circular questioning: Further exploration of polarities
Surfacing possible actions and their implications	– If you want this tension to intensify at your university and the negative aspects of both poles to come to light, what could you do as a change agent to make this happen?	Reflexive questioning: unexpected context-change question, paradox intervention
	– Conversely, if you want to strengthen the positive aspects of BOTH perspectives, what could you do as a change agent to achieve this goal?	Future-oriented reflexive question/ tetralemma-position BOTH
	– Assuming you could simply ignore this tension, i.e. pretend that this tension does not exist, what would that mean for your work as a change agent?	Tetralemma position NEITHER
	– What are some completely different possibilities of action that you can engage in as a change agent in relation to this tension?	Tetralemma position "NOT ALL OF THIS AND NOT EVEN THAT!"

Source: Authors' own creation/work

Table 2. Questions guiding focus group discussions consistent with Lüscher and Lewis' (2008) "Collaborative Process of Working Through Paradox", as well as Sparrer and Varga von Kibéd's Tetralemma (Sparrer and Varga von Kibéd's, 2000)

As a result of this step, 15 tensions were identified. The number of tensions was not predetermined but emerged empirically.

As part of an online survey (Step 3), 37 CAs were asked to review the 15 tensions, to comment on them, and then rate them in terms of how relevant (with 0 = not relevant to 5 = highly relevant) each was to them personally and their university. Three tensions from each of the two scales (i.e. a total of six) were selected for further examination. These six were selected from the 15 based on being ranked highly (4 or 5 on the Likert scale), having a narrow distribution in rankings, and to cover a range of tensions faced by SHEI CAs. Results were summarized in the form of six polarity maps (Johnson, 2014) to help participants learn about the positive results of focusing on either pole of each tension as well as the negative results of overemphasizing one tension's pole over the other (Step 4).

For the subsequent two online focus groups (Step 5), participating CAs were divided into subgroups of four to six individuals. Each group was asked to focus on one of the six tensions using the respective polarity maps. Coaching questions suggested by Lüscher and Lewis (2008) as well as by Sparrer and Varga von Kibéd (2000) were used to help participants examine and reflect on the respective tension in depth, consider alternative perspectives such as both poles, neither or other poles and to identify potential strategies to manage the tension. Table 2 gives an overview of the questions guiding focus group discussions.

The management strategies were coded next, again with Atlas.ti (Step 6). The content analyses revealed eight clusters in line with the three management strategies identified in

the paradox literature. A final online survey asked participants whether the discussions helped them achieve the focus group goals (Step 7).

4. Results

Results are presented in response to the two research questions on tensions and management strategies. A third section shares study participants' perspective on the research process.

4.1 Challenges and tensions experienced by change agents in Sustainability in Higher Education Institutions processes

The challenges identified through the content analysis range from the individual to the organization and systemic level. For example, at the individual level, interviewees responsible for SHEI often combine this task with other tasks in science, administration or management, thus sustainable development (SD) is only a complementary task. They also report increasing pressure from leaders to take on additional tasks. Especially, if their engagement is bottom-up, they report on the exhausting need to continuously motivate themselves. This results in work overload and a perceived lack of time. On the organisational level, interviewees indicated that they experience a lack of (top) management commitment and leadership. Moreover, SHEI structures are perceived as diverse and decentral and often it is unclear who to address in regard to SHEI. Interviewees report that many SHEI projects are not implemented or terminated due to a lack of organizational resources or personnel. Vertical and fragmented organizational structures were also identified as a challenge. On the systemic level, some wish for more support and a stronger SD vision from policy makers, whereas others are concerned about various stakeholders' (i.e. ministry, students, university board, etc.) expectations. Moreover, interviewees report that SD does not fit in with current research priorities that tend to reward narrow disciplinary excellence (e.g. scholarly vs societal impact).

Based on what CAs shared about the challenges they reported during the initial interviews (Steps 1 and 2), 15 potential underlying tensions emerged (Table 3). The CAs rated all of these 15 tensions as relevant to them and their institutions. Moreover, results suggested that these tensions occur at and between the individual, organizational and systemic levels of SHEI processes (Tables 3 and 4). Tensions also addressed diverse aspects such as academic topics, engagement with external stakeholders and most of all organizational issues.

Table 4 presents the six tensions that were selected for further examination and strategy discussion, including illustrative quotes.

4.2 Management strategies

The focus group discussions centered on the six tensions described in Table 4 and revealed different potential strategies to manage them (Table 5). Table 5 provides an overview of the proposed strategies (classified according to acceptance, separation or synthesis [Figure 1]), including illustrative quotes, and identifies the tensions that resulted in the respective strategies being mentioned.

Many of the strategies that were identified could be clustered as acceptance strategies. These strategies do not change a situation, but they can provide relief to CAs by helping them to accept a situation. Two strategy clusters were identified as separation strategies. These strategies can form "permanent or temporal pockets" (Hahn *et al.*, 2015) within the university, with objectives, performance indicators or structures that differ from traditional

Tension: level	Contradictory poles
**Academic freedom*: all levels	SD is a central societal concept and must be taken up by universities vs SD as a normative concept endangers the freedom of science and teaching
**Breadth vs focus in participation*: organizational	Bring everyone along vs focus on those who bring interest and capacity
**Commitment vs mandate (I)*: between organizational and individual level	Promote voluntary commitment of persons to SD vs clear mandate from management for SD agendas
Control vs autonomy: organizational	Install or allow control bodies vs make autonomous decisions at university level
**Cooperation vs competition*: organizational and systemic level	Cooperation vs competition within and between universities
*(*De)central SD structures (I)*: organizational level	Rely on decentralized commitment/allow decentralized initiatives vs establish central coordination offices for sustainability
**Depth of change*: organizational	Quick wins vs systemic change; optimization – improvement – renewal
**Diversity of actor(groups) within university*: organizational	Diverse poles: bureaucracy – flexibility; collegiality – hierarchy; (in)stable employment; intrinsic – extrinsic motivational systems
**Individual roles (I)*: individual level	Different prioritization/roles of CAs at work and the respective value systems
**Internal vs external goals*: organizational-systemic	Goals and interests of external partners vs sustainability goals of the university
**OE's autonomy*: organizational	Ensure autonomy of organizational entities (OE) vs alignment based on higher-level sustainability goals
**Degree of autonomy (U)*: between the organization and systemic level	Autonomy of university(s) vs political frameworks that promote/demand SD
**Resource allocation (U)*: organizational level, as well as between organizational and systemic level	Use budget for core tasks vs invest in sustainability in higher education institutions (SHEI)
**Scientific performance(s) (U)*: within and between all levels	Succeeding in relation to disciplinary academic performance evaluation system vs exploring new pathways of assessing success
**Societal responsibility*: organizational-systemic	Diverse poles: different expectations towards universities and different understandings of university's responsibility are in conflict

Table 3.
Overview of the 15 tensions and their contradictory poles identified through Step 2 and presented to CAs in Step 3

Notes: SD = sustainable development, "Level" indicates, if the tension arises at or between the individual, organizational or systemic level; Italic letters *mark those tensions that were further elaborated on, based on their relevance to the individual (I) or the university (U)
Source: Authors' own creation/work

research institutes and thus provide a suitable environment for pursuing a sustainability agenda. Two further clusters were summarized under synthesis strategies.

Study participants identified strategies they have already deployed (most consisting of acceptance strategies) as well as potential strategies that they have not yet implemented. During the focus groups, participants were not asked to differentiate between strategies they have/not used, so as not to interrupt the flow of the conversation. Nevertheless, when actual examples accompanied deployed strategies, they were ultimately coded as such (e.g. see quote Q8:40 for "Establish separate organizational entities with a sustainability focus", or Q13:25 for "Building on personal strength"). At least one quote in each cluster focuses on an example of a strategy that has been used.

Tension: level	Short description	Illustrative quote
High relevance to individual		
Individual role(s): Individual level	This tension reflects internal conflicts CAs experience. Apart from their roles as CAs, individuals often have other roles to fulfill (e.g. research, managerial/administrative). These roles are typically associated with divergent values and identities. Overemphasizing the CAs role can lead to burnout, whereas not pursuing this role can lead to a denial of one's own values	*. . . sometimes I have been afraid of what I have done, have I gone to too far now? (I 6:69)*
Commitment – mandate: between organizational and individual level	To successfully drive SHEI, CAs committed to engaging in bottom-up initiatives are needed. However, top-down support of these bottom-up initiatives is also necessary. Overemphasizing top-down approaches can lead to abdication of responsibility, whereas overemphasis of voluntary commitment might result in burning out CAs or limited continuity	*I'm the only one who has it (sustainability) somewhere in the job description . . . no one else gets money for it. So, it is somewhere simply personal initiative. (I4:29)*
(De)central SD-structures: organizational level	Central SHEI structures (e.g. SD institutes/ faculties/centers) pool competencies, knowledge and responsibility for SD. In a decentralized network, sustainability is anchored in various parts of the university and responsibility is diffused. Over-emphasizing central structures can make it difficult for outsiders to engage. Overemphasizing decentral structures, results in a lack of clarity about who is in charge	*The sustainability advisory board was the result of a rethinking process: we concluded that we had to somehow get a grip on this link between science and administration, and faculties also have to be brought together in some way. (I5:56)*
High relevance for university		
Degree of autonomy: between the organizational and systemic level	External regulatory requirements to foster SD can result in increased reporting obligations and can even be viewed as attacks on the freedom of science or resulting in universities' loss of power. However, if universities are granted complete autonomy, SHEI depends on the motivation of university leadership and internal CAs	*I would have expected much more from university regents, from the ministry, that is, from those who have some kind of control, supervisory or steering function of universities. (I5:76)*
Resource allocation: within and between all levels	Austrian universities have a global budget that is largely needed to cover fixed costs. Allocating parts of it to SHEI means limiting expenses in other areas. Overemphasizing traditional fixed costs make SHEI projects difficult to finance and disregards the significance of SHEI. Overemphasizing SHEI investments might result in reduced funding for traditional expenses or a shift of burdens among employees	*Anything we do that is not directly attributed to a course or research project is not as easy to fund, e.g., a SD office, a SD officer . . .. (I1 7:63)*
Scientific performance(s): within and between all levels	Overemphasizing SD research and outreach can lead to personal and organizational disadvantages as SD related activities are not well represented in performance evaluations. In contrast, overemphasis of disciplinary performance criteria strengthens disciplinary and compartmentalized knowledge generation and publication cultures, which tend not to address the complexity of societal problems	*Our SD doctoral program had problems because it did not fit into the normal scheme of an excellent doctoral college. The other doctoral colleges are as narrow and specific as possible. This one is as broad and open as possible. This is contradictory (I 3:110)*

Notes: CA = change agent, SD = sustainable development, SHEI = Sustainability in Higher Education Institutions
Source: Authors' own creation/work

Table 4. Overview and short description of the six tensions selected for further discussion along with the consequences of overemphasizing each pole with illustrative quotes (translated from German and partially shortened)

Table 5.
Overview and short description of acceptance, separation and synthesis strategies recommended by the study's SHEI change agents (CAs) with illustrative quotes (translated from German and partially shortened)

Strategy cluster	Management strategies	Tension(s)	Quote
Strategy type: acceptance strategies			
Focus on positive communication	Communicate about best practices and role models of one's own and/or other universities to inspire and empower action	Various	*I think it is important to create understanding for both poles within the university, one can explain: what do policy makers want, what does the university want? (Q 9:23)*
	Increase understanding of divergent value systems: when tensions arise due to differences between academic and government agencies' value systems (e.g. academic freedom vs public agency demands), explain these to constituents and encourage mutual understanding	Mainly: degree of autonomy	
	Enhance visibility of SD activities: share information about SD activities to increase activists' motivation and provide universities' leaders with best practice examples they can highlight	(De)central structures and individual role(s)	
Focus on process management	Adopt participatory approaches: involve individuals, ranging from "giving them a say" to co-decision-making	Mainly: commitment-mandate	*For many people, the primary interest is to address the topic [of SHEI], to communicate, to get involved by sharing one's perspectives about it. (Q12:43)*
	Provide service like an overview of SD activities at universities, linking actors and asking for feedback on one's SD initiatives	Mainly: (De)central structures and commitment-mandate	
	Demonstrate unique added value for collaborating in SHEI process to the various individuals and groups (e.g. students, faculty, staff, administration) from whom one is seeking buy-in or support	Mainly: commitment-mandate	
Build on personal strengths	Use Guerrilla tactics to "just do" what seems necessary even when there is no mandate to do so	Various	*I actually notice that it's better for my mental hygiene if I don't think about it so much, but simply work through tasks. (Q 13:25)*
	Draw on personal qualities like resilience, perseverance, patience and persistence; draw on one's dedication to SD to cope with tensions	Various	

(*continued*)

Table 5.

Strategy cluster	Management strategies	Tension(s)	Quote
Actively seek support	Secure support from leadership: sensitize leadership to the issue of sustainability and obtain their support, as some CAs may not act unless directed to do so; also create awareness of CAs' work and the tensions they experience	Various	*You need people who support the ideas and who, because of different interests . . . simply support the topic . . .. Because otherwise you're pretty much on your own and you . . . end up frustrated . . . (Q 13:13)*
	Leverage advocacy from bottom-up actors (e.g. students) who can make different and potentially more radical pleas than faculty and staff; use this strategy deliberately to increase pressure on universities to change	(De)central structures and resource allocation	
	Network to seek allies within and outside the university (e.g. NGOs, government) for support	Various	
Strategy type: separation strategies			
Collective action for sustainable development	Set up working groups to promote networking within and between universities as well as beyond to distribute the workload and motivate each other	Various	*How can [sustainability efforts] be strengthened at the individual university? . . . through working groups . . ., e.g. on education for sustainable development, climate, energy or whatever. This is perhaps less high-profile, but perhaps more effective within one's own university than something that comes from the network [of universities']. (Q10:51)*
	Appoint representatives: designate one individual per institute or department to form a working group to implement SD initiatives or identify and recruit volunteers for this role	(De)central structures and individual role(s)	
Establish separate organizational entities with a sustainability focus	Fund internal SD projects: university leadership provides funding for projects to support internal cooperation between institutes to address societal SD challenges	Scientific performance(s)	*In the area of research, we have our own internal call for proposals. The rectorate also provides money for certain topics. And there is a general demand for inter- and transdisciplinary participation. (Q8:40)*

(*continued*)

Table 5.

Strategy cluster	Management strategies	Tension(s)	Quote
Strategy type: synthesis strategies			
Change the mission	Change the university's goals: work toward incorporating sustainability as central to being a "responsible university"	Various	*Especially for transformative developments and CA activities, it is necessary to understand one's respective discipline in relation to the big picture . . . (Q 8:11)*
	Change assessment and evaluation criteria to support inter- and transdisciplinary sustainability science	Scientific performance(s)	
	Reflect on understanding of one's discipline: question one's role in one's respective discipline, recognize and publish work to contribute to a sustainability challenge (e.g. the sustainable development goals)	Scientific performance(s)	
Change business rules	Define travel time as working time: expand the definition of "working hours" by including time spent commuting using public transport, if it is used to work (e.g. answer emails)	Resource allocation	*For example, regarding travelling, you could also take external effects . . . into account and thus create a completely different picture. (Q 10:21)*
	Lengthen the time horizon on capital projects by considering a longer time horizon (e.g., 10 versus the typical 3–5 years) investments in green technology or (renovating) buildings can then be justified more easily financially	Resource allocation	
	Internalize external costs of CO_2 travel emissions by changing the costs of travelling and thus promote more sustainable modes of travel	Resource allocation	

Note: "Tension(s)" refers to tension(s) that were mentioned within the context of a particular management strategy
Source: Authors' own creation/work

4.3 Reflection on the research process and outcome

Feedback from study participants suggested that discussing challenges and barriers as paradoxical tensions resulted in CAs being able to shift from a focus on perceived deficiencies ("lack of. . .") to identifying ways to manage the tensions inherent to SHEI change processes. The majority (25 of 28 participants) rated the focus group discussion as very helpful or helpful in this regard (Figure 2).

5. Discussion

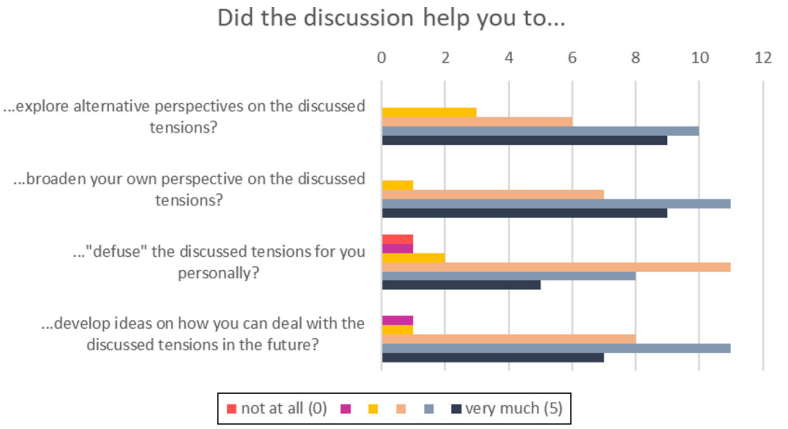
CAs face many barriers and challenges to embedding sustainability in HEIs (Leal Filho *et al.*, 2017; Lozano, 2006). To strengthen CAs' ability to manage these barriers and challenges, our study focused on:

- uncovering the tensions that underlie them; and
- identifying strategies for managing them.

Data were collected from 29 sustainability CAs from 17 of 22 public universities part of the Alliance of Sustainable Universities in Austria. The study's focus and methods were based on and adapted from paradox theory scholarship.

Before turning to a discussion of the tensions and strategies that were identified, it is important to note Austrian sustainability CAs named barriers and challenges consistent with those in the existing SHEI literature, i.e.

- work overload by having to combine SD efforts with other tasks (Verhulst and Lambrechts, 2015);
- a lack of leadership (Blanco-Portela *et al.*, 2017) and support from management (Leal Filho *et al.*, 2017; Akins *et al.*, 2019);
- a lack of policies to promote sustainability (Akins *et al.*, 2019) and of a vision to change sustainability and education policies by government (Leal Filho *et al.*, 2017);
- a lack of financial resources (Ávila *et al.*, 2019; Aleixo *et al.*, 2018; Deleye *et al.*, 2019) or prioritization of SD (Ávila *et al.*, 2019);



Source: Authors' own creation/work

Figure 2. Number of study participants ($n = 28$) who selected the closed-ended response options (with 0 = "not at all" to 5 = "very much") to the anonymous survey questions about the research process and outcomes

- the vertical and fragmented organizational structure of HEIs (Aleixo *et al.*, 2018); and
- the disciplinary cultures and compartmentalization (Ávila *et al.*, 2019; Deleye *et al.*, 2019), which limit inter- and transdisciplinary collaborations on complex sustainability topics (Bien and Sassen, 2020).

We therefore argue that the tensions and strategies identified by Austrian SHEI CAs are also likely to be applicable to SHEI CAs in other countries.

As suggested by the above, barriers and challenges have typically been framed as "lacking" something. According to paradox theory, however, barriers and challenges cannot be overcome unless the tensions underlying them are acknowledged, revealed and explicitly addressed.

5.1 Tensions underlying challenges experienced by Sustainability in Higher Education Institutions change agents

As anticipated based on paradox theory, the 15 tensions identified and validated by this study's participants offer perspectives and a more in-depth understanding of challenges to SHEI. Characterizing challenges in terms of underlying tensions with two or more opposing and interrelated poles sheds light on the fact that challenges cannot be eliminated through "either-or" decisions. Because of poles' interrelatedness, tension will resurface if one pole receives greater attention than the other (Smith and Lewis, 2011). Thus, each opposing pole must be identified and addressed, an approach that proved effective in our study. For example, instead of focusing exclusively on the perceived lack of academic leaderships' commitment to sustainability, the paradox approach allowed study participants to also recognize the limitations of top-down approaches. The tensions between the need for support from leaders as well as bottom-up engagement came to light and were explicitly addressed. Pragmatically, this study thus suggests that by reframing barriers and challenges as tensions with two or more poles (i.e. acknowledging that each pole has advantages and disadvantages), CAs can take first step needed to managing tensions virtuously in their day-to-day efforts to achieve SHEI.

Although we do not claim that the 15 tensions identified by this study are comprehensive, they address a broad range of aspects key to a whole-institution approach to SHEI (UNESCO, 2021). Many of the tensions addressed academic (mainly research), operational and governance as well as societal engagement with partners such as NGOs and government agencies. As such, this study's findings are consistent with prior research that Austrian public universities follow a holistic approach to SHEI (Bohunovsky *et al.*, 2020; Radinger-Peer and Bohunovsky, 2021).

One of the main tensions study participants identified occurred at the individual level, reflecting the fact that CAs typically hold and have to manage multiple roles in their universities. This is consistent with Smith and Lewis' (2011) tensions between "belonging and performing". According to the authors, these tensions occur as a result of a "clash between identification and goals as actors negotiate individual identities with social and occupational demands" (p. 383). Hoover and Harder (2015) similarly identify the frequent lack of clarity about the roles and responsibilities of SHEI CAs as an important source of tensions.

In contrast to this tension experienced at the individual level, about half of the remaining tensions mentioned focused on the organizational level. This finding is consistent with the "change" dimension in Hahn *et al.*'s (2015) analytical framework for SHEI. According to

these authors, tensions at the HEI level occur because of the many different perspectives on how sustainability can or should be integrated.

The other half of the remaining tensions occurred *between* the organizational and systemic level and at times also included the individual level. The number of tensions that touched on the systemic level are illustrative of HEIs' interdependence with scientific norms, government authorities and other societal forces that make change difficult (Kezar, 2011).

5.2 Strategies to manage these tensions

Following the identification of a range of tensions, six were selected for in-depth discussion of possible strategies to manage them. To the best of our knowledge, this study is the first to describe management strategies identified by actual SHEI CAs, based on tensions they experience in their daily work. Our findings thus build on and extend work by Hoover and Harder (2015) who stated the importance of addressing tensions in SHEI and of Lattu and Cai (2020) who focused on HEI management and proposed illustrative strategies. Moreover, our findings identified examples of acceptance, separation and synthesis strategies, thus illustrating the breadth of approaches that have already been deployed or could be deployed by SHEI CAs. In combination, the study's results show that there are many ways to overcome the barriers or challenges SHEI CAs face. The range of potential strategies can help CAs in their day-to-day work by giving them several options to explore and potentially pursue.

When CAs follow acceptance strategies, they leave the poles as they are and can find ways to use them constructively (Poole and Van de Ven, 1989; Hahn *et al.*, 2015). We identified the strategy to focus on positive aspects in communication, i.e. presenting good practice examples (to highlight that change is possible) and enhancing a better understanding of differences (to make people aware of tensions), as one acceptance strategy. This is in line with Lüscher and Lewis (2008) who name "effective and open" communication as a workable certainty to better involve team members. Involving people, providing services and highlighting what individuals can gain (added value) from participating in change processes were strategies that focus on process management. Similar workable certainties were found by Lüscher and Lewis (2008). The belief in one's personal strength differs from the abovementioned strategies in that it aims to strengthen CA's positive feelings and attitudes and, thus, focuses only on the individual. This particular strategy is in line with Karhu and Ritala (2020), who showed that virtuous tension management generates excitement and satisfaction instead of anxiety and other negative feelings.

In line with Hahn *et al.* (2018), separation strategies are used in the context of sustainability to maintain "core" business activities while also creating space for sustainability initiatives, thus allowing for different value and incentive systems. Hahn *et al.* (2015) argue that structural separation allows moral initiatives to withstand the dominant commercial logic. We showed that this applies to the SHEI context: The strategies we found in our study aim at forming groups that allow space for SHEI (as moral initiatives) within the traditional university setting.

Synthesis strategies do not eliminate tensions but rather find a means of meeting competing demands or considering divergent ideas simultaneously (Smith and Lewis, 2011); e.g. by seeking new perspectives that link or accommodate the opposing poles of a paradox (Hahn *et al.*, 2015). Indeed, this study identified strategies that aim at redefining goals of the university (contributing to SD) and changing assessment criteria or budgetary rules as synthesis strategies. Such strategies make decisions reasonable that were unreasonable in the past and, thus, allow for more sustainable solutions. For example, if universities included services to sustainability as a central aspect in their performance criteria for

faculty, researchers' tensions between the existing disciplinary science regime and SD-oriented transdisciplinary work would be eased.

5.3 Research process, limitations and further research

By guiding CAs to acknowledge tensions in their work (i.e. an important first step to deal with tensions [Hahn *et al.*, 2015]) as well as discussing possible strategies to manage these tensions, our study aimed to explore alternative perspectives on barriers and challenges to SHEI and to develop new ideas for how CAs can address them. Participants' feedback support findings from paradox theory that acknowledging tensions helps to reevaluate situations, find new opportunities and move ahead (Van der Byl and Slawinski, 2015; Hengst *et al.*, 2020; Hahn *et al.*, 2018). Applying a paradox perspective to SHEI challenges either through individual reflection or guided group processes can thus support CAs in their day-to-day work. As such, we recommend that CAs reframe the barriers and challenges they face as bipolar tensions, identifying both the negative and positive consequences of each pole (Johnson, 2014), and then, use the guiding questions in Table 2 to uncover new strategies for managing these tensions.

Because our study was exploratory and drew on data from SHEI CAs in Austria, we are not suggesting that the tensions or strategies identified as part of this study are comprehensive. We also acknowledge that the existence of the collaborative Alliance of Sustainable Universities in Austria network may have influenced the tensions that were identified and focused on. This is because the CAs that participated in the study were members of the Alliance and, thus, had opportunities to learn and interact with each other before and during the study. Moreover, although the study's expert sample drew on leading CAs from Austrian universities, we did not include other stakeholders such as students who have also played important roles in advancing SHEI. Students and other SHEI stakeholders may experience other tensions and use alternative strategies for managing them. Finally, it is important to note that the first author is part of the Alliance's expert group. Being an "inside" researcher can be a limitation (i.e. if not sufficiently reflective about one's role/interests) or advantage (i.e. if building on preunderstanding) (Brannick and Coghlan, 2007).

Although these limitations suggest the need for future research to assess the generalizability of this exploratory study's findings, we argue that the results are likely to be applicable to SHEI CAs in countries with similar university governance structures and institutional framework conditions. This claim is based on the similarities of the barriers and challenges documented in the literature with those identified by the Austrian CAs who participated in this study. Moreover, CAs can apply the process outlined in this article to address the particular barriers and challenges and, thus, the tensions they experience – because a paradox-informed approach is broadly applicable (i.e. typically not dependent on spatial and organizational contexts).

Another important question for further research is which of the strategies can and should be used by SHEI CAs. Our understanding of the unique features of HEIs (Kezar, 2011) and the first author's insider knowledge suggest that the choice of strategies is likely to depend on the CA's position in the HEI hierarchy. CAs' hierarchical position is strongly related to their social standing (Battilana, 2016). The latter, in turn, determines their levels of agency, resources and support (Pflitsch and Radinger-Peer, 2018; Battilana, 2016; Xiao *et al.*, 2019). There is also the question about the extent individual universities are capable of redefining their sustainability goals on their own, given that HEIs are strongly influenced by other universities, academic societies, on government agencies, etc. (Kezar, 2011). Although these questions fall outside the scope of this exploratory study, we argue that the acceptance strategies (i.e. ones that acknowledge tensions and try to "work through" them [Lewis, 2000;

Schad *et al.*, 2016]) identified in this article are relatively easy to implement in that they do not require support from university leaders. Thus, they are also strategies for CAs with limited decision-making power.

Yet, another aspect that deserves further research is the overall effectiveness of the various strategies identified by this study. Although the participating CAs used many of the strategies they suggested, we did not have the opportunity to learn how effective the CAs deemed them to be. In particular, it would be desirable to learn about the long-term impact of the use of acceptance, separation and synthesis strategies in addressing the tensions and thus the challenges to SHEI, as the exploration of paradoxes "is an ongoing and cyclical journey" (Lewis, 2000, p. 761).

6. Conclusions

This study provides novel insights into paradox theory-informed strategies to manage tensions underlying the challenges CAs face in embedding sustainability in their universities. To the best of our knowledge, this is the first empirical SHEI study on tension management to advance both scholarship and support CAs' practice. A mixed methods approach was used to reveal the rich experiences of a heterogenous group of 29 CAs, consisting of faculty, staff and administrators with leading roles in sustainability change processes at 17 Austrian public universities.

Results identified 15 tensions at and between the individual, organizational and system level. Six tensions, rated as most relevant by CAs and for universities, were selected for more in-depth exploration of management strategies. Based on discursive reflections of their diverse experiences, the CAs identified several clusters of acceptance strategies (positive communication, process management, building on personal strengths and actively seeking support), separation strategies (collective action for sustainable development and establishing separate sustainability organizational entities) and synthesis strategies (changing the mission and changing business rules).

Because the study was based on the experiences of CAs from Austrian public universities, we do not claim to have identified a comprehensive list of tensions underlying challenges faced by SHEI CAs globally, nor of all potential management strategies. However, in light of the consistency between the barriers to SHEI reported in the literature and challenges reported by the study's Austrian SHEI CAs, we anticipate that the insights from this study will support SHEI CAs' efforts in other countries.

Note

1. Abbreviations: (S)HEI: (Sustainability in) Higher Education Institutions, CAs: change agents; SD: sustainability/sustainable development (used as synonyms); vs: versus; NGO: non-governmental organisations.

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5. Discussion

The work of this cumulative dissertation, published in three scientific publications, investigates the status and process of organizational and institutional change toward SHEI. In this chapter, the main points of discussion from the three publications are highlighted and extended in some parts. Moreover, contributions to the research gaps identified in Chapter 1.1 are emphasized. The section is structured according to the three research objectives, i.e., the first sub-chapters focus on the status of change (Chapter 5.1), driving factors and pathways (Chapter 5.1), and tensions and their management (Chapter 5.3). Each sub-chapter also discusses research limitations and further research. The chapter concludes with practical implications (Chapter 5.4).

5.1. Status (Type, Area, and Depth)

To address RO1 (see Figure 15), i.e., investigating the status of organizational and institutional change, the "SHEI Analytical Framework" has been developed and applied to 13 Austrian universities in Papers 1 and 2.

Figure 15: Research objective 1 and its research questions RQ1.1 and RQ1.2 (detail of Figure 1)

5.1.1. Operationalization of SHEI

The "SHEI Analytical Framework" integrates different aspects of change toward SHEI and their respective literature bases, i.e.,

- areas of HEIs according to a WIA (e.g., Holst, 2022; Kohl et al., 2021; Lozano, Ceulemans, Alonso-Almeida, et al., 2015; Rieckmann & Bormann, 2020; Rieg et al., 2021; Schopp et al., 2020),
- depths of change (Ferrer-Balas et al., 2008),
- types of change, i.e., organizational (Pflitsch & Radinger-Peer, 2018; Rieg et al., 2021; Verhulst & Lambrechts, 2015) and institutional change (Haunschild & Chandler, 2008; Pflitsch & Radinger-Peer, 2018; Rieg et al., 2021).

The "SHEI Analytical Framework" thus spells out the theoretical basis, offers a precise concept for operationalizing the status of organizational and institutional change toward SHEI (answer to RQ 1.1), and addresses the often-formulated critiques of a weak theoretical basis (Cebrián et al., 2013; Lozano, Ceulemans, Alonso-Almeida, et al., 2015; Rieg et al., 2021; Stephens & Graham, 2010) and rather vague concepts of SHEI (Bautista-Puig et al., 2022, UNESCO, 2021). In Paper 1, it was successfully applied to analyze 13 universities comparatively, thus going beyond descriptive single case studies. Paper 1 has meanwhile been referred to by two review papers (Holst, 2022; Rieg et al., 2021) due to its theoretical and empirical contributions.

5.1.2. SHEI Status in Austrian Universities

Papers 1 and 2 conclude that all 13 analyzed universities have put effort into integrating sustainability in most or even all areas of their organization (see Table 3 in Paper 1), i.e., campus operations, education, research, societal engagement, and organizational culture (answer to RQ 1.2). This indicates that they aim for an integrative approach and exceed compartmentalized approaches which are criticized, e.g., by Lozano, Ceulemans and Alonso-Almeida (2015). This might also result from the

Alliance's impact on the universities of the case study, as the Alliance's memorandum of understanding calls for a holistic approach.

The following discussion focuses on the depth of integration as this aspect was less treated in Papers 1 and 2. It is important to note that the relative scales of the "SHEI Analytical Framework" were adapted to the Austrian case studies, i.e., the scale represents the range between the lowest and highest levels of activities observed for the universities analyzed in Austria, but it is not an absolute scale of what might be observed in other spatial and temporal contexts.

Most universities have, e.g., sustainability-related courses or study programs. Thus, sustainability is an add-on to existing educational structures, i.e., a weak change according to Sterling (2004), and rather an optimization than a deeper level of change according to Ferrer-Balas et al.'s FLA framework (2008). Two universities also have obligatory classes for all or at least several study programs, which can be interpreted as a deeper change (i.e., improvement, mainstreaming, and diverse actors on Ferrer-Balas et al.'s (2008) FLA framework). Nevertheless, a fundamental, paradigmatic change would rather be a change in ethos and purpose of education (Sterling, 2004) or education as sustainable development (Mochizuki & Yarime, 2015) – such changes were neither observed nor are they part of the "SHEI Analytical Framework".

The same holds true for the other areas: Regarding research, most universities show single or various but isolated activities within the HEI – similar to what is mentioned in SHEI publications (Holst, 2022; Hugé et al., 2016; Omazic & Zunk, 2021; UNESCO, 2017; Whitmer et al., 2010). Changes that apply to the organizational field level (e.g., the foundation of new journals, modified review systems) (Yarime et al., 2012) were not identified – which might be because they have not taken place, but also due to the focus of the interviews on the organizational level. Yet again, the reported changes are rather add-ons or optimization activities. The deepest form of change was found in four universities that also have a strategic focus on such research activities, which might be interpreted as a deeper change (improvement on Ferrer-Balas et al.'s (2008) level-dimension, and also mainstreaming and more actors), but – as it does not affect the whole university – it cannot be classified as renewal of the system (Ferrer-Balas et al., 2008; Sterling, 2004).

Regarding operations, eight universities followed some kind of certification scheme, five of which even decided on an EMAS certification. This was the deepest kind of change observed – according to Ferrer-Balas et al.'s (2008) level-dimension, this is rather an optimization (lowest level). Still, on the other hand, it is a mainstreaming of activities and includes several actors (level 2-3). No conclusion can be drawn if this really led to a deeper reorganization of operation processes. Yet, as the greening of HEIs' operations is deemed necessary for consistency between universities' fields of action (Holst, 2022), this is an important step.

The area of societal engagement was only assessed with a narrow relative scale that reflects the limited changes observed for the 13 universities analyzed in Austria, which can be all classified as weak regarding Ferrer-Balas et al.'s (2008) FLA framework as changes hardly address structures and processes and only optimize the system. Even on this narrow relative scale, only four universities display the highest level (e.g., sustainability days, reports, event series), which at least increases the number of actors. In contrast, many universities only have single projects (4 universities) or even no changes (5 universities). Thus, this area is either the one with the least changes, or this area – due to limited information from the interviews and difficulties in complementing by document and website research – could not be assessed well with the methods chosen.

The organizational culture of HEIs was operationalized as changes in the institutional frame that are considered essential in SHEI literature (Blanco-Portela et al., 2017; Lozano, Ceulemans, Alonso-Almeida, et al., 2015; Omazic & Zunk, 2021; Radinger-Peer & Pflitsch, 2017), i.e., strategic papers, the implementation of sustainability-centers and/or -boards, the integration in the scope of functions of rectorates, or the implementation of a broad, participatory SHEI process. As the institutional framework influences (de)legitimizes social practices (Greenwood et al., 2015; Haunschild & Chandler,

2008), such institutional changes can enable or hinder SHEI. In our analysis, we took the number of institutional changes as a proxy for enabling deep integration, assuming that more supportive framework conditions support a deeper change and affect more actors and more areas in a university. The results are promising as most universities adapted their institutional framework in multiple ways.

The type of organizational and institutional changes can also be seen as a proxy for the depth of change, as the two types differ regarding their financial resources, representation in strategic papers, and timely boundaries. Thus, new organizational entities that could be shown in most universities rather resemble a deeper change. Working groups, although they are no actual structural integration, play an important role in integrating various internal actors and often lead to long-term integration.

Although the main focus of case studies is to get in-depth knowledge instead of generalizing (Kyburz-Graber, 2015) and the Austrian context of the study limits some findings to this region, general insights are drawn for SHEI processes in countries with similar university governance structures and institutional framework conditions. Papers 1 and 2 present results that are more specific for the Austrian university system against the background of the Alliance. Nevertheless, it can be argued that the "SHEI Analytical Framework" can also be applied to other universities and HEIs. The areas of change referred to are prominent in the international SHEI body of literature; the FLA framework to analyze depth has been initially applied in an international comparative study (Ferrer-Balas et al., 2008), and driving factors and changes derive from international organizational and institutional change scholarship. Moreover, Austria has built broad experiences on SHEI in the last decade, and the Alliance, meanwhile, covers 19 of 22 public universities. Thus, it seems worth making these experiences accessible to the larger scientific community.

5.1.3. Limitations and Further Research

Although findings show that all analyzed universities have made significant steps toward SHEI, the focus of the research on organizational and institutional changes as recorded by interviewees or documented in reports limits the analysis to findings that can be assessed straightforwardly, i.e., change that can be observed and reported on easily. This pragmatic approach is in line with many SHEI studies that analyze SHEI processes in a similar way (Omazic & Zunk, 2021; Rieg et al., 2021), but the assessment of the depth of change as done before only works to a limited extent, as will be shown in the following.

Education for sustainability, e.g., also refers to pedagogy and didactics that support a critical reflection of current and/or transformative learning (Mochizuki & Yarime, 2015); research for sustainability employs methods that allow for addressing complexity, uncertainty, and values (Loorbach & Wittmayer, 2023) – such characteristics of SHEI are challenging to assess as didactics of individual lecturers are hardly reported or evaluated, nor are research methods reported in accessible databases – and even if they are, the information hardly says anything about transformative or value-based efforts made by researchers. What is also missed out are changes in the cognitive frame, informal rules, and (individual) values: an EMAS certification, e.g., tells little about how deeply individual employees have adopted new routines. "Taken-for-granted routines" are essential in establishing and maintaining (a new) social order (Haunschild & Chandler, 2008). Moreover, Paper 1 e.g., mentions the foundation of internal networks and inter- and transdisciplinary organizational entities as a sign of relatively deep changes toward SHEI.

Yet, such changes do not say anything about fundamental, long-lasting organizational and institutional changes, i.e., a system renewal (Ferrer-Balas et al., 2008; Sterling, 2004). Therefore, it would be valuable to (a) further develop the relative scales of the "SHEI analytical framework" to absolute scales that include system renewal and (b) elaborate on ways to research and support such fundamental changes. Studies that define different depths of change were described in section 2.3. (Giesenbauer & Müller-Christ, 2020; Mochizuki & Yarime, 2015; Ruiz-Mallén & Heras, 2020a; Sterling, 2004) and could build an interesting starting point, but would need further operationalization. Addressing SHEI

in this paradigmatic sense was thus outside the scope of this dissertation and requires further research.

The study builds on the knowledge and perceptions of members of the expert group of the Alliance, i.e., people who are leading change agents with in-depth knowledge and high personal motivation. But they also have a particular approach toward the topic, as they know each other, regularly exchange and learn from each other, and refer to Alliance's guidelines like the "Handbook for Sustainability Strategies" (Bohunovsky, Weiger, et al., 2020). Therefore, a certain bias and contraction cannot be ruled out. Broadening the empirical basis would increase the reliability and validity of the results. Besides investigating perspectives from actors who are no change agents for SHEI or even oppose the idea of a transformative university (Loorbach & Wittmayer, 2023), especially the role of students would be worth investigating. They are known from other countries to be relevant change agents for SHEI (Barth, 2013; Nejati & Nejati, 2013; Vandaele & Stålhammar, 2022) and also were shown as active in Austria (Paper 1), but the focus on Alliance's experts might have led to the underrepresentation of their importance. Moreover, including Austrian HEIs that are not members of the Alliance and HEIs from other countries, i.e., international comparative analyses, would allow specifying the influence of the network and divergent governance structures.

5.2. Driving Factors and Pathways

RO 2 (see Figure 16) aims to understand how and why change processes toward SHEI occur. These objectives have been addressed by scrutinizing external and internal drivers of change (RQ2.1) and differentiating different types of change by analyzing their pathways (RQ2.2).

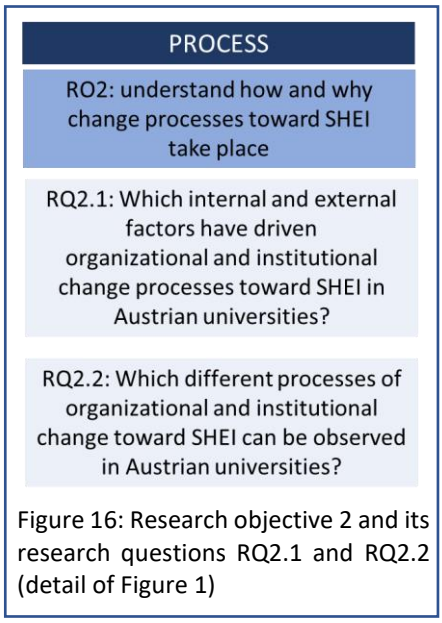

Figure 16: Research objective 2 and its research questions RQ2.1 and RQ2.2 (detail of Figure 1)

5.2.1. External Driving Factors of Change

The analysis identified policies from the Austrian Federal Ministry of Science and Research and academic networks as the main external driving factors, which can be argued by their driving force via funding, incentives, relations, and knowledge exchange (Aleixo et al., 2018; Verhulst & Lambrechts, 2015). Their influence on SHEI processes in Austrian universities has been discussed in Papers 1 and 2, thus contributing to answering RQ2.1.

More specifically, the foundation of the Climate Change Center Austria and the Alliance network and the start of the UniNEtZ project drove institutional learning in Austrian universities. As shown elsewhere, networks contribute to disseminating ideas and institutional change (Greenwood et al., 2015). Such networks change assumptions and values on the organizational field level, thus urging universities to strive for legitimacy within these networks. The same holds true for international developments like the publication of the UN Agenda 2030 and its sustainable development goals. Haunschild and Chandler (2008) name various examples where networks on the organizational field level brought about institutional change. They also refer to this as institutional learning due to field-level change (ibid.). As Austrian universities were shown to strive for broad integration of SHEI in all areas as recommended by the Alliance's Handbook (Bohunovsky, Weiger, et al., 2020), this could also be seen as a form of mimetic isomorphism, i.e., the tendency to follow homogeneous developments (DiMaggio & Powell, 1983; Haunschild & Chandler, 2008).

Moreover, changes to the template for the performance negotiations with the ministry were shown to drive change. This event resembles shocks or jolts, as Greenwood et al. (2015) call events that "*disturb preconceived and taken-for-granted ideas and prompt reflection about possible alternative ways of doing things*" (ibid., page 238). They name dramatic events like World War II as shock, but also the entry of new players. If one understands shocks as unforeseeable events that change rules on the field level within a short time frame, a coercive measure like the changes to the template for the performance negotiations with the ministry – which form the basis for governmental funding of Austrian public universities – resembles such events.

The influence of these external driving forces could be illustrated in Paper 1 by plotting the number of changes on a timeline, showing that the three peaks happened in the years of a) the foundation of the Alliance & the Climate Change Center Austria ("network"); b) the ministries intervention ("shock") in the form of changes to the template for the performance negotiations; and c) the start of UniNEtZ ("network").

5.2.2. Change Agents

Internal factors have been mainly addressed as change agents, which closely relates to the assumption of organizational change theory that emphasizes the role of people (Greenwood et al., 2015). Papers 1 and 2 discussed who within Austrian universities drove organizational and institutional change toward sustainability, thus contributing to answering RQ2.1. As discussed before (Chapter 2.5), change agents have agency, i.e., they can initiate organizational and institutional change toward sustainability. In this dissertation, only individuals who intentionally initiate and drive change toward SHEI from within the organization are called change agents.

This dissertation identified faculty members as a major driver of change in Austrian universities, but – especially in art universities – also staff members. This is especially interesting, as faculty and staff members differ strongly regarding their status and power, two factors shown as strongly influential for agency (Battilana, 2016). As has been discussed by Kezar (2011), universities are characterized by multiple power and authority structures. Faculty members can build on their academic power, i.e., expert power (ibid.). Staff members might build on their hierarchical power if they are in a higher position (ibid.). Nevertheless, it has been shown that also low-status staff members have initiated change in Austrian universities (Papers 1 & 2). Kezar (2011) mentions charisma as "*the willingness of a group to follow a person because of her or his unusual personal characteristics*" (ibid., page 69). This probably holds true for staff members and members of faculty. In about 50 % of the universities, students also started sustainability-related initiatives, which relates to Barth's student-driven pathway (Barth, 2013). Furthermore, support from the top-management has been shown as an important player – either by supporting bottom-up initiatives and/or by taking up sustainability in their strategic documents. This is also in line with findings from SHEI scholarship, which name leadership a "conditio sine qua non" (Barth, 2013) and where the lack of leadership is often identified as slowing down change processes (i.e., as a barrier of change) (Ávila et al., 2019; Lozano, 2006; Omazic & Zunk, 2021; Rieg et al., 2021).

To sum up answers for RQ2.1, it has been shown in Papers 1 and 2 that organizational and institutional change in Austrian universities has been driven by an interplay of individual change agents (driven by personal motivation), top-management (supporting bottom-up processes and initiated top-down changes), and external driving factors (especially networks and the Austrian Federal Ministry of Science and Research, via mimetic, normative, and coercive power). Austrian universities can thus be an example for Lozano's (2006) early claim that it needs leadership and (all) individuals to make change happen.

5.2.3. Pathways

RQ 2.2 "Which different processes of organizational and institutional change toward SHEI can be observed in Austrian universities?" was mainly addressed in Paper 2, where pathways were depicted graphically and analyzed along the timeline. By taking a dynamic perspective, it addresses the criticism that SHEI studies focus too much on descriptive case studies and lack overviews of change processes.

Four different types of pathways were differentiated (see Chapter 4.2). They differ regarding (a) the number of changes (decreasing), (b) areas involved (from all areas to a focus on operations and organizational culture), (c) main actors (from many diverse to focus on top-management), and (d) start time (from early 2000 to late 2010s). Two Austrian universities were identified as frontrunner universities (type A) that show broad, deep institutional and organizational change toward sustainability, where several activities influence and strengthen each other. Five further research universities show similar developments but started later (type B). For these universities, networks play a decisive role as initiators for change (see above, external drivers). Type C consists of three art universities, characterized by a focus on operations and partnerships in the UniNEtZ project. The three universities of Type D started their SHEI processes only shortly before the research phase; thus, their further development could not be evaluated. At that time, their processes were mainly driven by strategic decisions from the top-management.

We could identify different types that, despite the different pace, different starting situations, and different pathways, follow the idea of a WIA and, at the time of the research, showed institutional and organizational change toward sustainability in at least three of the five areas. This is in line with results from Germany (Barth, 2013; Singer-Brodowski et al., 2019) that also showed a diversity of pathways. To the best of my knowledge, there are no further publications on SHEI pathways.

5.2.4. Limitations and Further Research

Although the chosen approach revealed some interesting details about the change processes in Austrian universities, insights into change processes were limited by information documented and remembered by interviewees from one national context. This study was rather exploratory and built on the heterogeneous and, in this regard, relatively thin SHEI literature and 13 Austrian cases. Although this study presents a "SHEI Analytical Framework", it would need further – as already mentioned in Chapter 5.1. – international comparative studies to build robust theories about SHEI change processes across geographical and temporal scales.

Further in-depth analyses could help reveal how legitimization and institutionalization processes occur, i.e., enhance our understanding of reflexivity and theorization (Greenwood et al., 2015). Questions like "*why people act as the do*" or "*what conditions influence their acting*" (Kyburz-Graber, 2015) could gain more attention. Nevertheless, such approaches need interdisciplinary, long-term research that would have exceeded the possibilities of this dissertation.

Our focus on change agents as internal factors of change excludes other mechanisms that can also lead to institutional or organizational change. As mentioned in Chapter 2.4., institutional theory describes further factors as starting points for institutional learning (Haunschild & Chandler, 2008), like unintended consequences of decisions, forgetting, imperfect copying in mimetic processes, and selective and inferential learning. It would be interesting to analyze if such factors also play a role in SHEI change processes. Especially the role of incomplete institutionalization, i.e., the presence of "*competing, complementary, and conflicting logics that create a second condition*" (Haunschild & Chandler, 2008, page 632), seems worth further analyses in the light of the divergent logics within HEIs (see Chapter 2.7 and the following discussion of tensions).

5.3. Tensions and their Management

RO3 deals with the change process but focuses on factors that hinder or slow down these processes (see Figure 17). All three research questions were addressed in Paper 3. This part of the research strongly builds on paradox theory and answers the research questions following a change agents' perspective.

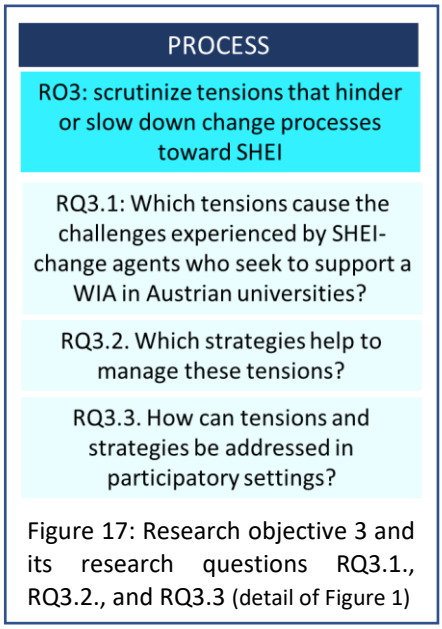

Figure 17: Research objective 3 and its research questions RQ3.1., RQ3.2., and RQ3.3 (detail of Figure 1)

Although it is not the first paper in the SHEI body of literature that builds on paradox theory (Hoover & Harder, 2015; Kemp & Scoffham, 2022; Lattu & Cai, 2020), the focus on change agents' perspective adds a novel approach to SHEI scholarship. Therefore, also a methodological research question was addressed in Paper 3 (RQ3.3).

5.3.1. Tensions

Starting from challenges that change agents reported in the interviews of the first research phase, 15 tensions were inductively identified and validated by Austrian change agents. This process shows that challenges – or barriers as they are even named frequently – are no one-sided "lack-offs" but can be seen with advantages and disadvantages. In accordance with paradox theory, this offers a new perspective and a deeper understanding of the challenges to SHEI (Gibson & Birkinshaw, 2004; Hahn et al., 2015a).

As shown, the 15 tensions cover various areas of change and address different levels, i.e., the individual, organizational, and systemic (Hahn et al., 2015b). Most tensions address the organizational level (6) or occur between the organizational and systemic level (4). An in-depth discussion of all 15 tensions would exceed the scope of this work – the following selection of tensions identified (in bold letters) show how the findings relate to SHEI- and paradox literature:

On the individual level, tensions between divergent **individual roles** were identified as crucial, i.e., change agents must deal with different expectations or values. This aligns with the findings of Smith and Lewis (2011), who describe a tension for priests between belonging and performing. Moreover, it relates to tensions described by Deleye et al. (2019) or Hoover and Harder (2015, page 184), who describe tensions between "*rigid or (institutionally) defined roles vs. dynamic or self-assigned roles*". It also links to the discussion about the "paradox of embedded agency" described in institutional theory (Battilana, 2016; Haunschild & Chandler, 2008), which refers to the tension of change agents between belonging to a particular organization and complying with its institutions while at the same time striving to change its rules and norms.

On the organizational level, a procedural tension was identified between **commitment and mandate**: The question of promoting the voluntary commitment of persons or building on a clear mandate from top-management to take over sustainability agendas. These tensions are similar to Hoover and Harders' (2015, page 184) findings, e.g., "reward and support for individuals vs. institution-wide effort needs collective action" or "identify leaders and experts vs. support for grassroot involvement and knowledge".

Another example of an identified tension arises between the organizational and systemic level that matches earlier studies: enhancing **competition versus collaborative work**. While cooperation, e.g., between disciplines in interdisciplinary sustainability research or as a general cooperative mindset (Wittmayer et al., 2021) is deemed necessary, current governance and steering paradigms in universities rather foster competition (European Commission & Directorate-General for Research and Innovation, 2021; Urai & Kelly, 2023; Wetzel et al., 2020).

The influence of networks (Alliance, CCCA, UniNEtZ) – discussed above as an important external factor and also relating the organizational to the systemic level – was also seen as a tension between **control and autonomy**, as the normative and mimetic power of these networks restricts the autonomy of universities to a certain degree. On the other hand, their input can support SHEI processes.

A similar restriction might come from participation in external certification schemes, like EMAS or ISO 14001, which builds a tension between **internal and external goals**. Last but not least, the identified coercive power of the Austrian Federal Ministry of Science and Research – an essential driving factor in the process – also comes with tension as it limits the university's autonomy. These latter findings are in line with Bien and Klußmann (Bien & Klußmann, 2021), who mention the controversy between HEIs' autonomy or stakeholder orientation in governance when it comes to the pure paradigm of traditional science and the instrumental paradigm of sustainability-related science. Also, Lattu and Cai (2020) mention the political power of the university system as a relevant tension in Finish universities.

To mention an example of an overarching tension: the tension between different interpretations of **scientific performances** strongly relates to modes of research (cf. Chapter 2.2), e.g., in transdisciplinary research. As Krainer and Winiwarter (Krainer & Winiwarter, 2016) point out, transdisciplinary research is often regarded as career-obstructive because it is not well represented in current evaluation schemes. This tension addresses the individual (e.g., decide for/against transdisciplinary approaches), organization (e.g., support transdisciplinary approaches or stick to traditional criteria), and the systemic level (e.g., re-design criteria for funding programs).

5.3.2. Management Strategies

Especially regarding practical implications (see Chapter 5.4), the question seems interesting, how change agents can deal with these tensions besides acknowledging them. The results revealed a total of 20 different strategies, which were clustered in eight groups and related to the three types of strategies: 11 strategies fall within the four acceptance clusters, 3 strategies within the two separation clusters, 6 strategies within the two synthesis clusters (see Table 5 in Paper 3). Our study could thus show that Austrian change agents apply or recognize various management strategies.

To the best of my knowledge, our study is the first to identify management strategies in a participatory setting, building on the experiences and perspectives of SHEI change agents. Lüscher and Lewis (2008) did similar work in a corporative context, whose approach inspired our work. Paper 3 thus provides an empirical and methodological basis for change agents' work.

5.3.3. Methodological Contributions to Address Tensions

Two approaches were combined in the "Tension Reflection Path", a participatory approach to address paradoxical tensions: One approach from paradox research that built on family therapy (Lüscher & Lewis, 2008) and one approach from systemic coaching that also has its foundations in paradox theory, the tetralemma (Sparrer & Varga von Kibéd, 2000). The anonymous feedback from participants is promising regarding the "Tension Reflection Path's" helpfulness in broadening one's own and exploring new perspectives, defusing tensions, and developing new ideas. The individual questions were perceived as stimulating, as most respondents answered with 4 or 5 (i.e., stimulating or very stimulating – see Figure 14 above and Figure 2 in Paper 3).

This feedback is in line with findings from paradox theory that acknowledging tensions, broadening and exploring other perspectives helps people to accept and even feel comfortable and embrace tensions (Miron-Spektor et al., 2018; Van der Byl & Slawinski, 2015) and to make sense of what they experience (Lüscher & Lewis, 2008). The "Tension Reflection Path" thus helps to overcome narrow thinking and pre-defined answers, strengthening a paradox mindset. Especially in the context of sustainability, which is rife with tensions and contradictions, a paradox mindset can help sustainability strategies gain legitimacy and success (Hengst et al., 2020).

5.3.4. Limitations and Further Research

Identifying and addressing tensions in an exploratory and participatory approach revealed intriguing insights into what makes SHEI change processes difficult and how these obstacles could be approached. Nevertheless, it also opens a myriad of follow-up questions that would be worth dealing with. Schad et al. (2016) summarized different building blocks of paradox research, like addressing the nature (types, relationships), approaches (collective, individual), and impacts (outcomes, dynamics) of paradoxical tensions. This dissertation could only touch upon these topics.

As mentioned in Paper 3, the list of tensions is not comprehensive and probably biased by the selection of change agents and the original interviews' focus. One of the main feedbacks in the online survey on the original list of tension was that tensions that arise in the area of education are hardly mentioned. Thus, a more systematic approach to identifying tensions would be valuable.

Concerning management strategies, those revealed through our approach can give first ideas of how to address these tensions. Further scrutinizing collective and individual approaches toward these tensions, as proposed by Schad et al. (2016), could provide further valuable insights into how to overcome these tensions. Moreover, looking at the organizational field level seems promising due to HEIs' high interdependency (Kezar, 2011). As discussed in Paper 3, the issue of power and social status that highly influences the ability of change agents to drive changes (Battilana, 2016) cannot be answered in our approach but would advance understanding of change processes significantly. Moreover, in-depth analyses of strategies applied in real life would increase knowledge of their effectiveness.

The ability of change agents to deal with paradoxical tensions depends on individual and organizational factors (Smith & Lewis, 2011) – and factors from the field level. Yet, these levels reveal different questions and demand different approaches – and are thus proto-typical arenas for further inter- and transdisciplinary approaches.

In Paper 3, we argue that the results are likely to be applicable to SHEI change agents in countries with similar university governance structures and institutional framework conditions. We argue that the barriers and challenges Austrian change agents reported are consistent with those in existing SHEI literature. Thus, it can be expected that the tensions and strategies are also applicable to other countries. Nevertheless, the focus on similar governance structures is essential, as universities – although sharing some key features (Kezar, 2011) – still differ concerning their internal governance as, e.g., has been shown between individual European universities (Gornitzka et al., 2017) and between countries (Middlehurst & Teixeira, 2012). The level of internal democracy, participation, centralization, and a focus on individual or collective governance authority (Gornitzka et al., 2017), as well as the framework given by the superordinate policy structure (i.e., in Austria, the Federal Ministry of Science and Research), will influence the strategies identified. However, the fact that Austrian change agents named barriers and challenges consistent with those in the existing SHEI literature showed that change agents from other countries face similar problems.

5.4. Practical Implications

Building on my personal background as a change agent within BOKU and coordinator of the Alliance, my research interest derives from practical considerations. Also, with this thesis, I want to contribute to the day-to-day practice of me and my colleagues.

Especially the approach of Paper 3 is driven by the wish to support change agents in overcoming daily challenges. As highlighted in the discussion of Paper 3, the novel perspective on challenges and their reframing as paradox tensions can support change agents to get a new view on barriers. As laid out in paradox theory, this process of acknowledging and accepting tensions is already the first – and very

important – step in dealing with them constructively (Hahn et al., 2018; Smith & Lewis, 2011). As a next step, the "Tension Reflection Path" (Table 3) can be used for individual reflection or guided group processes and to develop strategies. Moreover, the management strategies elaborated in the research process offer a set of possible – yet not comprehensive – points of departure.

Papers 1 and 2, in contrast, contribute to change agents' work by providing them with a point of reference when planning, starting, and implementing change. The "SHEI Analytical Framework" and the analysis of Austrian universities can support change agents and top-management to benchmark their university. Although this comes with the restriction that further changes took place since the publication of Papers 1 and 2, it can build a frame for such benchmarking.

5.4.1. Limitations of Inside Transformative Research

As an inside transformative researcher, I had to deal with various roles (Chapter 3.2). Being the coordinator of the Alliance requires my roles as a change agent, knowledge broker, and process facilitator. Working on the PhD thesis expanded these roles with being a reflective scientist and made self-reflectivity essential.

The danger that an inside researcher might assume too much and question too little was undoubtedly challenging for my research (Brannick & Coghlan, 2007). Therefore, the validation parts of the methodology were essential, i.e., written feedback on results of the qualitative content analysis I (changes), the online survey that allowed for feedback on the tensions identified, and the discussion of the six selected tensions in the focus groups.

One tension that I had to deal with arose between the critical approach of a researcher and the supporting attitude of a change agent and coordinator. In this case, it was essential to collaborate with the two supervisors who have no relation to the Alliance and could thus provide an essential corrective to guarantee accountability of my scientific work (Felt et al., 2013).

In line with Brannick and Coghlan (2007) and Fazey et al.(2018), I argue that combining action-oriented and scientific roles bears great opportunities – provided the research process is reflected critically. On the one side, it allows for deeper insights due to a broader knowledge-basis and an inside perspective of change processes. On the other side, it supports transformative actions with a scientific foundation and reflection.

6. Summary and Conclusions

In the face of humanity's severe social and environmental crises, higher education institutions (HEIs) bear a special responsibility to contribute to a sustainable future with their research, education, innovation, and critical reflection. However, this responsibility is not straightforward, as HEIs are currently stuck in unsustainable structures and practices. Despite long-lasting calls that HEIs have to transform themselves to be transformative, such fundamental changes have not materialized yet. There remains no final answer regarding what makes HEIs sustainable and how HEIs can become sustainable.

The overarching research objective of this dissertation is to contribute to the scientific debate on Sustainability in Higher Education Institutions (SHEI) by investigating the status and process of organizational and institutional change toward SHEI, i.e., changes of organizational practices as well as of norms, values, formal and informal regulations. It follows the idea of a whole-institution approach that reflects a holistic integration of sustainability in all parts of HEIs.

The dissertation follows three research objectives (RO). RO1 focuses on what changes and how deep change is to investigate the status of organizational and institutional change toward SHEI. RO2 takes a dynamic perspective to understand how and why change processes toward SHEI occur. RO3 focuses on challenges and hindering factors of change processes and scrutinizes tensions that hinder or slow down change processes toward SHEI.

The empirical part of this dissertation builds on a multiple-case study that covered – at the end of the research process – 17 of 22 public Austrian universities. All of them are members of the Austrian Alliance of Sustainable Universities. A mixed-method approach was taken with multiple steps (interviews, document and website analysis, focus groups, qualitative content analyses, and an online survey). The results were published in three publications.

As the author of the dissertation plays a professional role in the transformation processes of Austrian universities toward sustainability, this dissertation follows the idea of transformative research, i.e., normativity and interventional characteristics are accepted and reflected. Besides the academic intention of contributing to a better understanding of organizational and institutional change, this work aims to inform practitioners and contribute to overcoming practical day-to-day challenges and, thus, to support a sustainability transformation of the case universities.

Results regarding RO1 (status of change) show that the Austrian universities analyzed with the "SHEI Analytical Framework" strive for broad integration of sustainability, yet they go to different depths of change. Universities integrated sustainability in at least three of five change areas (campus operations, education, research, societal engagement, and organizational culture). In this framework paper, the depth of integration has been discussed in more detail, showing that despite some universities demonstrate a broad and relatively deep integration, a fundamental, paradigmatic change toward sustainability cannot be observed.

Concerning RO2 (how and why change takes place), results show that change processes in the Austrian universities analyzed are primarily driven by faculty members, who often initiated SHEI processes out of their conviction and without a formal mandate. Moreover, the interplay between different players (i.e., faculty, to- management, students, and administrative staff) is perceived as crucial. The influence of external driving forces could be illustrated by showing that the three peaks of changes took place in a temporal connection with the foundation of sustainability networks (Alliance, Climate Change Center Austria, UniNEtZ) and an intervention of the Austrian Federal Ministry of Science and Research. Moreover, four different paths could be differentiated, i.e., frontrunners (pioneers that broadly integrated sustainability), followers (also showing broad integration but with a later start, driven by scientists), art universities (focus on operations and driven by highly motivated university staff

members) and universities that only recently initiated sustainability processes (driven mainly by strategic decisions from top-management).

Investigations regarding RO3 (scrutinize tensions that hinder or slow down change processes toward SHEI) started from 15 tensions at and between the individual, organizational, and system levels that were inductively identified from challenges reported by change agents. Building on an in-depth analysis of 6 selected tensions, strategies to manage them were elaborated in focus groups. In line with paradox theory, we could show that the participatory discussion and acknowledgment of tensions resulted in new perspectives and diverse strategies to manage them. Examples of acceptance, separation, and synthesis strategies could be identified in line with paradox theory. A participatory approach to address tensions, the "Tension Reflection Path", was developed and proved helpful and stimulating for change agents.

The SHEI body of literature is often criticized for presenting siloed case studies that are rather descriptive, hardly give an overview of change processes, lack explicitness of theoretical frameworks, and build on vague concepts of SHEI. This dissertation contributes to this body of literature by developing and testing the "SHEI Analytical Framework" to investigate the organizational and institutional change toward SHEI and respective internal and external drivers, thus contributing to sharpening the concept of SHEI. It describes the status of integration of sustainability in a majority of Austrian universities, and it takes a dynamic perspective and investigates the process of how universities change. Moreover, it adds insights into organizational institutional and paradox theory to scrutinize challenges and tensions in the SHEI literature.

Although some findings remain of specific interest to the national context of the universities analyzed, the "SHEI Analytical Framework" (building on international literature) and the participatory tension management approach can inform SHEI in countries with similar university governance and be a foundation for international comparative research.

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List of Abbreviations

Abbreviation	Meaning
Alliance	Alliance of Sustainable Universities in Austria, see page 24
BOKU	BOKU University of Natural Resources and Life Sciences Vienna
CA(s)	Change Agent(s)
CCCA	Climate Change Center Austria (a research network that promotes climate research and climate impact research, fosters collaboration in and among these fields and provides society and policymakers with scientifically sound information and advice on climate-relevant topics)
CSR	Corporate Social Responsibility (often used as a term for denominating sustainability efforts in corporations)
EMAS	Eco-Management and Audit Scheme (EU Management tool for companies and organizations)
ESD	Education for Sustainable Development
HEI/HEIs	Higher Education Institution / Higher Education Institutions
RO	Research Objective
RQ	Research Question
SD	Sustainable Development (used synonymously with sustainability in this dissertation)
SDGs	Sustainable Development Goals
SHEI	Sustainability in Higher Education Institutions
UniNEtZ	„Universitäten und Nachhaltige Entwicklungsziele“. (A project initiated by the Alliance. The partner institutions take on (co-)sponsorships for one or more SDGs and compile knowledge and activities throughout Austria on the respective SDGs to support the Austrian government in implementing the Sustainable Development Goals. It forms a network of universities and researchers working on SDGs. Further information: https://www.uninetz.at/en)
WIA(s)	Whole-Institution Approach(es), see Chapter 2.2

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Appendix A: Online Survey

1. Please enter your first and last name:
2. What position(s) do you fill at your university? (multiple selection allowed)
    a) Researcher
    b) (Senior) Lecturer
    c) Staff member of the administration
    d) Employee in university management
    e) Student
    f) Professor
    g) Employee at a cross-linked organizational unit of the university
    h) other
3. Please rate the relevance of the presented tension* for your work. (0=no relevance; 5 = high relevance)
    a) Personal relevance: To what extent does the tension play a role for you personally? Do you sometimes reflect on issues related to this tension? Do you sometimes face decisions related to this tension? Do you sometimes ask yourself the question mentioned in the presentation or a similar question?
    b) Relevance to the University: To what extent does this tension play a role at your university? Are issues related to the tension discussed at the university, or are they implicitly in the room?
4. Field for comments on the tensions (please give the number or name of the respective tension):
5. Do you experience or observe any other tension or challenge in your role as a change agent not covered by the previous questions?
6. Do you have any general feedback on the tensions?
7. Do you have any other feedback, questions, or comments for the survey author?

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* Tensions (for a further description see page 84):

1. Academic freedom
2. Breadth vs focus in participation
3. Commitment vs mandate
4. Control vs autonomy
5. Cooperation vs competition
6. (De)central SD structures
7. Depth of change
8. Diversity of actor(groups) within university
9. Individual roles
10. Internal vs external goals
11. OE's autonomy
12. Degree of autonomy
13. Resource allocation
14. Scientific performance(s)
15. Societal responsibility

Appendix B: German Report on Focus Group Discussion for Participating Experts

This report was sent to change agents who had participated in the focus groups and further experts from the Alliance of Sustainable Universities in Austria. It contains

- a short introduction presenting the research process, participants and a summary of the focus groups;
- description of the six selected tensions in a matrix and written text;
- summary of results from the discussion;
- results from feedback questionnaire.

Spannungsfelder in universitären Nachhaltigkeitsprozessen

Ergebnisbericht zu Gruppendiskussionen mit Expert*innen der Allianz Nachhaltige Universitäten in Österreich

Bericht: Lisa Bohunovsky

Einleitung

Dieser Bericht fasst die Ergebnisse aus zwei Gruppendiskussionen zusammen, die am 16. und 23. März 2021 über Zoom stattgefunden haben. Dabei wurden jeweils drei Spannungsfelder diskutiert, die Change Agents (CA) bei der Institutionalisierung von Nachhaltigkeit (NH) an Universitäten erfahren. Unter Change Agents werden hier Akteur*innen verstanden, die Nachhaltigkeitsprozesse an Universitäten vorantreiben – basierend auf einem formalen Mandat der Universitätsleitung und/oder persönlichem Engagements. Für diese Arbeit wurde vor allem mit den Expert*innen der Allianz Nachhaltige Universitäten in Österreich gearbeitet.

Die Spannungsfelder wurden in einem längeren Prozess, der in Tabelle 1 zusammengefasst ist, ausgewählt und ausgearbeitet. Der vorliegende Bericht fasst für die sechs ausgewählten Spannungsfelder (a) den Ausgangspunkt für die Diskussion (Matrix und Beschreibung) und (b) erste Ergebnisse aus der Diskussion zusammen. Der Fokus dieses Berichts liegt auf der Dokumentation der Diskussion, nicht auf der wissenschaftlichen Auswertung. Eine wissenschaftliche Publikation ist für 2022 geplant. Erste Ergebnisse aus den ursprünglichen Leitfadeninterviews mit Fokus auf Institutionalisierungs-prozesse sind in zwei Artikeln publiziert[1].

Tabelle 1: Zusammenfassung des Forschungsprozesses

Schritt	Datum	Methode	Ziele	Basis/Stichprobe
1	03-09/18	Leitfadeninterviews	Institutioneller Wandel und Integration von NH, Erfolgsfaktoren und Herausforderungen	15 Change Agents (CA) von 13 Allianz-Universitäten
2	12/20-01/21	Qualitative Inhaltsanalyse & Interpretation	Clusterung von Herausforderungen und Identifikation potenzieller Spannungsfelder	Nicht zutreffend
3	02/21	Online Umfrage	Validierung und Bewertung der Relevanz von Spannungsfeldern für CA und Universitäten	36 Change Agents (CA) von 17 Allianz-Universitäten
4	02/21	Ausarbeitung von “polarity matrices” für 6 ausgewählte Spannungsfelder	Vertiefung des Verständnisses ausgewählter Spannungen	Nicht zutreffend
5	03/21	2 Gruppendiskussionen zu je 3 Spannungs-feldern	Diskussion der Spannungsfelder	29 Change Agents (CA) von 17 Allianz-Universitäten
6	05-08/21	Qualitative Inhaltsanalyse & Interpretation	Ausarbeitung von Strategien zum Umgang mit Spannungen	Nicht zutreffend

[1] Bohunovsky, L., V. Radinger-Peer, and M. Penker, Alliances of Change Pushing Organizational Transformation Towards Sustainability across 13 Universities. Sustainability, 2020. 12(2853).
Radinger-Peer, V. and L. Bohunovsky, Strukturelle Einbettung von Nachhaltigkeit an Österreichischen Universitäten, in Rigour and Relevance: Hochschulforschung im Spannungsfeld zwischen Methodenstrenge und Praxisrelevanz, A. Pausits, R. Aichinger, and M. Unger, Editors. forthcoming, Waxmann Verlag: Münster, New York.

An den Gruppendiskussionen und an der vorhergehenden online Umfrage nahmen Expert*innen aus Universitäten der Allianz Nachhaltige Universitäten teil (Change Agents). Die Anzahl und den Hintergrund der Teilnehmer*innen finden Sie in Tabelle 2. Die Gruppendiskussionen wurden von Marianne Penker, Verena Radinger-Peer und Lisa Bohunovsky (alle: BOKU) vorbereitet und durchgeführt.

*Tabelle 2: Anzahl und Hintergrund der Teilnehmer*innen*

Hintergrund	Gruppendiskussion 1	Gruppendiskussion 2	Gesamt
Wissenschaft	7	3	10
Management	4	1	5
Verwaltung	3	4	7
Anderes	1	6	7
Teilnehmer*innen gesamt	**15**	**14**	**29**

Ablauf der Gruppendiskussionen (Dauer 2,5 Stunden):

1. Ankommen, Begrüßung & Vorstellungsrunde
2. Vorstellung des Forschungsvorhabens inkl. Rückfragen & Diskussion
3. Wechsel in die Gruppen & Diskussion von je einem Spannungsfeld
    - Vorstellung des zu diskutierenden Spannungsfelds (Matrix)
    - Leitfrage 1: Möchten Sie an dieser Darstellung [Matrix] gleich vorab etwas korrigieren oder ergänzen, um in die Diskussion starten zu können? Gibt es Verständnisfragen in Bezug auf dieses Spannungsfeld?
    - Leitfrage 2: Könnte jemand anderer dieses Spannungsfeld mit den jeweiligen positiven und negativen Aspekten ganz anders sehen?
    - Leitfrage 3: Wenn Sie möchten, dass sich dieses Spannungsfeld an Ihrer Universität verschärft und die negativen Aspekte beider Pole zutage treten sollen, was könnten Sie als Change Agent dafür tun?
    - Leitfrage 4: Wenn Sie umgekehrt die positiven Aspekte BEIDER Seiten stärken möchten, was könnten Sie als Change Agent dafür tun?
    - Leitfrage 5: Variante (a) Angenommen, Sie könnten dieses Spannungsfeld einfach ignorieren – also so tun als ob es dieses Spannungsfeld nicht gäbe, was würde das für Ihre Arbeit als Change Agent bedeuten? Variante (b) Warum spielt dieses Spannungsfeld überhaupt eine Rolle? Könnten Sie es einfach ignorieren?
    - Leitfrage 6: Gibt es in Bezug auf dieses Spannungsfeld noch ganz andere Handlungsmöglichkeiten für Sie als Change Agent? Möglichkeiten, die wir bisher noch nicht bedacht haben?
    - Leitfrage 7: Gibt es noch etwas, dass Sie zu diesem Spannungsfeld und der Diskussion mit der Gruppe teilen möchten?
4. Pause
5. Kurzpräsentation der Ergebnisse durch Gruppenmitglieder und Feedback
6. Feedback-Umfrage ausfüllen
7. Abschluss und Verabschiedung

Die Auswahl der sechs Spannungsfelder basiert auf den Ergebnissen der Online Umfrage (s. Schritt 3 Tabelle 1). In dieser Umfrage wurden 15 Spannungsfelder vorgestellt, die aus den Ergebnissen der Interviews herausgearbeitet wurden. Die Teilnehmer*innen wurden gebeten, diese Spannungsfelder anhand der Relevanz (a) für sie persönlich und (b) für ihre Universität zu reihen. Dementsprechend

wurden im Folgenden je drei Spannungsfelder, die auf den Ebenen (a) und (b) hoch gewichtet wurden, weiter bearbeitet.

Nach der Beschreibung je eines Spannungsfeldes (Matrix und Fließtext) werden im Anschluss die Ergebnisse nach folgendem Aufbau dargestellt:

- Ergänzungen/Erläuterungen/Konkretisierungen (v.a. Leitfrage 1)
- Andere Sichtweisen (v.a. Leitfrage 2)
- Verschlechterung der Situation (v.a. Leitfrage 3)
- Lösungsansätze inkl. Einschränkungen und Widersprüchen (v.a. Leitfragen 4,6)
- Sinn des Spannungsfeldes (v.a. Leitfrage 5)

Spannungsfelder auf universitärer Ebene

1. Autonomie – politische Rahmenbedingungen

Matrix zum Spannungsfeld

	Autonomie der Universität	Politische Rahmenbedingungen
POSITIVE ASPEKTE / ERGEBNISSE	• Autonomie der Universitäten ist ein hohes Gut • Entscheidungsfreiheit ohne politische Einflussnahme • größtmögliche Autonomie durch UG 2002, aber Finanzierung und Aufsicht des Bundes	• Politische Rahmenbedingungen können NH-Prozesse an Universitäten stärken (z.B. Gelder, nicht-finanzielle Anreize, Berichtspflichten zu Nachhaltigkeit, entsprechende Erwartungen in den Leistungsvereinbarungen, Unterstützung durch wohlwollende Beamte) • NH als politische Priorität macht Umsetzung von NH-Projekten einfacher • Externe Kontrolle und politische Rahmenbedingungen helfen, Prozesse zu koordinieren und zu bündeln
NEGATIVE ASPEKTE BEFÜRCHTUNGEN	• Gefahr, dass NH Randthema bleibt, weil Unis in anderen Sachzwängen gefangen • Verantwortung gegenüber Geldgebern und Gesellschaft kommt zu kurz • Freiwilligkeit alleine reicht nicht aus • Abhängigkeit von der Motivation und dem Interesse der Universitätsleitung	• Politische Einflussnahme wird als Angriff auf Freiheit der Wissenschaft und ihrer Lehre gesehen • Machtverlust der Universität und ihrer Organe; Universitäten können Rahmenbedingungen nur beschränkt mitgestalten • Zunahme von Berichtspflichten • Politische Rahmenbedingungen können umgekehrt auch nachteilig für NH-Prozess sein
CA	• Müssen innerhalb des Spannungsfeldes agieren: Wunsch nach mehr nachhaltigkeitsfördernden Rahmenbedingungen / hohe Bedeutung der universitären Autonomie, Bürde durch zusätzliche Berichtslegung • Fraglich, inwiefern politische Rahmenbedingungen im Sinne von Nachhaltigkeit beeinflussbar sind	

Abbildung 1: Darstellung des Spannungsfelds im Sinne einer „Polarity matrix" als Diskussionsinput basierend auf Analyse und Interpretation der Interview-Ergebnisse. NH: Nachhaltigkeit; CA: Spezifische Position/Sichtweise der Change Agents; UG: Universitätsgesetz

Beschreibung

Dieses Spannungsfeld wird von den Polen „Autonomie der Universität" und „Politische Rahmenbedingungen" aufgespannt. Während die Autonomie der Universitäten ein hohes Gut ist und Universitäten möglichst ohne politische Einflussnahme entscheiden können sollen, ist eine Universität in politische Rahmenbedingungen eingebettet. Österreichische Universitäten haben mit dem UG 2002 größtmögliche Autonomie erlangt, sind aber der Aufsicht des Bundes unterstellt und werden vom Bund finanziert (UG 2002).

Dadurch ergeben sich politische Rahmenbedingungen, die auch universitäre Nachhaltigkeitsprozesse mitbeeinflussen. Diese können im besten Fall Nachhaltigkeitsprozesse an Universitäten stärken, indem förderliche Rahmenbedingungen (z.B. Gelder, nicht-finanzielle Anreize, Berichtspflichten zu Nachhaltigkeit, entsprechende Erwartungen in den Leistungsvereinbarungen, Unterstützung durch

wohlwollende Beamte) geschaffen werden. Die Erfahrung zeigt, dass die finanzielle Unterstützung gegeben ist, wenn das Ministerium etwas als Priorität erkennt. Externe Kontrollen und entsprechende politische Rahmenbedingungen helfen, entsprechende Prozesse zu koordinieren und zu bündeln.

Umgekehrt kann (steigende) politische Einflussnahme als Einschränkung der Freiheit der Wissenschaft und ihrer Lehre gesehen werden. Politische Einflussnahme geht auch mit einem Machtverlust der Universität und ihrer Organe einher, da politische Rahmenbedingungen von Universitäten nur eingeschränkt mitgestaltet werden können. Politische Rahmensetzungen führen oft auch zu einer Zunahme der (bereits als groß empfundenen) Berichtspflichten der Universitäten. Politische Rahmenbedingungen können zudem auch nachteilig für Nachhaltigkeitsprozesse sein (z.B. Billigstbieterprinzip).

Ohne politische Einflussnahme im Sinne der Nachhaltigkeit besteht dahingegen die Gefahr, dass Nachhaltigkeit an Universitäten keine bzw. nur eine kleine Rolle spielt, da Universitäten oft in anderen – vordergründig wichtigeren – Sachzwängen gefangen sind. Nachhaltigkeitsprozesse an Universitäten sind damit von der Motivation und dem Interesse der Universitätsleitung an diesem Thema abhängig. Die Verantwortung der Universitäten gegenüber ihren Geldgebern und der Gesellschaft kommt zu kurz. Freiwilligkeit wird oft als nicht ausreichend gesehen – es braucht Gesetze und Vorgaben, um Nachhaltigkeit an Universitäten voranzubringen. Auch Kritiker*innen von politischer Beeinflussung muss klar sein, dass nichts im luftleeren (politikfreien) Raum geschieht.

Dieses Spannungsfeld ist zwischen der organisationalen und der systemischen Ebene aufgespannt und betrifft die Unternehmenskultur der Universität. Das Spannungsfeld knüpft eng an die Frage an, inwiefern Universitäten sich externer (nicht-politischer) Kontrollen (wie z.B. EMAS, GRI, ISO 140001) unterziehen oder ihre Autonomie in den Vordergrund stellen sollen. Gleichzeitig ist an Universitäten auch die Autonomie einzelner Organisationseinheiten groß – dieses rein auf Organisationsebene angesiedelte Spannungsfeld wird hier jedoch nicht angesprochen.

Change Agents stehen einerseits vor der Herausforderung innerhalb dieses Spannungsfeldes agieren zu müssen. Andererseits stellt sich die Frage, inwiefern es für Universitäten und ihre Change Agents auch möglich ist, politische Rahmenbedingungen im Sinne von Nachhaltigkeit beeinflussen zu können. Einerseits besteht der Wunsch nach mehr nachhaltigkeitsfördernden Rahmenbedingungen, andererseits betonen auch sie die Wichtigkeit der universitären Autonomie und die Bürde durch zusätzliche Berichtslegung gegenüber dem Ministerium.

Ergebnisse der Diskussion

Ergänzungen/Erläuterungen/Konkretisierungen

- Akkreditierungen mitdenken, sind auch Rahmenbedingungen
- Unterschiedlichkeit der Universitäten beachten

Andere Sichtweisen

- je weiter man weg ist von den Entscheidungsprozessen, je weniger Knowhow man über die Prozesse im Hintergrund hat, umso höher ist die Wahrscheinlichkeit, dass dieses Spannungsfeld anders gesehen werden kann.

Verschlechterung der Situation

- Viele top-down Versprechungen in Leistungsvereinbarungen und anderswo (Erwartungshaltung) ohne zusätzliche Mittel zu sichern; und ohne internes back-up (Selbstverpflichtung bei gleichzeitiger Begrenzung des Handlungsspielraums, enttäuschte Erwartungen, Widerstand, Vertrauensbruch – Stimmung zerstört für weitere Vorhaben)

- Berichtswesen noch verstärken (Zwischen-, End-, Schlussbericht), Zeitdruck erhöhen und an Institute abschieben

Lösungsansätze inkl. Einschränkungen und Widersprüche

- **mehr Einblick/Mitsprachemöglichkeit** in Abläufe & Berichte: wird unterschiedlich gesehen
  - Informationsweitergabe nicht möglich (Vertraulichkeit)
  - Überforderung der Universitätsangehörigen: wollen/können nicht über alles informiert sein; Personalfluktuation als Hindernis
  - Für jene, die Interesse haben, sollte es aber möglich sein (Holschuld)
  - Partizipative Prozessgestaltung im kleineren Kontext möglich (für kleinere Universitäten machbar); auch Bringschuld der Rektorate
- **Aushalten**, dass Unklarheiten & Konflikte in Zusammenhang mit diesem Spannungsfeld entstehen; bei Bedarf aufklären [Sichtweise des Rektorats darstellen]: Irgendwie muss man SF ignorieren, sonst kommt man nicht weiter; man muss einfach das Beste daraus machen
- **Verständnis schaffen für beide Pole**: Sichtweisen von Politik und Universität (Rektorat) offenlegen – in beide Richtungen (an Politik: wie funktioniert Uni; an Uni: wie funktioniert Politik)
- **Gegenseitige Angebote** zwischen Universitäten (Rektorat) und Politik (Ministerium)
- **Commitment der Leitung** sichern
- Statt auf politische Rahmenbedingungen zu hoffen: **Vision der Universität** entwickeln und kommunizieren (Storytelling): Wir sind nachhaltig! Realitäten schaffen. Geht nur auf Basis eines starken Commitments des Rektorats

Sinn des Spannungsfeldes

- 100% autonome Universität ist ein Idealzustand, den wir alle haben wollen, aber nicht realistisch
- Beide Pole wichtig, um erfolgreich zu sein
- Politisches Umfeld zwingt uns, uns als Universität permanent zu hinterfragen -> lässt uns auch besser werden

2. Akademische Leistung(en) – aktuelle Leistungsbeurteilungssysteme versus neue Wege gehen

	Aktuelle Leistungsbeurteilung erfüllen	Neue Wege gehen
POSITIVE ASPEKTE / ERGEBNISSE	• Aktuelle (international gültige) Leistungsbeurteilungssystem basieren in erster Linie auf SCI-Publikationen und der Höhe der Drittmitteleinwerbung • Wissenschaftliche Leistungen daran auszurichten ist wichtig für Fördergelder, Karriere, Erfolg der Universität	• NH erfordert transformative, inter-/transdisziplinäre Forschung & tiefergehenden Austausch mit der Gesellschaft -> der Komplexität der Herausforderungen entsprechend • Nh Durchführung von Forschung • Gesellschaftliche Entwicklungen fordern Wissenschaftler*innen auf außerhalb „klassischer" Wissenschaft aktiv zu werden
NEGATIVE ASPEKTE BEFÜRCHTUNGEN	• Beitrag der Uni zu NH nicht voll ausgeschöpft • Fokus auf Publikationsindices erschwert NH-Forschung und weitergehende NH-Aktivitäten • Aktuelle Publikations- und Forschungsförderungssystem stärkt vorhandenes, abgesichertes Wissen, statt neue, nachhaltige Wege aufzuzeigen • Komplexität der gesellschaftlichen Probleme wird nicht anerkannt	• wissenschaftliche Leistungen in den aktuellen Leistungsbeurteilungssystemen nur unzureichend abgebildet • Risiko auf individueller Ebene und für Universitäten • ITD-Projekte und nh Durchführung teurer • Kann zu schlechterer Ausgangsposition bei Akquise / Karriere führen • Schwierig für Wissenschaftler*innen mit befristeten Verträgen
CA	• Als Wissenschaftler*innen direkt betroffen • In ihrer Funktion als Change Agents in Ausverhandlungsprozesse involviert	

Abbildung 2: Darstellung des Spannungsfelds im Sinne einer „Polarity matrix" als Diskussionsinput basierend auf Analyse und Interpretation der Interview-Ergebnisse. NH: Nachhaltigkeit; CA: Spezifische Position/Sichtweise der Change Agents; UG: Universitätsgesetz, SCI: Science Citation Index; ITD: Inter- und Transdisziplinarität

Beschreibung

Wissenschaftler*innen werden anhand von (international gültigen/einheitlichen) Leistungskriterien gemessen. Diese basieren in erster Linie auf SCI-Publikationen und der Höhe der Drittmitteleinwerbung. Umfang und Qualität der Lehre sowie gesellschaftliches Engagement (für eine nachhaltige Entwicklung) spielen eine geringere Rolle. Die wissenschaftliche Leistung an diesen Kriterien auszurichten ist notwendig, um weitere Fördergelder einzuwerben, Karrierepfade zu beschreiten und den Erfolg der Universität im aktuell gültigen Universitätssystem zu sichern.

Forschung, die für eine nachhaltige Entwicklung relevant ist und transformativ wirkt, d.h. aktiv zu einer Veränderung der Gesellschaft beiträgt, erfordert inter- und transdisziplinäre Ansätze. Auch muss der Austausch mit der Gesellschaft tiefer und vielfältiger sein, als es alleine durch wissenschaftliche Publikationen möglich ist. Damit kann Forschung der Komplexität der Herausforderung und den Präferenzen und Perspektiven unterschiedlicher Gruppen gerecht werden. Auch der Versuch, Forschung auf nachhaltige Weise zu betreiben (z.B. Reduktion von Flügen, Ressourcenschonung, u.ä.) kann positiv im Sinne einer Nachhaltigkeitsperformance der Universitäten wirken. Neue Bewegungen, wie die Fridays/Scientists for Future, verstärken den Druck auf Wissenschaftler*innen außerhalb dessen aktiv zu werden, was durch Leistungskriterien abgedeckt ist, bzw. sich auf eine Art und Weise zu positionieren, die sich im herkömmlichen Wissenschaftssystem nachteilig auswirken kann.

Gleichzeitig kann ein starker Fokus auf Nachhaltigkeits-relevante Forschungszugänge dazu führen, dass wissenschaftliche Leistungen in den aktuellen Leistungsbeurteilungssystemen nur unzureichend abgebildet sind. Dies kann zu einer schlechteren Ausgangsposition bei der Akquise von weiteren Forschungsgeldern oder langsameren Karriereverläufen führen, wenn die entsprechenden Entscheidungen – wie oft üblich – vor allem die klassischen Leistungskriterien der Antragsteller*innen in Betracht ziehen. Vor allem für Wissenschaftler*innen mit befristeten Verträgen kann das zu schwierigen Situationen führen. Inter- und transdisziplinäre Projekte (durch den höheren Koordinationsaufwand) und die nachhaltige/klimaschonende Durchführung der

Forschung (durch z.B. höhere Reisekosten und -zeiten) sind zudem teurer in der Durchführung, was ebenfalls von Wettbewerbsnachteil ist. Auf aggregierter Ebene bedeutet ein schlechteres Abschneiden bei aktuellen Kriterien auch für die Universitäten ein großes Risiko, da auch sie an diesen Kennzahlen gemessen werden.

Ein einseitiger Fokus auf aktuelle Leistungsbeurteilungssysteme führt dahingegen dazu, dass der Beitrag der Forschung zu einer nachhaltigen Entwicklung nicht voll ausgeschöpft wird, da der Fokus auf der Erreichung der klassischen Leistungsindikatoren und weniger auf der Nachhaltigkeitsrelevanz der Forschung liegt. Das aktuelle Publikations- und Forschungsförderungssystem erschwert inter- und transdisziplinäre Forschung, aber auch ein stärkeres Engagement von Wissenschaftler*innen außerhalb von publikations-relevanter Forschung. Darüber hinaus stärkt dieses System tendenziell vorhandenes Wissen statt neue, nachhaltige Wege aufzuzeigen. Monodisziplinarität und enge Interdisziplinarität klammern zudem die Komplexität der realen gesellschaftlichen Probleme aus.

Dieses Spannungsfeld ist einerseits auf individueller Ebene relevant. Es spannt sich andererseits zwischen der organisationalen und systemischen Ebene auf, indem Leistungskriterien vom Wissenschafts-/Gesellschaftssystem definiert und auch Universitäten daran gemessen werden. Es betrifft das Wechselspiel der Bereiche Forschung, Lehre und Austausch mit der Gesellschaft.

*Change Agents können als Wissenschaftler*innen direkt betroffen sein und in ihrer Funktion als Change Agent auch im Ausverhandlungsprozess dieses Spannungsfeldes eine Rolle spielen.*

Ergebnisse der Diskussion

Ergänzungen/Erläuterungen/Konkretisierungen

- Positiv: Erfahrungen, die man in ITD (Inter-/Transdisziplinarität) macht, kann man dann in anderen Bereichen einbringen.
- Journale sind offen für ITD, aber mit zunehmenden Impact Factor verengen sie sich; Reviewer sind uneinig bezüglich ITD;
- Kooperationen mit zivilgesellschaftlichen Akteur*innen werden seit kurzem abgefragt – Hinweis auf Umdenken (auch auf Ebene der Universitätsleitung)?
- 3rd mission zwar eingefordert, aber nicht mit Geld hinterlegt – unklar, wie als CA geschickt mitspielen, um System langfristig zu ändern? Noch viel zu tun
- Formale Rahmenbedingungen sind klar: Entwicklungspläne – Leistungsvereinbarungen und runterbrechen auf Organisationseinheiten
- Für beamtete Angestellte viel leichter zu machen als für Nachwuchswissenschaftler*innen; Nachwuchs wird einem autokratischen System „ausgeliefert".
- Beides wird eingefordert: klassische Kriterien UND andere
  „Das heißt in Summe eigentlich mehr erfüllen als den klassischen Kriterienkatalog. Also richtige Schwächen aus dieser Polarität kann man sich fast nicht leisten. Sonst wird man nicht ernst genommen"

Andere Sichtweisen

- Sichtweise der Universitätsleitung, die Interesse an Fördergeldern & Erfolg der Universität hat, passt nicht unbedingt mit NH-Themen zusammen, da zählen die klassischen Kriterien; NH beruht weiterhin auf Freiwilligkeit und eigenem Interesse der Universität;
- Es gibt auch Gegenkräfte, die change agents ernst nehmen müssen
- Großteil der Wissenschaftler*innen ist gar nicht betroffen, Exzellenzdisziplinen müssen sich nicht um ITD kümmern, bekommen auch so Geld und Aufmerksamkeit der Universitätsleitung

Verschlechterung der Situation

- Man braucht nur die jetzige Situation weiter an die Spitze treiben und die Wissenschaftler*innen noch weiter unter Druck setzen => noch mehr Mittel, noch mehr SCI-Publikationen einfordern;

Lösungsansätze inkl. Einschränkungen und Widersprüche

- **Best Practices kommunizieren**, um Universitäten bei Veränderungen zu unterstützen
  - Veränderung braucht vielleicht nicht unbedingt Ressourcen, ev. „nur" interner Umbau
  - Vorreiter-Universitäten als Best-Practice nutzen
- Einfach tun/**Guerilla-Ansatz** – selber der Wandel sein
  - Vieles ist bereits innerhalb der aktuellen Rahmenbedingungen möglich
  - Dabei mögliche Anknüpfungspunkte an bestehende Einrichtungen mitdenken
- **Kooperationen** suchen
  - Akteur*innen von außen reinbringen
- **Forschungszentren/-schwerpunkte** stärken bis hin zur Auflösung der Fakultäten
  - Schwierigkeiten im Zusammenhang mit Lehre (diese ist oft an Institute geknüpft)
  - Bsp: LIT (JKU), Transdisziplinaritätszentrum der ETH, Cambridge
- **Universitätsinterne Ausschreibungen** zu Themenkomplexen, die Zusammenarbeit zwischen Instituten, Fakultäten und Bereichen (Technik, Sozial-, Wirtschaftswissenschaften)
- **Andere Beurteilungskriterien entwickeln**
  - Nicht existierende Kriterien streichen, aber (gemeinsam) anders definieren und gewichten -> benötigt einen Prozess mit Führungsebene und Mitarbeiter*innen
  - Kooperation mit zivilgesellschaftlichen Akteuren/3rd mission als eine wichtige Ergänzung
  - Zielvereinbarungskonzept beleben und mit positiven Framings besetzen, aber Gefahr, dass es für andere Richtung genutzt wird (auf klassischen Kriterien aufbaut)
  - Verhältnis von Forschung und Lehre überdenken
- Eigene Disziplin auf NH-Transformation beziehen/**eigenes Disziplinenverständnis in den Kontext des großen Ganzen setzen**
  - Die eigene Rolle in der jeweiligen Disziplin/Tätigkeit als Teil des großen Ganzen Verständnisses zu sehen
- Übergreifende Visionen (**Globalziele**) der Universität, die neue Zugänge fördern, entwickeln (z.B. Klimaneutralität 2030)

Sinn des Spannungsfeldes

- dieses Spannungsfeld zwischen akademischer Wertschätzung und Innovation, das bleibt erhalten – was vielleicht eh ganz gut ist
- Diese Beispiele zeigen, dass es trotz riesiger Polaritäten und unterschiedlicher Sichtweisen Möglichkeiten und Wege gibt, die Dinge konstruktiv zu bearbeiten und auch zum Ergebnis zu bringen.
- „*Und ich glaube nicht, dass man sozusagen das ganze Spannungsfeld, nicht mehr sehen soll. Man muss das SF mit unterschiedlichen Gewichtungen und unterschiedlichen Elementen besetzen. Man kann nicht diese ganzen Leistungskriterien einfach wegstreichen*."

3. Ressourcenverteilung – vorhandene Mittel für Kernaufgaben versus zur Stärkung von Nachhaltigkeit nutzen

	vorhandene Mittel für Kernaufgaben	vorhandene Mittel zur Stärkung von Nachhaltigkeit
POSITIVE ASPEKTE / ERGEBNISSE	• Globalbudget ist v.a. für Kernaufgaben (Forschung & Lehre) vorgesehen – verstärkt durch formelgebundene Finanzierung • positive Bilanzierung & sparsamer Einsatz der Mittel im Vordergrund • Kurzfristige Betrachtung notwendig (LV-Perioden)	• Nachhaltigkeit braucht Investitionen (Personal, Sachkosten) • längerfristig sind dadurch z.T. Kostenreduktionen gegeben (z.B. Energieeffizienzmaßnahmen, erneuerbare Energieproduktion, Vermeidung von Strafzahlungen) • Vorbildfunktion kann wahrgenommen werden
NEGATIVE ASPEKTE BEFÜRCHTUNGEN	• Nachhaltigkeitsprojekte schwierig umzusetzen, weil wenig Mittel für NH-Projekte bzw. nur betriebswirtschaftlich sinnvolle Projekte • Fokus auf vordergründig wichtige Investitionen • Gesellschaftliche Verantwortung der Universitäten als Vorbild bzgl. NH wird nicht / kaum nachgekommen • (gesellschaftliche) Potentiale und zukünftige Gewinne werden nicht gesehen	• Investitionen für NH können zu trade-offs mit Kernaufgaben führen • Ökologisch nachhaltige Lösungen können sozial nachteilig sein (z.B. höhere Mensa-Preise) -> Gefahr, dass manche Gruppen nicht mitgenommen werden • teilweise Verlagerung auf nicht-finanzielle Ressourcen (z.B. längere Reisezeiten)
CA	• Kämpfen meist für Stärkung des eine Pols (Mittel für NH), anerkennen budgetäre Restriktionen • In ihren anderen Rollen auf budgetäre Zuwendungen für Kernaufgaben angewiesen • Enger Zusammenhang mit Machtstrukturen und Themenkonkurrenzen innerhalb der Universitäten	

Abbildung 3: Darstellung des Spannungsfelds im Sinne einer „Polarity matrix" als Diskussionsinput basierend auf Analyse und Interpretation der Interview-Ergebnisse. NH: Nachhaltigkeit; CA: Spezifische Position/Sichtweise der Change Agents; LV: Leistungsvereinbarungen

Beschreibung

Universitäten erhalten ihr Globalbudget – verstärkt durch die formelgebundene Finanzierung – vor allem für ihre Kernaufgaben im Bereich Lehre und Forschung. Eine positive Bilanzierung und der sparsame Einsatz von Mitteln müssen dabei im Vordergrund stehen. Durch die dreijährigen Leistungsvereinbarungsperioden stehen kurzfristige finanzielle Aspekte im Vordergrund.

Um Nachhaltigkeit auf institutioneller Ebene voranzubringen sind hingegen Investitionen notwendig – einerseits für Personal, das Nachhaltigkeitsprozesse koordiniert und vorantreibt, andererseits für Sachkosten, die eine nachhaltige Betriebsführung ermöglichen (Investitionen in Gebäude, nachhaltige Beschaffung; Reiserichtlinien, die Flüge reduzieren sollen, u.ä.). Manche dieser Investitionen führen – meist jedoch erst längerfristig – zu Kostenreduktionen (Energieeffizienzmaßnahmen, Investitionen in erneuerbare Energieproduktion). Durch Investitionen in Nachhaltigkeit können Universitäten eine gesellschaftliche Vorbildfunktion einnehmen.

Die höheren Kosten für nachhaltige Lösungen können zu Trade-offs zwischen Nachhaltigkeit und den Kernaufgaben von Universitäten führen, z.B. zu einer Entscheidung zwischen einer nachhaltigen Lösung (z.B. zertifizierten Ökostrom) oder Personal für Lehre, Forschung oder entsprechende Services. Ökologisch nachhaltige, klimafreundliche Lösungen können darüber hinaus in sozialer Hinsicht nachteilig sein, z.B. durch längere Reisezeiten, die auf Kosten des Privatlebens gehen oder indem finanziell schlechter gestellte Gruppen benachteiligt werden (z.B. durch höhere Kosten für nachhaltiges Essen in den Uni-Mensen).

Ein einseitiger Fokus auf die Kernaufgaben Lehre, Forschung, Austausch mit der Gesellschaft und auf kurzfristig sparsame Mittelverwendung führt hingegen dazu, dass Nachhaltigkeitsprojekte schwierig umzusetzen sind, weil Investitionen in Sachgüter und Personal für Nachhaltigkeitsagenden nicht getätigt werden. NH-Projekte werden nur umgesetzt, wenn sie sich betriebswirtschaftlich in absehbarer Zeit rechnen oder vordergründig am wichtigsten sind, da nur die aktuellen Kosten, nicht aber die (gesellschaftlichen) Potentiale und zukünftigen Gewinne gesehen werden. Die Universitäten

werden damit ihrer gesellschaftlichen Verantwortung und Vorbildwirkung für eine nachhaltige Entwicklung nicht gerecht.

Dieses Spannungsfeld ist einerseits auf organisationaler Ebene angesiedelt, da Entscheidungen zur Mittelverwendung innerhalb der Universitäten getroffen werden. Es hängt eng mit universitären Machtstrukturen und Themenkonkurrenzen zusammen. Andererseits spielt die systemische Ebene eine Rolle, da die Mittelzuwendung durch Verträge zwischen Bund und Universitäten, sowie Gesetze geregelt ist. Auch können universitäre Fehlentscheidungen spätere gesellschaftliche Kosten verursachen (z.B. CO_2- Kompensationszahlungen).

Change Agents sind von diesem Spannungsfeld insofern betroffen als sie meist für die Stärkung des einen Pols dieses Spannungsfeldes kämpfen (vermehrte Ressourcen für Nachhaltigkeit), dabei aber die budgetären Restriktionen der Universitäten beachten müssen bzw. zu spüren bekommen. Auch sind viele von ihnen in ihren anderen Rollen auf budgetäre Zuwendungen für die Kernaufgaben der Universitäten angewiesen.

Ergebnisse der Diskussion

Ergänzungen/Erläuterungen/Konkretisierungen

- Es geht um finanzielle Ressourcen
- Abhängig von der strukturellen Integration von NH an der Uni: Alleinkämpfer*in oder Struktur?
- Zwischen einmaligen Investitionen und Dauerbelastungen unterscheiden.
- Erfolgskriterien für eine Universität in Leistungsvereinbarungen sind die, die zählen; solange da nicht NH drinnen steht, ist es schwierig, dies umzusetzen
- Mittel für NH nur für Operations, Lehre & Forschung fehlen

Andere Sichtweisen

- Abhängig von Sicht auf Aufgaben einer Universität: „*Wenn man Universitäten als Einrichtungen sieht, die die Aufgabe haben, möglich rasch Expert*innen zu produzieren, die in der Industrie oder in der Wirtschaft möglichst rasch einsteigen können und die Wirtschaft vorantreiben, dann ergibt sich ja diese ganze Diskussion gar nicht.“*
- Andere Sichtweisen des Unirates können zu Veränderungen führen

Verschlechterung der Situation

- Konkrete Beispiele: Fokus auf Werte, die hochgehalten werden (Verluste hervorheben)
- Nach außen tragen, dass Rektorat o.ä. eigentlich gesetzeswidrig handelt, weil nicht im Sinne des eigentlichen Auftrags der Universität
- Auswirkungen nur für die Leistungsvereinbarungsperiode betrachten
- Freiheitseinschränkungen für die Angehörigen der Universität in den Vordergrund stellen
- Kommunikation: Individuelle Mobilität als bequemere Variante beschreiben
- Freiheit der Forschung und Lehre [als gefährdet bezeichnen]

Lösungsansätze inkl. Einschränkungen und Widersprüche

- **Reise = Arbeitszeit:** Reisezeit als Gewinn darstellen, ev. sogar als Arbeitszeit anrechnen lassen
- **Betriebswirtschaftlichen Betrachtungszeitraum erweitern**
    - nicht die kurzen Amortisationsziele der Industrie anwenden
    - Lebenszyklusbetrachtungen bei Gebäuden
    - Errichtung von PV-Anlagen
    - Anlageentscheidungen: nachhaltige Fonds (NH=Zukunftssicherheit)
- **Externe Effekte mitberücksichtigen** und ein ganzheitliches Bild vermitteln

  - CO_2-Budget erstellen
  - Ressourcen-Währung einführen (als Parallelwährung)
  - (Umwelt-)Kosten von Handlungen/Entscheidungen sichtbar machen
  - Wäre auch wichtige informationsinitiative gegenüber Studierenden
- **Nachhaltigkeit als Kernthema** verankern
  - Vision der Uni/Narrativ/wir schaffen Realitäten -> **Globalziel ändern**
- **Wettbewerbsvorteile** der Universität durch Nachhaltigkeitsaktivitäten darstellen
  - Studierenden ist Nachhaltigkeit wichtig und macht die Universität als Studienort attraktiv
- **Best-Practice bzw. Icebreaker-Beispiele** sammeln
  - Lösungen anderer Universitäten aufzeigen (müssen nicht unbedingt Best Practice sein)
  - Machbarkeit aufzeigen
  - Erzeugt Motivation und nimmt Angst
  - UniNEtZ und Allianz als Beispiele
- Gesellschaftliche Relevanz universitärer Entscheidungen/Handlungen ist wichtig. Das wird auch in den Rektoraten so gesehen -> Universitäten müssen an den Punkten dran sein, die die Zukunft bestimmen, sonst kann es später zu Legitimations- oder Existenzproblemen kommen -> **Globalziel**
- **NH auf eine höhere Ebene heben**: politische Unterstützung durch Ministerium suchen
  - Link zu Spannungsfeld Autonomie – Politik
- **Druck aufbauen**/Revolution/sprunghafte Veränderungen
  - Universitäten sind historisch gesehen Ausgangspunkt von großen gesellschaftlichen Veränderungen (Vietnamkrieg, Frauenrechte, etc.)
- **Umfeld ändern/auf das Umfeld einwirken** -> Stadt, Lieferanten, für Unis zuständige Einrichtungen auf Landes/Bundesebene (FM plus, BIG)
- **UNIKO** wäre eine gewichtige Stimme für Universitäten; „geballte Macht der Universitäten“ (fokussiert bisher leider noch wenig auf NH, ausgenommen NH-Manifest)
- **Geld aufstellen**: Ko-Finanzierungen sichern für Forschungsprojekte

<u>Sinn des Spannungsfeldes</u>

- „*Das kann natürlich in zwei Arten ausgelegt werde. Das Spannungsfeld gibt's nicht mehr, weil Nachhaltigkeit kein Thema ist. Oder weil Nachhaltigkeit ganz allgemein akzeptiert ist. Und selbst wenn Nachhaltigkeit allgemein akzeptiert wäre, wären die Mittel trotzdem beschränkt. Das würde neue Spannungsfelder ergeben. Also ich glaube, aus dem Spannungsfeld kommt man nicht heraus, solange es um irgendeine Art von Verteilung geht.*“
- Man will Geld auch nicht verschwenden; Geld sollte allerdings kein Killerargument sein.
- Das Spannungsfeld macht Sinn, nur werden die Prioritäten oft ein bisschen falsch gesetzt.

Spannungsfelder auf persönlicher Ebene

4. Freiwilliges Engagement versus Auftrag der Leitung

	freiwilliges Engagement der Kolleg*innen/ Mitarbeiter*innen für NH	Klarer Auftrag der Leitung für NH-Agenden
POSITIVE ASPEKTE / ERGEBNISSE	• Es braucht engagierte Personen, die NH-Prozess vorantreiben • Eigenverantwortung und Eigeninitative – jede*r kann etwas beitragen • Vielfältige Initiativen entstehen	• Viele Beispiele, dass etwas nur / besser geht, wenn deutliche und klare Unterstützung aus dem Rektorat gegeben ist • Klare Ansprechpartner, Verantwortliche und Expert*innen für NH-Agenden • Verwaltungsmitarbeiter*innen können erreicht werden (Weisung)
NEGATIVE ASPEKTE BEFÜRCHTUNGEN	• Auslastung / Überlastung der zuständigen / engagierten Personen • Mehraufwand selten finanziell abgegolten • Rückhalt von Unileitung variabel • Widerspruch zu eigentlichen Aufgaben -> Konfliktpotential mit Vorgesetzten • Verantwortung / Ansprechperson unklar • Fehlende Kontinuität bei NH-Agenden	• Top-down Aufträge stehen der an Universitäten üblichen Eigenverantwortung der (wissenschaftlichen) Mitarbeiter*innen entgegen • Ehrenamtliches Engagement wird zurückgedrängt / auf Expert*innen ausgelagert • Aktivitäten kommen zum Erliegen, wenn ein (klarer) Auftrag fehlt
CA	• Change Agents zeichnen sich durch hohes (ehrenamtliches) Engagement mit all den negativen Folgen aus. • Stehen aber auch vor der Frage, wie den Prozess aufsetzen: ehrenamtliche Mitstreiter*innen / klare Aufträge? • Vor dem Hintergrund der Verschiedenheit der Akteursgruppen agieren	

Abbildung 4: Darstellung des Spannungsfelds im Sinne einer „Polarity matrix" als Diskussionsinput basierend auf Analyse und Interpretation der Interview-Ergebnisse. NH: Nachhaltigkeit; CA: Spezifische Position/Sichtweise der Change Agents;

Beschreibung

Um einen Nachhaltigkeitsprozess an Universitäten erfolgreich voranzutreiben, braucht es engagierte Personen. Oft sind es Personen, die in Eigenverantwortung und Eigeninitiative diesen Prozess starten, beleben und/oder einzelne Nachhaltigkeitsinitiativen initiieren. Jede*r Universitätsangehörige hat die Möglichkeit, aktiv zu werden und einen Beitrag zu einer nachhaltigen Entwicklung (der Universität und der Gesellschaft) zu leisten. Auch wenn die ideelle Unterstützung durch das Rektorat variiert und nur geringe Finanzmittel zur Verfügung stehen, können so vielfältige Initiativen in unterschiedlichsten Bereichen der Universität und im Austausch mit der Gesellschaft entstehen.

Gleichzeitig hat sich gezeigt, dass vieles besser bzw. überhaupt erst ins Laufen kommt, wenn die Universitätsleitung (v.a. das Rektorat) das Nachhaltigkeitsthema in ihre Agenden aufnimmt und klare Verantwortlichkeiten definiert. Initiativen bekommen damit einen ganz anderen Charakter. Direkte Aufträge durch das Rektorat oder andere übergeordnete Stellen, im Sinne von Nachhaltigkeit aktiv zu werden, sind an Universitäten für Verwaltungsmitarbeiter*innen leichter umzusetzen. Sie werden z.B. durch Weisung oder die Aufnahme ihrer Nachhaltigkeitstätigkeiten in die Arbeitsplatzbeschreibung zu verantwortlichen Ansprechpartner*innen und Umsetzer*innen – und damit zu Expert*innen.

Gleichzeitig entspricht ein top-down Prinzip nicht der Arbeitskultur an Universitäten. Gerade Wissenschaftler*innen und (externe) Lehrende agieren vor allem aus Eigenverantwortung heraus. Wenn Nachhaltigkeitsagenden v.a. aufgrund von top-down Aufträgen abgearbeitet werden, besteht die Gefahr, dass ehrenamtliches Engagement zurückgedrängt wird. Statt selber die Verantwortung zu übernehmen und aktiv zu werden, wird dies auf zuständige Personen ausgelagert. Auch kommen Nachhaltigkeitsaktivitäten zum Erliegen, sobald diese top-down Aufträge ausbleiben oder unklar sind (z.B. weil innerhalb der Leitungsgremien Uneinigkeit besteht).

Wenn der Nachhaltigkeitsprozess vor allem auf freiwilligem, bottom-up Engagement beruht, kommt es zu Mehraufwand für die aktiven Personen und die Gefahr der Überlastung steigt. Die Erfahrung zeigt, dass sich oft die immer selben Akteur*innen angesprochen fühlen – was diesen Effekt verstärkt. Auch wenn das Engagement von der Universitätsleitung mehr oder weniger wohlwollend zur Kenntnis genommen wird, der Mehraufwand wird selten finanziell abgegolten. Wenn Kernaufgaben zu kurz kommen oder dieses Engagement nicht durch die Arbeitsplatzbeschreibung abgedeckt ist (v.a. für Mitarbeiter*innen aus der Verwaltung), kann es zu Konflikten mit direkten Vorgesetzen kommen. Engagierte Personen vermissen daher einen klaren Rahmen bzw. Auftrag für diese zusätzlichen Arbeiten und ein klares Commitment der Universitätsleitung. Auch ist bei bottom-up Initiativen die Verantwortung unklar und für Außenstehende fehlt die zentrale Ansprechperson. Da Initiativen oft an nur wenigen Personen hängen, fehlt die Kontinuität, wenn diese die Universität verlassen (v.a. auch bei Studierenden, befristet Angestellten) oder ihr Engagement nachlässt.

*Dieses Spannungsfeld betrifft die Organisationskultur und ist vor allem auf organisationaler Ebene gegeben, wirkt sich aber auch auf die individueller Ebene aus. Die individuelle Ebene wird jedoch stärker durch das Spannungsfeld „Individuelle Rolle(n)" abgedeckt. Mit der unterschiedlichen Situation für Verwaltungsangestellte, Wissenschaftler*innen und Studierende wird auch die Verschiedenheit der Akteursgruppen an Universitäten angesprochen.*

*Change Agents sind direkt von diesem Spannungsfeld betroffen, da sie oft jene Personen sind, die durch ihr (ehrenamtliches) Engagement den Nachhaltigkeitsprozess vorantreiben, aber auch vor der Frage stehen, wie sie den Prozess insgesamt aufsetzen sollen: Sollen sie sich auf ehrenamtliche Mitstreiter*innen verlassen oder versuchen, von der Universitätsleitung entsprechende klare Aufträge zu bekommen und Nachhaltigkeit entsprechend zu institutionalisieren? Und sie müssen vor dem Hintergrund der Verschiedenheit der Akteursgruppen agieren, d.h. die diversen Handlungsrahmen von Wissenschaftler*innen, Studierenden und Mitarbeiter*innen der Verwaltung berücksichtigen.*

Ergebnisse der Diskussion

Ergänzungen/Erläuterungen/Konkretisierungen

- Ehrenamt impliziert „keine Gegenleistung" versus intrinsische Entscheidung
    - Nähren (Zufriedenheitsgefühl): Dinge auf den Weg bringen, abschließen, einen Schritt weiterkommen
- Viele Uni-Angehörige richten sich (nur) nach der Leitung -> daher ist Commitment der Leitung wichtig
- Gefahr der Reduktion auf Rolle als Bittsteller*in

Andere Sichtweisen

- Vielleicht in privaten Unternehmen anders? Dort wird Eigenengagement mehr geschätzt/honoriert?
- NH-Themen beim wissenschaftlichen Personal weniger wichtig, beschäftigen sich mit (wichtigeren/anderen) Themen
    - Ist eine Frage der Ressourcen: Wenn jemand sozusagen gar keine Ressourcen hat und eigentlich in seinem Handlungskontext vollkommen eingedeckt ist, wie das Beispiel von den Lehrenden (habe gar keine Zeit, keine Ressourcen, um mich darum zu kümmern), dann ist zusätzliches Engagement schwierig;
- Abhängig von Tagesverfassung/Zeit

Verschlechterung der Situation

- Mehr Ressourcen fordern/Mit NH auf die Nerven gehen
- Überbewerten des Change Agents und NH-Themas führt zu Abwehrreaktionen → „Das kann ich schon nicht mehr hören!"

- Alle einbinden/Basisdemokratie und selber keine Entscheidungen treffen
- Über andere drüberfahren, niemand einbeziehen

Lösungsansätze inkl. Einschränkungen und Widersprüche

- **Mehrwert** für die jeweilige Zielgruppe **darstellen**
- Andere mitnehmen & einbinden, Leistungen anerkennen, Brücke zwischen verschiedenen Akteur*innen sein; **Zusammenarbeit fördern**
    - **Kooperation und Zusammenarbeit mit anderen (Universitäten)**
- **Gute Kommunikation** zu verschiedenen Akteur*innen
    - **Nach außen kommunizieren** -> erzeugt positiven Druck nach innen (Manifeste, Entwicklungsplan, Leistungsvereinbarungen)
- **Commitment der Leitung sicherstellen** (viele richten sich nach der Leitung)
- **Incentives abseits von Geld**/alternatives Wertesystem schaffen: Teilhabensmomente (Co-Leadership, Co-Design), Ansprache, Interfaces lustvoll gestalten (betrifft alle Leitungsebenen: Uni, Ministerien, Drittmittel, etc.)
    - Mehrwert darstellen
    - Leistungen erwähnen (Wahrnehmung und Anerkennung)
    - Anerkennung im Team: schön, dass du da bist, leistest wichtigen Beitrag
    - Bsp. Mitwirkung an Ausschreibung
- Sich als CA als Kanal (zwischen Engagement und Rektorat) sehen, **Brücken bauen**
- **Anerkennung** durch Aufnahme des Themas Nachhaltigkeit durch Ministerium, UNIKO, etc.
- **Preise** erhalten/Wahrnehmung der Uni von außen
- **Vorbild** sein
- **Bewusstsein** schaffen
- Es braucht **Geduld, Zeit & Beharrlichkeit**
- **Unterschiedliche Rolle** von bottom-up Initiativen und offiziell beauftragten Nachhaltigkeitsagenden macht Sinn

Sinn des Spannungsfeldes

- Das freiwillige Engagement der Uniangehörigen wird gebraucht, um Arbeit gut zu machen; darauf angewiesen, dass andere Personen sich in den Arbeitsgruppen einbringen, dass Feedback und Rückmeldungen kommen;
- Herausforderungen spornen an – machen erfinderisch, kreativ, neue Lösungen
- NH weglassen geht nicht mehr (EMAS) -> Verlust der Zertifizierung würde zu Aufschrei führen

5. Individuelle Rolle(n)

	Rolle als Change Agent	Andere Rolle(n) an der Universität
POSITIVE ASPEKTE / ERGEBNISSE	• Engagement basiert auf persönlichen Überzeugungen • Eigene Werte und Grundsätze können gelebt werden • Beitrag zu positiver Veränderung kann geleistet werden	• Andere Rollen (Lehrende, Wissenschaftler*innen, Mitarbeiter*innen der Verwaltung, Vorgesetzte, etc) sind mit tlw. divergierenden Wertehaltungen und Identitäten verbunden und ebenfalls wichtig • Konzentration auf diese Aufgaben entspricht effizienter Nutzung persönlicher Ressourcen
NEGATIVE ASPEKTE BEFÜRCHTUNGEN	• Permanentes Gefühl der Arbeitsüberlastung, „nichts mehr wirklich gut machen“ • Gefühl, die eigene Rolle als Change Agent noch größer gestalten zu müssen, da NH noch vieler Schritte bedarf • Notwendige Zeit für Kernaufgaben fehlt • Abhängig von Selbstmotivation oder Zuspruch von außen • Braucht viel Kraft und Mut	• Befürchtung, dass NH-Prozess ins Stocken gerät • Widersprüche zwischen eigenem Tun und persönlicher Überzeugung für NH • Verleugnung eigener Werte kann zu Demotivation & negativen Auswirkungen auf psychische Gesundheit führen
CA	• Innerer, individueller Konflikt • enger Zusammenhang mit freiwilligem Engagement vs. Auftrag	

Abbildung 5: Darstellung des Spannungsfelds im Sinne einer „Polarity matrix“ als Diskussionsinput basierend auf Analyse und Interpretation der Interview-Ergebnisse. NH: Nachhaltigkeit; CA: Spezifische Position/Sichtweise der Change Agents

Beschreibung

Dieses Spannungsfeld betrifft Change Agents ganz persönlich. Kaum jemand von ihnen hat den ausschließlichen Auftrag, Nachhaltigkeit an der Universität voranzutreiben – meist handeln sie aus einer bestimmten Position heraus, die andere Aufgaben umfasst. Ihr Engagement als Change Agent basiert oft auf ihrer persönlichen Überzeugung, etwas zur nachhaltigen Entwicklung beitragen zu wollen. Als Change Agent können sie ihre persönlichen Werte und Grundsätze leben und motiviert etwas zur positiven Veränderung ihrer Universität beitragen.

Gleichzeitig haben Sie andere Aufgaben zu erfüllen: Sie sind Lehrende, Wissenschaftler*innen, Mitarbeiter*innen der Verwaltung, üben leitende Funktionen aus, u.v.m. Mit diesen Rollen sind oft divergierende Werthaltungen und Identitäten verbunden. Change Agents sind diese (Kern-)Aufgaben ebenso wichtig, sie werden für diese bezahlt und ihre Leistung an ihnen gemessen. Sachlich betrachtet wäre es vielleicht besser, sich auf diese Aufgaben zu konzentrieren, um die begrenzten persönlichen Ressourcen möglichst effizient für das einzusetzen, was der Arbeitsauftrag ist.

Die Rolle als Change Agent aufzugeben oder zurückzufahren und sich auf Kernaufgaben zu beschränken, fällt jedoch schwer. Es besteht die Angst, dass der Nachhaltigkeitsprozess ins Stocken kommt und die Universität nicht mehr ihren angemessenen Beitrag zu Nachhaltigkeit leistet. Im Rahmen der Kernaufgaben kann es auch sein, dass jemand im Widerspruch zu seinen/ihren Überzeugungen und Werten agieren muss (z.B. Flugreisen für Konferenzen, Einhaltung nicht-nachhaltiger Richtlinien, nicht-nachhaltige Beschaffungen). Persönliche Überzeugungen müssen z.T. ausgeblendet werden. Die Verleugnung der eigenen Werte kann zu Demotivation in der Arbeit führen oder sich negativ auf die psychische Gesundheit der Betroffenen auswirken.

Die Überbetonung der Rolle als Change Agent kann dahingegen zu einer permanenten Arbeitsüberlastung führen und dem Gefühl, nichts mehr wirklich gut machen zu können. Durch das oft zeitaufwändige Engagement für Nachhaltigkeitsagenden, die nicht wirklich zu den Kernaufgaben gehören, stehen Change Agents im inneren Konflikt mit ihrem Bedürfnis, auch diesen die notwendige Zeit einzuräumen. Da es oft freiwilliges Engagement ist und die Erfolge schwer erkämpft sind, müssen sie sich immer wieder selbst motivieren, ihre Unsicherheit überwinden oder auf den Zuspruch von außen hoffen, und sie stellen sich die Frage nach dem Sinn ihrer freiwilligen Tätigkeit.

Dies trifft vor allem dann zu, wenn Change Agents als Einzelkämpfer*innen agieren. Die Rolle als Change Agent erfordert viel Kraft und auch Mut. Es kann das Gefühl entstehen, sich in Dinge einzumischen, die einen vermeintlich nichts angehen.

Dieses Spannungsfeld ist auf der individuellen Ebene angesiedelt. Es hängt eng mit dem Spannungsfeld „ehrenamtlichen Engagement versus Nachhaltigkeit als Auftrag der Leitung" zusammen, wobei letzteres eher den organisationalen Rahmen anspricht und weniger die individuelle Ebene.

Das Spannungsfeld der individuellen Rollen spiegelt einen inneren, individuellen Konflikt von Change Agents wider – wobei es von manchen stärker empfunden wird als von anderen. Je mehr das Engagement freiwillig und zusätzlich zu den Kernaufgaben gestaltet ist oder die Wertschätzung der Leitungsorgane fehlt, umso eher ergeben sich Konflikte zwischen den unterschiedlichen Rollen. Da es für eine nachhaltige Entwicklung noch vieler Schritte bedarf, kann sich durch das Gefühl, die eigene Rolle immer noch größer gestalten zu müssen, ebenfalls ein Rollenkonflikt ergeben.

Ergebnisse der Diskussion

Ergänzungen/Erläuterungen/Konkretisierungen

- Auch wenn man für NH an einer Uni zuständig ist, heißt das nicht, dass man sich um alle NH-Agenden der Unis kümmern kann -> damit könnte man den einzelnen Aspekten auch nicht den Stellenwert geben, den sie verdienen;
- Gleichzeitig ist man oft die/der zentrale Ansprechpartner*in und bekommt sehr vielfältige Anfragen
- Vieles kommt kurzfristig, unvorhersehbar
- Als jemand mit befristetem Dienstvertrag ist es schwieriger, sich von weiteren Aufträgen abzugrenzen -> kann auch dazu führen, dass für NH-Agenden weniger Zeit ist oder Mehrstunden notwendig sind
- Möglichkeiten zum Delegieren sind abhängig vom Engagement der Kolleg*innen
- Leitung hat wenig Vorstellung davon, was die Koordinationsstelle leistet, wieviel Engagement dahintersteckt;

Verschlechterung der Situation

- Viel ankündigen (als Universitätsleitung) und nie Taten folgen lassen, nie die Ressourcen bereitstellen
- Nie nein sagen, Aufgaben akkumulieren

Lösungsansätze inkl. Einschränkungen und Widersprüche

- **Aufgaben/Lasten verteilen & Unterstützung suchen**:
    - Operatives auf mehrere Schultern verteilen, Arbeitsgruppen gründen, Studierende einbinden;
    - Unterstützung im außen suchen (BIG, Ministerium, etc.)
    - Unterstützung aus der Allianz suchen
    - Verbündete suchen
- **Sichtbarkeit** herstellen: interne und externe Öffentlichkeitsarbeit
- **Spannungsfeld einfach ignorieren**, nicht darüber nachdenken, in welche Rolle man gerade agiert
- **Entschleunigung**: Dinge entschleunigt angehen, (Frei)Räume schaffen, Multitasking vermeiden
- **Verständnis schaffen** bei Vorgesetzer/m
- **Keine zu fixen Pläne machen**

- Auf den **Sinn in der Arbeit** konzentrieren
- **Erfolge visualisieren**/bewusst machen
- **Schwierigkeiten antizipieren/miteinkalkulieren** -> weniger belastend
    - Widerstand professionell und mit möglichst wenig Emotion begegnen
- EMAS als guter Hebel, um Dinge voran zu bringen; v.a. auch durch **Verbesserungsvorschläge des/r externen Auditors/Auditorin**

6. (De)zentrale Strukturen

	Zentrale NH-Strukturen	Dezentrales NH-Netzwerk
POSITIVE ASPEKTE / ERGEBNISSE	• z.B. Nachhaltigkeits-Institute / Fakultäten, Nachhaltigkeitszentren, -koordinatoren • Bündelung von Kompetenzen und Wissen zu Nachhaltigkeit, Übernahme der Verantwortung • zentrale Ansprech- und Koordinationsstellen • Stellen Querverbindungen zwischen Disziplinen, Bereichen, etc. her • Sichtbare Zeichen von NH an der Uni, Stabilität & Kontinuität	• NH-Akteur*innen institutionell unterschiedlich angebunden • Verteilung der Verantwortung • Gemeinsame Klammer kann durch Beirat, Kerngruppe, o.ä. gegeben sein • Expertise und Umsetzungswille verschiedener Stellen wird genutzt • Selbstorganisation entspricht der Organisationskultur von Universitäten
NEGATIVE ASPEKTE BEFÜRCHTUNGEN	• Akteur*innen außerhalb dieser Strukturen können sich nur schwer engagieren; Demotivation • Vorhandene Expertise und Potentiale bleiben ungenutzt • Zentrale Stellen können als Ganzes in Frage gestellt werden • Widerspruch zur dezentralen Governance von Universitäten	• Komplexe Struktur für Außenstehende und neu hinzugekommene schwierig zu durchschauen • Zentrale Anlaufstelle mit Entscheidungsbefugnis fehlt (mit zunehmender Komplexität) • Inhaltliche Klammer, strategische Ausrichtung fehlt • Einzelne Bereich bei Wegfall von Personen gefährdet • Irritationen möglich, da quer zu Hierarchien & Strukturen
CA	• Entweder Teil eines dezentralen Netzwerks oder einer zentralen Nachhaltigkeitsstruktur • Sichtweise auf Vor- und Nachteile abhängig von eigenen Erfahrungen / eigener Situation • Müssen sich als Gestalter*innen des NH-Prozesses für eine oder andere Organisationsform einsetzen	

Abbildung 6: Darstellung des Spannungsfelds im Sinne einer „Polarity matrix" als Diskussionsinput basierend auf Analyse und Interpretation der Interview-Ergebnisse. NH: Nachhaltigkeit; CA: Spezifische Position/Sichtweise der Change Agents;

Beschreibung

Zentrale Strukturen zur Verankerung von Nachhaltigkeit an Universitäten sind z.B. Nachhaltigkeits-Institute/Fakultäten, Nachhaltigkeitszentren, -koordinatoren. Sie bündeln Kompetenzen und Wissen zu Nachhaltigkeit und fungieren als zentrale Ansprechstellen. Sie können die Verantwortung für den Nachhaltigkeitsprozess und einzelne Aktivitäten übernehmen, als Koordinationsstellen dienen und die für Nachhaltigkeit notwendigen Querverbindungen zwischen Disziplinen, universitären Bereichen, etc. herstellen. Sie sind ein sichtbares Zeichen für Kontinuität, Stabilität und der Verankerung des Nachhaltigkeitsthemas an den Universitäten.

In einem dezentralen Netzwerk ist Nachhaltigkeit an verschiedenen Stellen der Universität verankert und lebt vom Engagement einzelner Akteur*innen. Die Mobilitätsbeauftragte ist Teil des Instituts x, ein Kollege des Facility Managements versucht, nachhaltige Beschaffung zu forcieren, eine Professorin des Instituts y berät das Rektorat in Bezug auf Nachhaltigkeit in der Lehre, etc. Die Verantwortung ist auf mehrere Bereiche aufgeteilt. Eine gemeinsame Klammer kann durch einen Nachhaltigkeitsbeirat oder eine Kerngruppe o.ä. gegeben sein, in dem die Aktivitäten mehr oder weniger stark abgestimmt und strategische Diskussionen geführt werden. Da an Universitäten Expertise und Umsetzungswille an verschiedenen Stellen vorhanden ist, kann diese Art der Selbstorganisation sehr effizient sein und der Organisationskultur von Universitäten gut entsprechen.

Für Außenstehende und Personen, die neu an die Universität kommen oder neu in den Prozess einsteigen wollen, ist es jedoch schwierig zu erkennen, wie solch ein dezentrales Netzwerk funktioniert, wer Ansprechpartner*in ist oder wer Entscheidungen trifft. Je größer der Nachhaltigkeitsprozess ist, umso schwieriger ist es ohne zentrale Koordination und/oder zentrale Stellen, und es wird zunehmend herausfordernd, verschiedene Meinungen und Vorstellungen zusammenzubringen. Die Gefahr besteht, dass die inhaltliche Klammer oder eine gemeinsame strategische Ausrichtung fehlt oder einzelne Bereiche aus personellen oder anderen Gründen aus dem Prozess herausfallen. Diese Form der Organisation liegt quer zu üblichen Hierarchien und Strukturen und kann damit für Irritationen sorgen.

Wenn der Fokus dahingegen zu sehr auf zentralen Strukturen liegt, besteht die Gefahr, dass Akteur*innen, die nicht Teil dieser Strukturen sind, keine Möglichkeit sehen bzw. haben oder keinen Anreiz haben, sich im Prozess zu engagieren. Sie können auf diese zentralen Stellen verweisen und sich damit selbst aus der Verantwortung nehmen. Vorhandene Expertise und Potentiale bleiben dadurch ungenutzt. Auch eine zentrale Struktur ist angreifbar bzw. kann leichter als Ganzes in Frage gestellt werden als ein dezentrales Netzwerk. Zentrale Stellen können darüber hinaus in Konflikt zur grundsätzlich dezentralen Governance von Universitäten stehen.

Dieses Spannungsfeld ist auf Ebene der Organisation (Universität) angesiedelt. Es spricht die Frage an, wie ein Nachhaltigkeitsprozess am besten aufgestellt ist. Es ist eng mit dem Spannungsfeld zwischen freiwilligem Engagement und top-down Aufträgen für Nachhaltigkeit verbunden.

*Change Agents sind entweder Teil eines dezentralen Netzwerks oder einer zentralen Nachhaltigkeitsstruktur. Die Sichtweise auf die Vor- und Nachteile der beiden Pole ist daher auch von ihrer eigenen Situation und ihren eigenen Erfahrungen abhängig. Als Gestalter*innen des Prozesses liegt es zudem oft an ihnen, sich für die eine oder andere Organisationsform einzusetzen.*

Ergebnisse der Diskussion

Ergänzungen/Erläuterungen/Konkretisierungen

- Infrage stellen einer Stelle aktuell nicht vorstellbar (weil NH aktuell ein Trend ist)
- Dezentrale Personen sind oft Einzelkämpfer*innen, die nicht in den Gesamtkontext eingebunden sind und u.U. auch in Frage stellen, was andere machen; wenn Einzelkämpfer*innen weggehen, ist das ein großer Verlust [weil sie ihr Wissen, Engagement, etc. mitnehmen]
- Eine Uni braucht mehr als 1-2 Personen, sehr weit gefächertes Themengebiet, braucht auch Struktur, um zu zeigen, dass mehr als eine Person dahintersteht
- Zentrale Struktur darf nicht nur strategisch aufgestellt sein, es braucht auch Leute für die Umsetzung, *„Sonst verlässt es sehr langsam und sehr zögerlich und nur auf Motivation einzelner die strategische Ebene."*
- Zentrale Strukturen bergen die Gefahr, dass alles, was NH betrifft, dort „abgeladen" wird (einerseits Vorschläge, was alles getan werden müsste, andererseits auch die Verantwortung dafür) – viele haben auch den Anspruch an sich, für alles zuständig zu sein
- Strukturen, die quer liegen, bringen Vernetzung (Faculty, Campus Management, Rektorat, etc.) – [hoher Anspruch:] man muss mit allen im Austausch sein
- kleinere Projekte und Engagements in einzelnen Bereichen ändern nur in diesem einen Bereich etwas.
- Auch für die Umsetzung braucht es zentrale Strukturen, z.B. Räume für Online-Conferencing
- Stundenausmaß: sehr unterschiedliche Vorstellungen; Zentrale Personen sind oft „eigentlich" für etwas Anderes zuständig; „Es funktioniert, weil wir das alle wollen"; es braucht aber Personen, die in der Lage sind, sich dafür einmal Zeit zu nehmen.

- Inwiefern spielen unterschiedliche Akteursgruppen eine Rolle? Alle mitdenken, aber bestimmte Formate sprechen vor allem bestimmte Akteursgruppen an.
    - Unterschiedliche Gruppen werden von unterschiedlichen Leuten adressiert
- Wenn mehrere Leute aktiv sind, wird es schwierig, den Überblick zu behalten
- Dezentrale Strukturen können wirkmächtig sein, wenn dadurch z.B. dem Rektorat gegenüber gezeigt wird, dass es mehrere/viele Personen sind, die da dahinter stehen.
- Zentrale Strukturen für den (strukturierten) Austausch mit dem Rektorat notwendig

Andere Sichtweisen

- Einzelkämpfer*innen fehlt der Gesamtkontext
- Für externe Stakeholder sind zentrale Ansprechstellen einfacher
- Auch für interne angenehm, *„wenn es irgendwo jemanden gibt, der dafür zuständig ist & das ganze Thema dann damit abgehakt ist“*
- Dezentrale Strukturen für Universitätsmanagement (Rektorat) auch unangenehm: Forderungen, die man nicht (finanzieren) will, Dinge können dann nicht mehr in eigener Hand gehalten werden;

Verschlechterung der Situation

- Nachhaltigkeitsbeauftragten mit zu wenig Stunden einsetzen oder jemanden, der sich eigentlich nicht für die Materie interessiert
- Mainstreaming von NH – jeder muss einfach in seinem Bereich was machen, (keine übergeordnete Struktur); regelmäßige Reports über Tätigkeiten (von allen) verlangen
- Kommunikation unterbinden: Leute nicht einander vorstellen, Treffen nicht abhalten; Interesse und Kompetenz von bestimmten Personen in Abrede stellen;
- Kommunikation an sich reißen, Vorhaben verkünden ohne Absprache mit Rektorat oder anderen Personen (weil mir z.B. die Geduld ausgeht); nicht von Aktivitäten berichten/in Kenntnis setzen; Personen, die vielleicht dagegen sind, nicht informieren oder sie aktiv ablenken;
- Links auf der Homepage nicht funktionieren lassen -> Informationen verstecken und unzureichend aufbereiten, nicht zur Verfügung stellen
- Ergebnisse kleinreden, nicht erwähnen

Lösungsansätze inkl. Einschränkungen und Widersprüche

- **Commitment der Leitung**: Beide Seiten stärken: Rektorat überzeugen, sich zu deklarieren -> Stelle/Gremium schaffen, dass offiziell wirklich was tun darf & dezentrale Stellen anspricht -> nur Kombination (aus zentral und dezentral) ist wirklich effektiv
- **Verbindung von den best-of aus beiden Handlungsfeldern:** Stelle, die bestimmte definierte Aufgaben hat und Budget und die dann fähig und in der Lage ist, alle Personen, die engagiert sind, einzubinden, abzuholen und dabei zu halten -> das Beste herausholen
- **Kommunikation**: Zentrale und dezentrale Stellen müssen voneinander Bescheid wissen, nicht vergessen, dass es die jeweils anderen gibt.
- **Vertreter*innen benennen**: pro Lehrstuhl eine Person identifizieren, die sich aktiv um die Umsetzung solcher Initiativen kümmert. Wenn man denen ein paar Stunden gibt, es zu machen, hätte man einen Pool an Menschen.
    - Dass man an die Lehrstühle herantritt und bittet, identifiziert jemanden.
    - ein bisschen eine zentrale Struktur geben -> Konkurrenz zwischen den Lehrstühlen reduzieren
    - Geeignete Person finden: am Ende hängt es immer von der Brillanz der Personen ab, von ihrer Überzeugung und auch ihrer sozialen Kompetenz

- **Kommunikation**: es hängt von der Qualität der Kommunikation ab, ob ein Thema weitergeht oder nicht. Je zentraler es (eine Struktur) ist, umso schwieriger ist es, die Message wirklich in alle Bereiche zu transportieren oder an die Leute zu bringen, die helfen können
    - Kommunikation als positiver & negativer Schlüssel
    - Übersicht geben (wer ist aktiv?)
    - wichtiges internes Narrativ: wir ziehen hier an einem gemeinsamen Strang. Also wir sind alle bei der Sache mit dabei.
    - Neues in der eigenen Institution entdecken/aufgreifen, zeigen und dann schauen, dass die Institute miteinander reden. Was habe ich für eine Lösung gefunden für ein Problem. Dass die interne Kommunikation angeregt wird und dass man zeigt, okay man kann gemeinsam sehr viel mehr erreichen
    - Immer wieder Feedback einfordern – Möglichkeiten geben, Ideen einzubringen
- **Vorbild** sein
- **Kooperationen**: Wenn internes Problembewusstsein fehlt -> externe Verbündete suchen (z.B. Veranstaltungen: aufzeigen, was es woanders schon gibt; Erfahrungen aufzeigen; s.a. Allianz
- **Persönliche Qualitäten**/Resilienz
- **Eigene Ideen weitergeben**: nicht als eigene große Idee verkaufen

Sinn des Spannungsfeldes

- wenn man das ignoriert, tut man sich selber nichts Gutes.
- Ignorieren des Spannungsfeldes würde zu Frust und Stillstand führen

Ergebnisse des Feedbacks

Die Teilnehmer*innen wurden am Ende der Diskussion gebeten, Feedback zur Diskussion gegeben. Die folgenden Abbildungen fassen die Ergebnisse aus beiden Gruppendiskussionen zusammen.

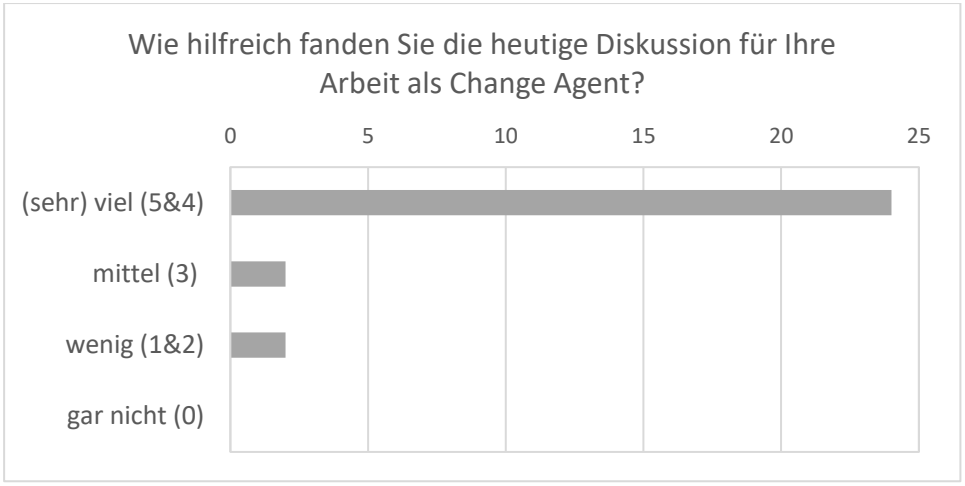

Abbildung 7: Allgemeines Feedback zur Diskussion

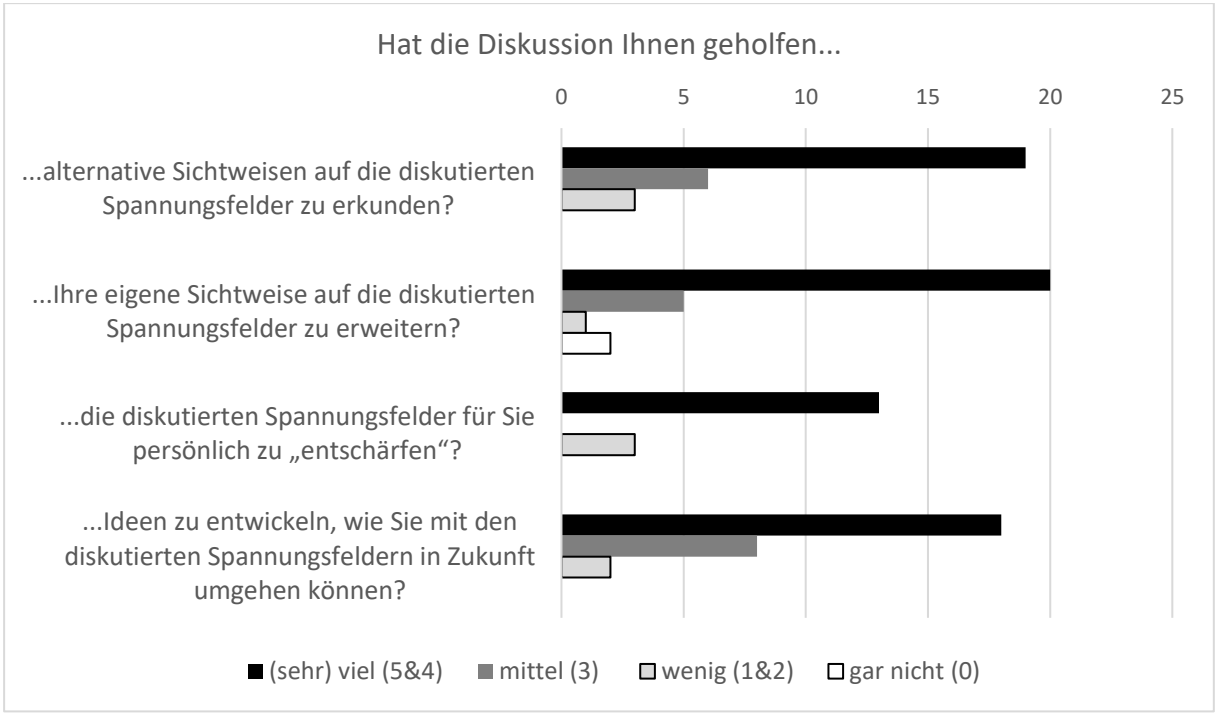

Abbildung 8: Feedback zu Teilaspekten

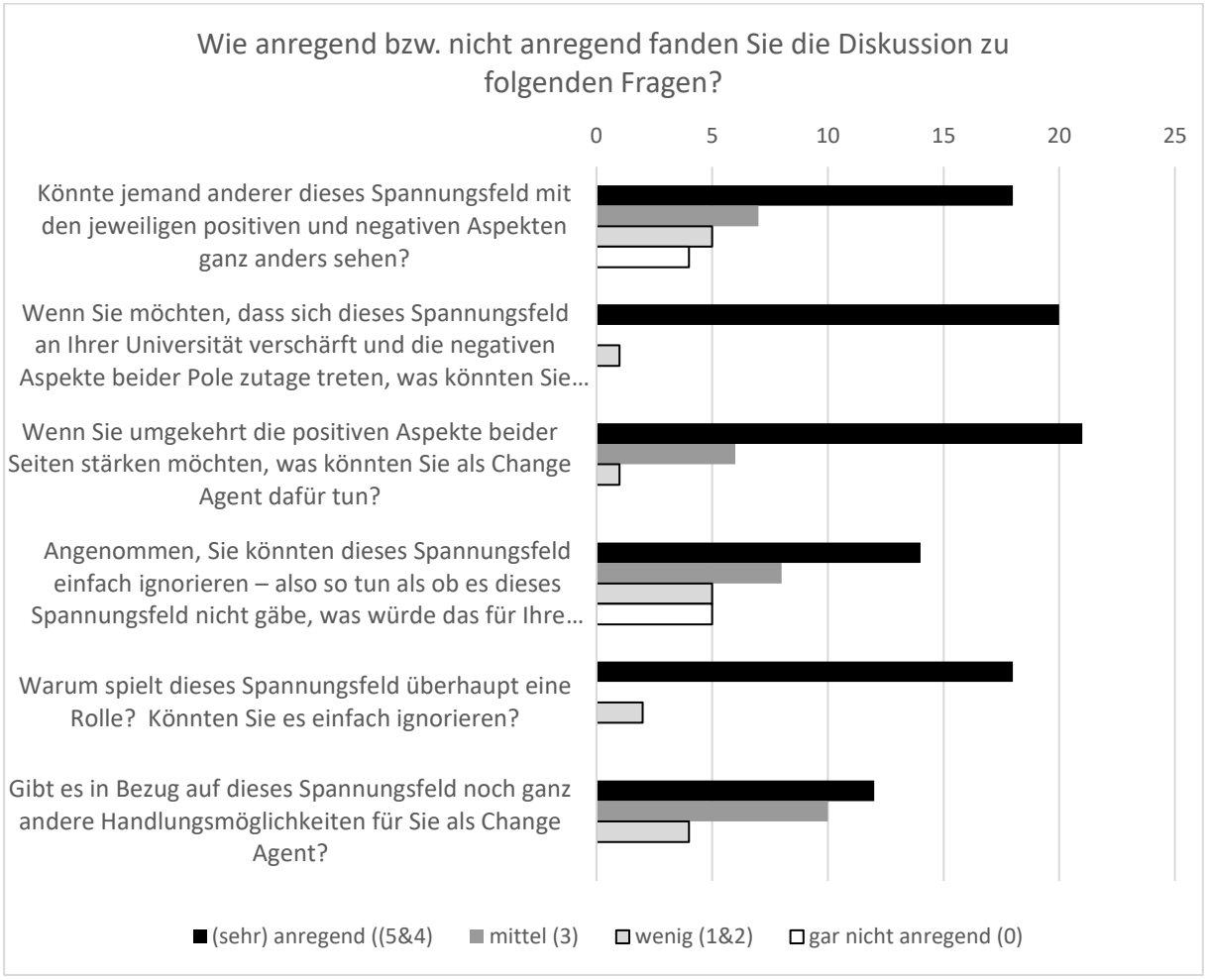

Abbildung 9: Feedback zu den Leitfragen (s.a.Einleitung)

Appendix C: Focus Group Schedule

Start	Duration	Topic
11:00	00:10	Arrival & welcome (including buffer); Goals and process of the focus group
11:10	00:05	Introduction round: name & organization, one word about expectations
11:15	00:08	Input: research project and feedback on the comments (general)
11:23	00:05	Questions/discussion
11:28	00:05	introductory exercise: value square (Schulz von Thun)
11:33	00:02	Change into groups (prepared groups, unless there are objections)
11:35	00:02	**Welcome in groups and start recording** Transcript on PPT by the moderator -> look over it together at the end & ask someone from the group to present results in the plenum.
11:37	00:05	Introduction of the tension field (ppt)
11:42	00:05	**Would you like to correct or add anything in this presentation in advance to be able to start the discussion? What questions do you have in relation to this tension, to facilitate your understanding?** *Can we agree on this common view?* *Are there any questions about understanding this area of tension?*
11:47	**00:10**	**Could someone else view this tension, with its respective positive and negative aspects, differently?**
		Possibly follow up: or is that a general view? Who? How different?
		If the discussion does not get going: Would the rectorate, senate, monodisciplinary scientists, students, etc. also approve of this presentation on the area of tension? Or mention other aspects?
11:57	**00:05**	Now, a somewhat paradoxical question: **If you want this tension to intensify at your university and the negative aspects of both poles to come to light, what could you do as a change agent to make this happen?**
		If your scope for action is very limited: what could the university / other actors at the university do about this & how can you, as a change agent, support them?
12:02	**00:25**	**Conversely, if you want to strengthen the positive aspects of BOTH perspectives, what could you do as a change agent to achieve this goal?**
		(If your scope for action is very limited: what could the university / other actors at the university do about this & how can you, as a change agent, support them?)
		Possible inputs: mention general management strategies: *Acceptance and 'working through'* *Temporal separation* *Spatial/Structural separation* *Synthesis/Integration* *Combination of approaches* *Differentiation & integration* *Dynamic decision-making/ oscillating*
12:27	**00:05**	**Assuming you could simply ignore this tension, i.e., pretend that this tension does not exist, what would that mean for your work as a change agent?** *OR: Why does this area of tension even play a role? Could you just ignore it?*
		What would 'acceptance and "working through"' mean in the context of this area of tension?
12:32	**00:05**	**What are some completely different possibilities of action that you can engage in as a change agent in relation to this tension?** Possibilities we haven't considered yet?
12:37	00:05	**Is there anything else you would like to share with the group about this area of tension and discussion?**
12:42	**00:03**	**Share notes - Who would like to present the group's results in the plenary session?**
12:45	00:05	Break
12:50	00:10	Plenum: Tension 1 (short presentation by group member and discussion)
13:00	00:10	Plenum: Tension 2 (short presentation by group member and discussion)
13:10	00:10	Plenum: Tension 3 (short presentation by group member and discussion)
13:20	00:08	**Complete feedback survey**
13:28	00:02	Conclusion and farewell (outlook for report)

Appendix D: Academic CV & Publication List

Elisabeth (Lisa) Bohunovsky, Mag.rer.nat., MSc

ORCID	https://orcid.org/0000-0001-6918-0220
Affiliation	Centre for Global Change and Sustainability, University of Natural Resources and Life Sciences (BOKU), Vienna
Web	https://boku.ac.at/en/personen/person/5FDD9B3F81EB50F8

Academic career and positions

2018-to date	Deputy of Centre for Global Change and Sustainability, BOKU University of Natural Resources and Life Sciences, Vienna
2013-to date	Senior researcher at Centre for Global Change and Sustainability, BOKU University of Natural Resources and Life Sciences, Vienna
2009-2013	Deputy / Co-leader of Working Group "Quality of Life and Integrated Strategies". SERI Sustainable Europe Research Institute GmbH, Vienna
2004-2013	Sustainability researcher and project leader, SERI Sustainable Europe Research Institute GmbH, Vienna
2001-2003	Administrative project manager, Institute for Urban and Regional Research (ISR) of the Austrian Academy of Sciences, Vienna

Education, academic qualification, and further education

2020-to date	PhD student at BOKU University of Natural Resources and Life Sciences, Vienna
2006-2008	International Postgraduate Program: Renewable Energy in Central & Eastern Europe (MSc), Technical University Vienna & Energiepark Bruck/Leitha (Austria) • Thesis: „Behavioural Aspects of Energy Consumption in Private Households. Participatory Approaches for Energy Conservation"
2003-2004	Studium Integrale, supplementary university studies for interdisciplinary communication, Faculty of Interdisciplinary Research and Continuing Education (IFF); University of Klagenfurt (Austria)
1993-1999	Diploma studies in Human Biology, Human Ecology (Mag.ª rer.nat.), University of Vienna, completion with distinction • Thesis "Das Mühlviertel – ein ländlicher Raum. Bevölkerungsentwicklung seit 1970 im Spiegel des Verhältnisses Mensch-Natur" [Das Mühlviertel – a Rural Area in Austria. Aspects of Population Development since 1970 and Man-Nature-Relationship]

International experiences

09-10/2022	LEO Lecturer Intermittent with the School for Environment and Sustainability SEAS at the University of Michigan (MI, USA) for Fall A term, Course "EAS 501- Campus Sustainability"
02-06/1996	Universidad Autónoma de Madrid, Spain, Erasmus Student Exchange Program of the European Union
07-08/1995	International Volunteer at Pictured Rocks National Lakeshore (Michigan, USA): assisting with research and conservation work

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