

Article

Sustainability Transfer as a Concept for Universities in Regional Transformation—A Case Study

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Abstract: The research object of this study is the in-depth discourse on the sustainability transfer activities of higher education institutions (HEIs) and their contribution to a regional sustainable transformation. For this purpose, a heuristically-derived concept of sustainability transfer is empirically tested with a mixed-methods approach based on the example of Eberswalde University for Sustainable Development (HNEE). The empirical findings demonstrate that the realization of sustainability transfer depends mainly on the personal initiative of teachers and researchers. Major barriers are a lack of time and financial resources. The observed concept of sustainability transfer is applicable to all study and research areas of HNEE. Involvement in sustainability transfer can include the whole of society, from politics, enterprises, and civil society to education and research institutions. Overall, the empirical testing of the concept offered by this study illustrates its practical suitability to capturing specifically those sustainability transfer activities that are not tapped by third mission approaches. This opens up a novel dimension for transfer potential at universities and their role in regional sustainability transformation. It also highlights that the interdependencies between HEIs and practitioners need to be more contextualized with quality criteria such as the value of the transfer performance or level of ambition.

Keywords: higher education institutions; sustainability transfer; sustainable transformation; practitioner-university partnership; sustainable development



Citation: Demele, U.; Nölting, B.; Crewett, W.; Georgiev, G. Sustainability Transfer as a Concept for Universities in Regional Transformation—A Case Study. *Sustainability* **2021**, *13*, 4956. <https://doi.org/10.3390/su13094956>

Academic Editors: Daniel Schiller and Verena Radinger-Peer

Received: 5 March 2021

Accepted: 20 April 2021

Published: 28 April 2021

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1. Introduction

Higher education institutions (HEI) are one of several actors in a regional sustainability transformation because they can contribute theoretical and empirical knowledge, methodological competence, criticism and the ability to reflect on promoting regional transitions towards sustainability [1]. HEIs are part of the public knowledge structure and thus act as regime players. At the same time, university research and/or students can be niche actors promoting sustainability innovations through projects and networks [2,3]. In neither role, however, can universities be the sole actor driving regional sustainable development, they depend on cooperation with further actors bringing in practical knowledge and experience-based expertise, resources, and operational capacities [4]. We call these societal actors from outside of the university system “practitioners”.

Generally, there is a growing focus on transfer from HEIs, as expectations of both society and policy in Germany increase for universities to have a direct societal impact beyond education and research [5,6]. Effective university-practitioner cooperation has an enormous but as yet un-tapped potential for dealing with regional sustainability challenges. However, concepts for such interaction are either rather general and fuzzy or very specific (e.g., restricted to mere technology transfer from engineering development to production in business); there is a gap between theory and practice that may arise as a result of conceptual ambiguity, hindering strategic alignment, and the applicability of results to a solution [7,8]. This gap is also reflected in the very divergent motives of theoreticians and

practitioners. For example, while academics tend to be interested in open sustainability research and knowledge transfer, companies are interested in quick, profitable, output-oriented sustainability solutions due to their characteristics as market players. Accordingly, HEIs can take on different roles in generating knowledge and shaping society.

Concepts such as “entrepreneurial university” or RIS university (Regional Innovation Systems) focus on economic effects and classical technology transfer [9]. They can be summarized under the term “mode 1 universities” [10], which are based on a rather linear understanding of transfer. The “mode 1” of knowledge production on the part of the university is traditionally academic, autonomous and disciplinary, and knowledge is transferred from the university to companies. In the context of complex regional change processes with a diverse structure of actors, this understanding is insufficient.

Thus, “mode 2” of knowledge production comes into view, which, in addition to scientific solidity, claims a practical application reference [7,11]. Such a “post-normal science” [12] strives for solutions to social problems and the design of corresponding social processes; it is, thus, about “socially robust knowledge” that proves itself in practice or application [7,13]. In order to be able to produce results that can be applied both to science and society, this type of knowledge generation is reflexive, e.g., with regard to socio-ecological consequences and side effects, which is why aspects such as technology assessment or social innovations are important here.

Following on from “mode 2”, Etzkowitz and Leydesdorff emphasize social interactions that link HEIs with industry and government and involve them as innovation drivers [14]. They propose a “Triple Helix Model” with the strands university–industry–government to illustrate corresponding interdependencies, overlapping and exclusion areas in the innovation process. While this can be used to illustrate the dynamic process in generating knowledge, such a model is only suitable to a limited extent in the context of this article because, firstly, the reference to sustainability with its many facets and normative orientation is missing and, secondly, the model has an economic reference. Thus, the “Triple Helix Model” covers too narrow a scope of regional sustainability transformation for the exploration and testing of the developed sustainability transfer concept for HEIs. The same applies to the continuation of this model by adding further components as a so-called Quadruple or Quintuple Innovation Helix [15], whose predominant reference points are the market and economic-state structures [16].

The focus of this paper is on sustainability transfer, which is only partially compatible with the Helix approach understanding of innovation in terms of value orientation alone. In the context of “mode 2”, concepts such as “engaged university” or “co-creation for sustainability” can be used, which focus on the interaction of HEIs with practitioners from all societal fields and include socio-ecological, cultural and, thus, overall societal contributions in addition to economic and technological achievements [10,16]. It is precisely these “mode 2 universities” that are the subject of this article.

Against this background, we propose the concept of sustainability transfer focusing on the agency of HEIs for regional sustainability transformation, providing practical knowledge as well as strategic and normative orientation. Sustainability transfer refers to bi-directional exchange of knowledge, ideas and technology between universities and practitioners to promote sustainable development in a societal context [17]. This transfer aims at using synergies from both practitioners and the university system to achieve comprehensive results for promoting sustainable development [18]. At the normative and strategic level, such an exchange includes, for example, guiding principles, definitions and goals of sustainability as well as striving for societal participation [19]. In the continued rollout, the characteristics of such an exchange also involve operational processes including organizational, methodological and social characteristics as well as rules and exchange formats for these processes [20]. They define how transfer activities are co-designed, tailored to local contexts, communicated, and put into practice. Their features, therefore, determine success and failure of sustainability transfer activities.

So far, there are only few scientific concepts and empirical analyses available, which provide guidelines for sustainability transfer in a local and regional context [8,16,17,21]. For this reason, this paper aims to advance the foundations for sustainability transfer activities between universities and practitioners. We have developed a framework and methodological approach for conceptualizing, empirically investigating, and analyzing systematic processes of science-practice interactions. We have conducted an exemplary empirical survey of sustainability transfer activities at HNEE [22].

The overarching research question is: What does the concept of sustainability transfer contribute to an improved understanding of HEIs' agency as a key element for regional sustainability transformation strategies? We underpin our general research interest with the following subordinate questions: Q1: What kind of forms and formats of sustainability transfer can already be found in education and research? Q2: What are the benefits, drivers and barriers encountered when teaching and research personnel engage in different forms of sustainability transfer? Q3: What are the advantages and limitations of the proposed concept of sustainability transfer with regard to clarifying individual and organizational dilemma situations of science-practice interaction in sustainability transitions?

The research object of this study is the role of university-practitioners' cooperation in teaching and research as two essential functions of universities that may possibly contribute, together with third mission activities, to a sustainability transformation. The challenge here is that the connection and interdependencies between science and practice related to regional sustainability transformation, points to questions regarding an extension or even a change of the reference system for HEIs from science to other societal functional (sub-)systems. This requires an adapted understanding of scientific conception.

The aim of this explorative empirical study is to understand and assess such transfer activities that have practical societal impact such as "co-creation for sustainability" [16] and that go beyond science communication. It intends to identify generic processes in the occurrence of sustainability transfer as well as opportunities for action to develop and implement sustainability transfer. Moreover, it helps to understand the obstacles to the conceptual development and implementation of sustainability transfer. Our findings serve to inform organizational reflection and development of HEI structures and processes, as a contribution to making regional sustainability transition happen. However, as this empirical research focuses on HEI activities, it does not have a specific spatial or regional focus, nor do we have an explicit regional delimitation.

The study follows a mixed methods approach with an explorative as well as an explanatory interest in knowledge generation. The study builds on an empirical survey of sustainability transfer at the Eberswalde University for Sustainable Development (HNEE). This university was chosen as a case study because of its focus on sustainability research, teaching and transfer manifested by a broad range of university-practitioner co-operation for mainly regional sustainable development, in line with the university's transfer strategy [23]. In Section 2 the concept of sustainability transfer is introduced. We provide a classification of the concept, a definition and a description of the specific characteristics of sustainability transfer. Subsequently we describe the methods used in Section 3. In Section 4 the results comprise firstly the needs, potentials and barriers of sustainability transfer identified by the respondents and secondly the findings concerning formats, the ratio of sustainability-orientation in the activities, the type of actors involved as well as perceived advantages and obstacles of sustainability transfer for the respondents. In Section 5 we discuss our findings regarding the introduced concept of sustainability transfer, in Section 6 we present conclusions, limitations, and needs for future research.

2. Conceptual Framework and Characteristics of Sustainability Transfer

To achieve a common understanding of the transfer activities of HEIs and a conceptualization that supports the operation and implementation specific to sustainable development, we developed further a conceptual understanding of sustainability transfer building on earlier work [17,24]. Yet, there is a methodological challenge in conceptu-

alizing and analyzing practitioner-university relationships. The reason for this is that (sustainability) transfer activities vary considerably depending on the common agreement reached between the university and the practitioners involved, regarding their understanding of and aspiration to sustainability. This can include the type of collaboration (e.g., project-based, discursive, reflexive, agile, results-oriented, etc.) and the choice of transfer. Therefore, a framework was developed for an empirical test at our own university. Based on the characteristics of sustainability transfer, (a) constellations of actors, (b) complexity of transfer relations, (c) formats, and (d) typical phases are outlined. These characteristics feed the survey instruments.

2.1. Classification and Delimitation of Sustainability Transfer

In this paper we apply a broad understanding of transfer that refers to the exchange of knowledge, ideas, experience and technologies between universities and actors from other societal fields outside academia, here called practitioners. This includes business, politics, administrations, municipalities, NGOs, and other civil society organizations, initiatives and citizens as well as educational organizations. Teachers, researchers, students, employees, e.g., from the administration and, in particular, transfer offices can be involved on behalf of the universities.

Sustainability transfer is defined as a specific form of transfer, namely the practitioners-university co-operation that contributes or aims to contribute to a sustainable development in society. It is characterized by a definition of the sustainability goals of the transfer activities and a description of the sustainability effect aimed at in each case. Results of sustainability transfer are (a) contributions to sustainable development such as models, projects, technologies, concepts, solutions, tests or discussions about sustainability and (b) the strengthening of the key competencies for sustainable development of the transfer partners involved, through joint learning processes [24].

Analogous to general transfer activities, sustainability transfer takes place in the core and compulsory areas of a university (teaching, research) and in the context of third mission, which is understood to comprise interactions with actors external to the university for the realization of socially relevant solutions [25] (see Figure 1). In our understanding third mission activities focus on organizational framework conditions and support structures on the part of the universities, such as science communication, communication channels, exchange formats, and network management.

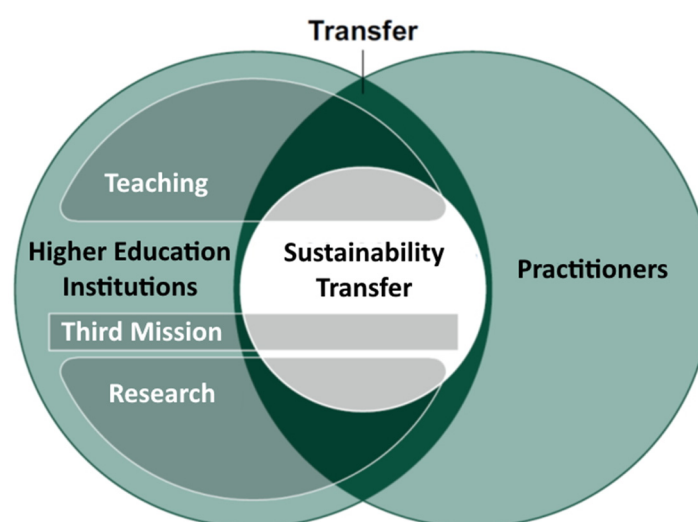


Figure 1. Areas of sustainability transfer.

A crucial aspect of sustainability transfer is its orientation towards sustainable development, this is decisive to differentiate general transfer from sustainability transfer activities. Elsewhere, for the purpose of reflecting on the sustainability orientation, we

propose three approaches which enable an assessment: a) an explicit and joint description of the sustainability goals of the transfer activity, b) the description and consideration of the societal impact of the transfer activity, and c) the reflection and competence-oriented design of the (joint) learning process of the transfer actors according to the principles of Education for Sustainable Development (ESD) [24]. The sustainability orientation makes transfer activities more complex because the goals of sustainable development are often disputed and have to be negotiated and operationalized for each activity. This has consequences for the characteristics of sustainability transfer that are displayed hereinafter. As sustainability transfer is substantively linked to teaching and research activities, we assume that sustainability transfer in teaching is especially appropriate, in order to involve local and regional stakeholders in transdisciplinary projects and discussions and to improve key competencies for sustainable development [17]. Several case studies point to an enormous potential for concrete, low-threshold contributions to regional sustainability with students as transfer actors [26–28].

2.2. Complexity of Transfer Interaction

Experience shows that sustainability transfer is not only supply-oriented, but also requires a mutual exchange between university and practice due to the mostly very complex content-related and methodical handling of sustainability challenges, which ideally leads to a cooperative implementation of sustainable practical solutions. As the following Figure 2 [17] shows, the likelihood of integration between university and practice also increases with growing intensity of exchange or cooperation.

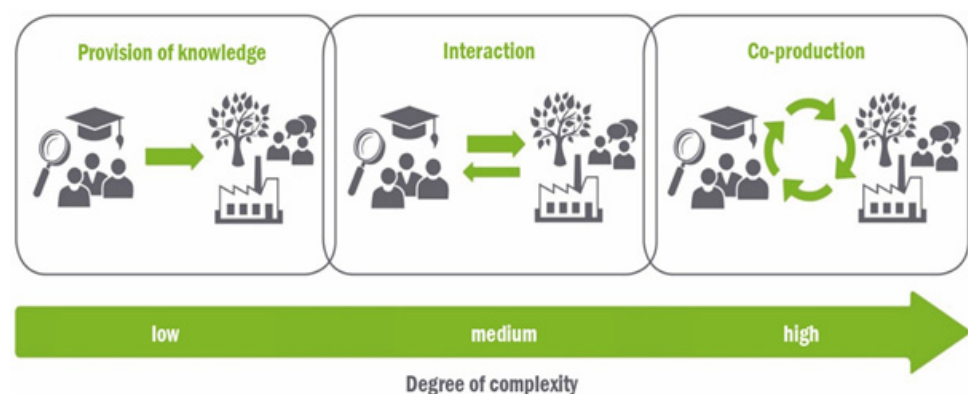


Figure 2. Degrees of complexity of sustainability transfer.

Of course, unidirectional provision of knowledge such as public lectures, exhibitions or practitioners in the lecture hall do have an impact. They are particularly good for showing practical problems, but also for low-threshold science communication with a wide target radius. Their advantage is that they can be carried out with a low input of resources.

Interaction is more demanding when university actors systematically ask for feedback from the field on their transfer activities in order to be able to assess their benefits and effects. Mutual exchange of feedback loops helps in the follow-up of transfer activities. When addressing specific target groups, the communication effort is necessarily higher than with supply-oriented communication because, for example, assessments are obtained on the practicability of recommendations for action. Examples include team teaching, internships, contract research, technology transfer, and expert opinions.

Co-production can be determined at least approximately on the basis of explicitly formulated sustainability goals for the respective transfer activities as well as an assessment of the sustainability impact. Universities then see themselves as one of several actors in the solution of sustainability problems. Transfer is not only conceived and carried out reciprocally, but also jointly and at eye level [4]. This involves the creation of a joint problem description and the development of solution approaches as well as shared responsibility in

application and implementation. This form of exchange is intensive, based on trust and permanence and, thus, focuses on selected, small target groups. Examples are student projects and theses together with practice and for practice, transdisciplinary research projects, e.g., in the form of real laboratories, or joint development of mission statements and sustainability visions.

2.3. Transfer Formats

Due to the fact that transfer includes all functional areas of a university, there is a broad variety of formats for transfer as can be seen in Table 1 [29]. This is also intended to illustrate the multi-layered starting points for sustainability transfer. Corresponding to the previously explained degrees of complexity of interaction, we have developed a heuristic overview of (sustainability) transfer activities in teaching, research, and third mission.

Table 1. Spectrum of transfer formats.

	Teaching	Research	Third Mission
Provision of knowledge from/out of the university	<ul style="list-style-type: none"> Inviting practitioners to courses Using teaching examples from practice in courses (e.g., question, case study, role play) Excursions to practitioners Student project or thesis: developing solutions for practitioners (questions and information from practice) 	<ul style="list-style-type: none"> Popular science publications (professional journals, brochures) Handout for practitioners (manuals, checklists, recommendations) Public relations communication on research results (websites, flyer, press releases, interviews) Public presentations, panel discussions in professional events, Blogs (researchers communication about research) Exhibitions on the basis of research Provision of scientific expertise for policy and society Developing patents, license agreements, models etc. 	<ul style="list-style-type: none"> Press work Open day Exhibitions Websites Social media Corporate design and layout Collaboration on Transfer Consulting for communication (concepts etc.) Fair events Alumni work
Interaction for practitioners	<ul style="list-style-type: none"> Developing solutions for practitioners in courses Team-teaching with practitioners Internship Practical training, certificates Advice from practitioners for teaching programs (advisory board) Student project or thesis: developing solutions with practitioners (question, information from practice, joint supervision, results: recommendations etc.) 	<ul style="list-style-type: none"> Consulting for enterprises, policy, associations (advisory board, hearing, expert communication, expert report) Research workshop with practitioners on questions of implementation and validation of research results from a practice perspective 	<ul style="list-style-type: none"> Frame for dialogue formats Cooperation agreements with businesses, public agencies and municipalities Start-up activities support and consultation
Co-production jointly with practitioners	<ul style="list-style-type: none"> Using learning methods that explicitly refer to practice (research based learning, project based learning, service learning) Student project or thesis: developing solutions jointly with practitioners (joint development of questions, scoping, joint supervision, and valuation through practitioners) 	<ul style="list-style-type: none"> Transdisciplinary projects: joint problem description, co-design of research projects Transdisciplinary projects: joint development/ co-production of sustainability innovations, solutions, overall concepts Transdisciplinary projects: test of instruments, solutions and implementation (co-implementation) Joint scientific publications with practice 	<ul style="list-style-type: none"> Societal engagement (e.g., cultural, social and ecological offers for and by students) Developing and shaping cooperation and strategic partnerships for sustainable development through joint activities

2.4. Transfer Phases

Similar to project management, transfer can be divided into four typical phases, which include specific requirements and tasks [24]: (a) Initiation of transfer and identification of transfer partners, (b) concept and goals of the transfer activity, (c) implementation of the transfer activity, and (d) compilation and documentation of the results. Even if these phases overlap and, therefore, cannot always be separated from each other beyond doubt, it is worth taking a closer look at them to perceive certain challenges with regard to sustainability transfer at different stages.

In the first phase, the choice of topic is based on the practical problem and the interests of the actors, who agree on the specific transfer activity. With regard to sustainability, the challenge here is to balance their motives and goals. The second phase focuses on developing and testing the concept of sustainability, including clarifying content and agreeing on sustainability goals to be achieved in the learning process. For this, ESD offers a variety of approaches and planning suggestions. The challenge of sustainable learning processes is mainly the claim of environmental and social ethical responsibility, which may also cause contradictions with, e.g., economic exploitation interests. The third phase of implementation is concerned with the implementation of the approaches developed to tackle the practical sustainability problem, which at the same time sets in motion a learning and development process in which theory and practice are linked and scientific methods and concepts are applied. Finally, in the fourth phase, the results and experiences are documented and reflected upon so that they can be further used, for example, as a basis for supplementary transfer steps or follow-up projects. This phase is also important for reflecting on the sustainability orientation and impact of transfer.

2.5. Research Approach

The orientation of the research approach (see Figure 3) is made up of three components: Literature research, developed conceptual framework for sustainability transfer, and interviews with deans and vice-deans of the HNEE (see detailed explanations in the method section below). These three sources enabled the deduction of the overarching research question already mentioned in the introduction and the subordinate research questions (Q1, Q2, Q3). Through plausibility assessments, the following assumptions (A1-5) guiding the explorative research: A1: Beyond the third mission, there is demonstrable sustainability transfer in the university functions of teaching and research. A2: Practitioners in the context of sustainability transfer represent all societal realms and not only companies. A3: All three degrees of complexity of sustainability transfer can be found. A4: A broad range of formats for sustainability transfer can be found in teaching and research, with varying degrees of complexity. A5: The description of sustainability transfer projects reveals the ideal-typical transfer phases.

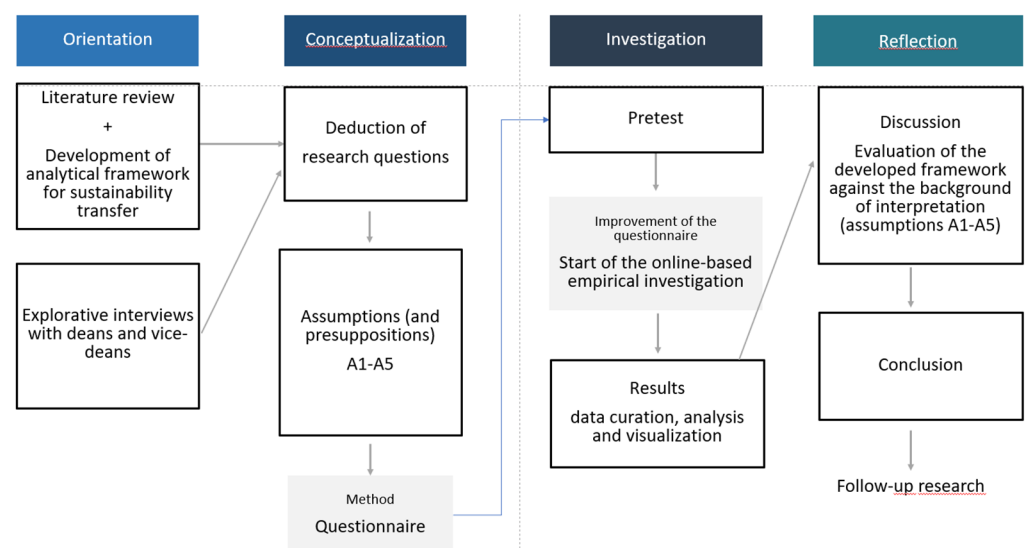


Figure 3. Research model.

Due to the fact that we did not check a causal model, the explication of hypotheses in the context of in-depth correlation analyzes only makes sense in a subsequent step for the relatively new research subject of sustainability transfer. Based on these assumptions, a questionnaire was developed and an online-survey was conducted (see Section 3).

3. Methods

To answer the research question (Section 1) in a targeted manner against the background of the sustainability transfer concept (Section 2), triangulation was the method chosen [30]. The advantage of triangulation as a research method is that different perspectives on the phenomenon (in this case of sustainability transfer) are used and, thus, a more complete picture is obtained [31]. Allowing for triangulation of results, the empirical case study is designed as an explorative quantitative and qualitative research approach [32]. Compared to purely quantitative or purely qualitative approaches, it is more appropriate for testing the suitability of the sustainability transfer concept. Consequently, our empirical study design is informed by a literature review, document analysis, and results of university specific reporting on research, transfer, and science communication activities. In a first step, we applied semi-structured interviews to orient, structure, and enrich the online survey.

Semi-structured expert interviews: Three interviews with the deans and vice-deans of three of the four HNEE faculties were conducted in 2020 as an exploration of sustainability transfer in teaching, research and third mission beyond activities communicated on the website and university documents. The interviews served to gain insights into the shared understanding of (sustainability) transfer, a first overview over transfer activities in relation to the thematic focus of the respective departments, exemplary cases, as well as potentials and barriers for further development. The interviews were documented and informed the design of the questionnaire [33].

Pretest: In order to make the questionnaire more robust and also to obtain indications for its validity, we have created a list of pretesters from different faculties and disciplines of HNEE. The diversity of pretesters was important for obtaining an assessment of the suitability of the questionnaire from various perspectives. We then sent the questionnaire to eight pretesters from the various faculties of the HNEE and asked for their feedback. The pretesters should assess whether the questions are understandable, if there are points of criticism such as logical inconsistencies or if something is missing. Our focus was to find out whether the descriptive features developed in our conceptual framework for sustainability transfer (see Section 2) are comprehensible to ensure that the sustainability transfer construct is valid in the questionnaire. Pretesters uncovered in their comments and feedback minor errors and inconsistencies, which has improved the validity and reliability of the questionnaire, even if we have not yet carried out a comprehensive validity analysis at this early stage of the exploration of the object of investigation.

Online survey: For the empirical survey on sustainability transfer, a semi-structured online questionnaire was used as a survey instrument developed in several test runs with the application LimeSurvey. We chose an online survey with this application to reach as many HNEE researchers and lecturers as possible with a proven survey tool during pandemic times. In the survey period August to September 2020, 35 complete datasets have been counted, which is statistically sound enough to draw conclusions about the population of 260 lecturers and researchers at the HNEE [34]. In terms of content, the study is deductive. In the general part, after an introductory clarification of the transfer concept, basic questions were asked about the participation of practitioners in teaching and research in the period January 2018 to December 2019. The subsequent questions focus exclusively on sustainability transfer with an increasing level of detail, again preceded by a corresponding definition to reduce conceptual misunderstandings. A special part of the survey asks for concrete examples of sustainability transfer, which are to be described by means of specific questions. The aim here was to gain a deeper understanding of case and situation-related initiation and implementation processes of sustainability transfer. In this special part of the survey 29 cases with sustainability transfer activities have been described by the respondents [22].

Further, we considered integrating empirical data from semi-standardized questionnaires with lecturers and researchers of the HNEE regarding science communication, emphasizing primarily third mission, however, the processing of the data and the categories of this survey were not compatible with the end of our study.

There are certain limitations to the methodological approach of this paper that need to be taken into consideration. First, it must be pointed out that the study is exclusively focused on the HNEE. Therefore, its implications must be understood in the particular context of HNEE and cannot be directly transferred to other HEIs. The empirical investigation is therefore to be viewed as a case study. The HNEE has a distinct claim to contribute to sustainable development in society and practice (explicitly also in the region) through transfer. However, this survey so far only shows the work at the university on sustainability transfer, not (yet) the effects in the region.

Instead, the empirical survey delivers a more heuristic value as it combines carefully collected data as a basis of practical interpretation. Due to the type of predetermined response options that can be partly based on plausibility considerations, neither incompleteness, nor confounding variables, nor misinterpretations nor wrong assumptions in the questionnaire design can be excluded. A further reason for this may be social desirability that could arise regardless of the given options for anonymization. Reluctance, lack of interest or convenience [20] may be named as possible barriers for a lack of transfer activity that were not mentioned as possible reasons within the questionnaire.

To sum up, with its evaluation mode and the described case studies, the study delivers valuable insights and impulses for a successful sustainability transfer. In accordance with its exploratory and explanatory research character this study may be a starting point for a profound debate regarding the contribution of universities to sustainable development.

4. Results

4.1. Explorative Interviews with Deans of Departments and Third Mission Division

At the Eberswalde University for Sustainable Development, near Berlin, about 2300 students study in four faculties. The university of applied sciences has a strong focus on sustainable development in teaching and research.

Three explorative interviews with deans and vice-deans from three departments of HNEE served to underpin our assumptions derived from the literature and develop an adapted empirical research design.

Need for conceptual understanding of sustainability transfer: The interviews displayed a very broad range of conceptions and understandings of (sustainability) transfer, varying between departments, lecturers, and researchers, thereby confirming the need for conceptual orientation. For many professors, sustainability transfer is a concept that is difficult to connect to their own knowledge production and teaching practices. In the forest department, an especially high share of 'unknown' transfer activities was assumed in the field of teaching, due to a strongly developed tradition of formulating Bachelor and Master thesis topics together with actors from practice, e.g., forest administrations. Additionally, transfer activities in research beyond what is required from third-party funded projects was unknown, due to conceptual ambiguity. The Faculty of Landscape Management and Nature Conservation showed a well-developed conceptualization of sustainability transfer with several research groups and projects contributing to sustainability transfer in teaching and research. Its shared understanding was a two-way exchange with practice for elaborating joint targets for research activities. Yet, despite this very advanced practice and culture, conceptual clarity was needed with regard to transfer and third mission. The third interview saw transfer as an exchange and the network with regional small and medium sized enterprises and community administrations as a basis for further developing sustainability transfer.

Need for overview of current (sustainability) transfer activities: In general, transfer activities were mentioned to be mainly bound to research activities (a) because of funder's requirements and (b) due to the mechanism of 'research professors' that allows to temporarily reduce teaching obligation in favor of research activities. Transfer activities in teaching were illustrated. Yet, no department was capturing these activities systematically. One department gave as examples for transfer activities in teaching, besides practice-oriented thesis topics, the case of project semesters or 'practice share' involved in a teaching concept in general. With regard to transfer activities, mainly the department with an internalized transfer motivation

could mention distinct transfer activities, ranging from the organic farming network, to special best transfer-practice third party funded projects and a joint experimentation field run together with farmers and cooperating institutes. In the third department, transfer activities mainly appear not to have an explicated sustainability target. They are conducted together with SMEs and actors from the policy domain and have been incorporated mainly in different teaching formats, mainly situationally influenced by students' interests. For example, students work on an environmental management concept for another HEI in a project. In another format, practice organizations bring their questions to discuss and exchange with the students of an afternoon. Conditioned cases are used to prepare students for field visits to enterprises. These transfer activities from teaching have recently been switched to more project-based formats and participation at the beginning of a project seeks to capture the citizens' needs and interests. This citizen orientation together with the orientation toward municipal enterprises forms the core of exchange and transfer activities.

Potentials and barriers for (sustainability) transfer: The (vice-) deans expressed the need for more time and attention to be devoted to sustainability transfer as well as clearer conceptual guiding or guidelines for the sustainability transfer activities. Furthermore, an empirically-founded basis for pre-existing transfer activities was needed in order to identify potentials and barriers. Demands articulated in the interviews concerned conceptual clarification to allow for informed exchange about transfer, support for the time and effort needed for coordination of science-practice interaction, clarification of third mission support structures, a database with best practice formats and success examples, evaluations/impact analyses of existing successful initiatives. A fundamental question remained across all departments, namely how the time and effort needed to invest in science-practice-interaction could be realized. This would include, e.g., reducing teaching load for transfer activities as well as acknowledgement and incentives for individuals and also departments as success criteria.

4.2. Organization of Transfer in Teaching and Research

In a first approach to transfer activities respondents were asked about transfer formats in general that they applied in teaching and research. These formats are differentiated according to the initiative for the corresponding transfer activity. The following two Tables 2 and 3 [22] give an overview over the involvement of practitioners in the teaching and research fields at HNEE.

Table 2. Transfer activities in teaching.

Please Tick How You Have Involved Practitioners in Your Teaching at HNEE in the Period January 2018–December 2020 (Multiple Answers Possible)		
	Organized myself	I was involved
Invitation of practitioners to lectures: Practice experts, stakeholders report	19	8
Use of practical examples in the course (e.g., questioning, case studies, role-play)	20	6
Development of solutions for practitioners (practical questions)	17	7
Team teaching with practitioners (joint conception of the courses)	8	3
Use of teaching methods with explicit practical relevance (research-based learning, project-based learning, service learning)	16	4
Practical advice for study programs (e.g., advisory board)	4	2
Project and thesis work: Development of solutions for practitioners (practical questions)	19	6
Project and thesis work: Development of solutions together with practitioners (information, joint supervision of the work)	15	4
Project and thesis work: Development of solutions together with practitioners (joint development of problem solving, joint supervision and validation by practitioners).	11	2
Excursions to and with practitioners	22	5
Career training (e.g., certificates, hunting license, certificate forest pedagogy, quality management TÜV)	4	1
Arrangement and supervision of internships	11	7

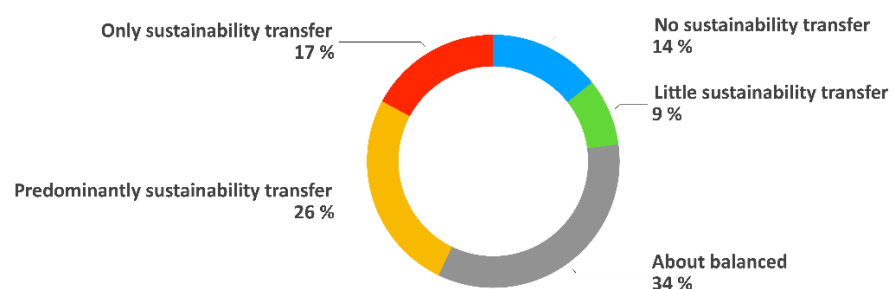
Table 3. Transfer activities in research.

Please Tick How You Have Involved Practitioners in Research at HNEE in the Period January 2018–December 2020 (Multiple Answers Possible)		
	Organized myself	I was involved
Popular scientific publications (articles in practice-oriented journals, brochures)	9	9
Handouts for practitioners (guidelines, checklists, recommendations for action, etc.)	10	6
Public relations for research content (websites, flyers, press releases)	15	7
Public talks, panel discussions in the context of the practice	17	5
Exhibitions based on research	2	3
Provision of scientific expertise for politics and society (discussion paper, statements of scientific advisory boards)	8	6
Consulting on behalf of companies, politics, associations (participation in advisory boards, expert discussions, expert appraisal)	6	7
Development of patents, license agreement, models, proposals for standards, etc.	0	1
Research workshops with practitioners on issues of implementation and validation of results from a practitioner's perspective	10	7
Transdisciplinary research projects with practitioners: joint problem definition, conception of research projects	10	8
Transdisciplinary projects with practitioners: joint development of sustainability innovations, solutions	10	5
Transdisciplinary research projects with practitioners: testing or trial of solution approaches and implementation	9	6
Joint scientific publications with practitioners	3	2

4.3. Share and Allocation of Sustainability Transfer

In a next step, transfer activities are differentiated whether they are general transfer activities or specific sustainability transfers. The respondents were asked to judge themselves whether they were conducting transfers or sustainability transfers. The majority of respondents carried out sustainability activities in some form. As can be seen in Figure 4 [22] only 14% of the respondents have not carried out any sustainability transfer at all. This suggests a clearly positive attitude towards sustainability transfer at the HNEE and well-founded experience in this field [22].

How high is the share of sustainability transfer activities in the total transfer activities you have implemented?

**Figure 4.** Sustainability transfer at HNEE.

A closer analysis of sustainability transfer in HNEE's study programs and research focuses reveals an equal distribution throughout. There are four faculties with different study programs at HNEE: Faculty of Forest and Environment, Faculty of Landscape Management and Nature Conservation, Faculty of Wood Engineering, Faculty of Sustainable Business. Sustainability transfer activities are comparatively evenly spread across all degree programs offered by the four faculties. Thus, it cannot be concluded from the results that certain disciplines are particularly well or poorly suited for sustainability transfer. This underlines the whole institution approach that HNEE pursues. Similar to the analysis

of the study programs, it is also apparent in the area of research that sustainability transfer takes place in a very balanced way in the following three main research areas of the HNEE: Sustainable rural development, sustainable production, use of natural materials, and sustainable management of limited resources.

4.4. Cooperation Partner

Sustainability transfer depends significantly on the partners that cooperate. Thus, a detailed knowledge of the practitioners involved is crucial to understand sustainability transfer and its societal impact. The survey shows that transfer partners cover a wide range of societal fields, not just business. This also reflects the aspiration to shape sustainable development in all facets of society emphasizing the need for a broad understanding of transfer. This result also indicates that sustainability transfer can contribute to regional sustainability transformation in many sectors and fields of action. The variety of cooperation partners in sustainability transfer is illustrated in the following four-field matrix in Figure 5 [22].

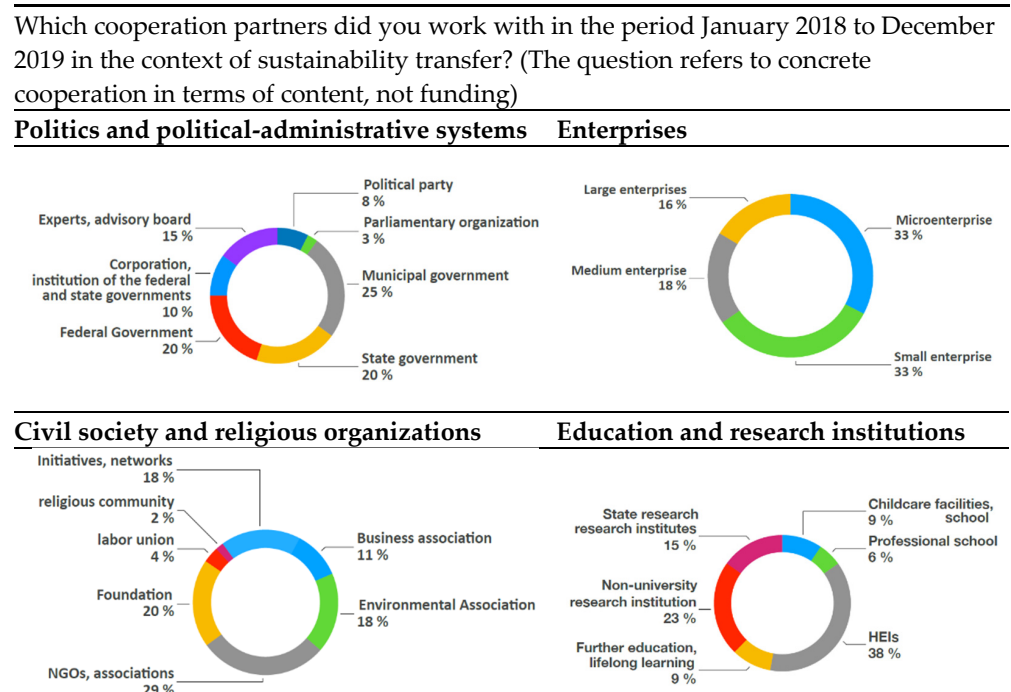


Figure 5. Diversity of cooperation partners.

Worth mentioning in this context is also the question about how the practitioners have been contacted. 28% of the respondents stated that the contact had taken place as a result of previous collaborations. 19% have been approached directly by the practitioners, while 18% have sought out and approached the practitioners themselves. 16% stated that the contact had been arranged internally through an institution or colleague at HNEE. Just as many stated that the contact had been initiated outside of the HNEE through an external institution or network.

4.5. Experiences, Motivation, and Barriers for Sustainability Transfer

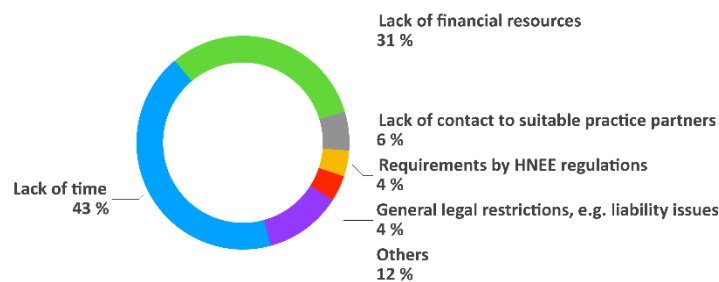
Most of the respondents show a positive attitude towards their sustainability transfer experience acknowledging the potential to develop their professional skills and enhance their impact as transfer agents at HNEE as can be seen in Table 4 [22]. This gives a good impression about motivation to engage in sustainability transfer.

Table 4. Implementation Experiences.

	What Has Been Your Experience in Implementing Sustainability Transfer?					
	Fully Agree	Agree to a Limited Extent	Neutral	Rather Not Agree	Do Not Agree at All	No Reply
Deepen my understanding of practice, application contexts, and societal sustainability challenges.	22	6	3	0	0	4
I can further develop my professional and methodological knowledge.	19	7	4	1	0	4
I do unpaid extra work.	7	8	9	5	2	4
My teaching is becoming more relevant to practice, competence orientation is increasing.	15	9	4	0	0	7
My teaching and student learning processes become unpredictable and unproductive.	1	3	3	10	11	7
I improve my professional reputation.	5	13	9	1	2	5
I am socially effective with my transfer activities.	11	14	4	1	0	5
I experience transfer activities as frustrating.	0	3	6	13	9	4
I devote a large part of my working time to sustainability transfer.	0	7	7	14	3	4

Based on their experience with sustainability transfer respondents named as a core obstacle the lack of financial resources and time (see Figure 6) [22]. Far fewer stated a lack of contact to suitable practitioners or the regulatory framework of HNEE as a barrier.

What kind of obstacles have you experienced in implementing your sustainability transfer activities? (Multiple answers possible)

**Figure 6.** Barriers to sustainability transfer.

4.6. Description of Sustainability Transfer Examples

In a qualitative part of the survey respondents were asked to describe in more detail up to three examples of their sustainability transfer activities in order to provide an overview over the variety of concrete transfer activities as well as deeper insights into their specific constellations. The conceptual framework (see Section 2) was applied to the specific examples, following closely the questions previously asked in the general part of the survey. In other words, the questions served here as a guideline for describing individual sustainability transfer activities as comprehensively as possible. The eight criteria for description included a name or title for the transfer activity, assignment to university function, the sustainability goals of the activity, central measures, duration of the activity, the partners from the practitioner's side and how the contact was made, and the financial resources for funding the activity.

Twenty-two respondents described altogether 29 examples of sustainability transfer at the HNEE. These preliminary descriptions along the eight characteristics provide a first impression of what was going on in the practitioners-university cooperation. These mini cases are consistent with the findings from the general survey and enrich the picture of sustainability transfer activities.

The majority of sustainability transfer activities is located in the area of research, followed by activities that take place in the context of teaching as can be seen in Figure 7 [22].

To which field of action would you assign the sustainability transfer activity?

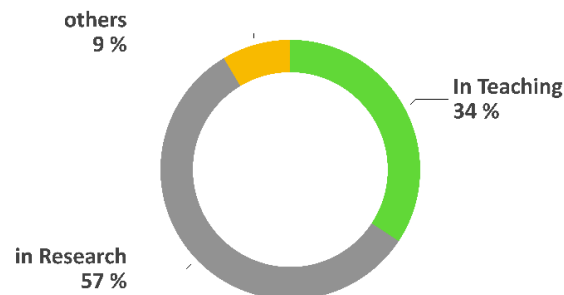


Figure 7. Relation of sustainability transfer in teaching and research.

The participants were asked to give some details regarding the sustainability goals of the transfer activity. The results show that each project followed specific sustainability goals, either focusing on one specific industry or topic, or showing coherence with the Sustainable Development Goals (SDGs). In addition, within a few projects the goal was characterized by cooperation in which competence building within all partners as well as a deep learning process were emphasized.

The concrete measures that were taken within the sustainability transfer activities correspond to the variety of contents within the departments that were described earlier. Some activities were characterized by workshop or discussion formats. Others focused more on an active part to foster an intensive exchange with cooperation partners from different fields.

Altogether, the specific examples correspond with the results from the quantitative part of the survey. They show in detail a wide range of topics and practitioners as transfer partners, different goals, ambitions, and measures, as well as forms and formats of interactions and financial funding. These detailed descriptions immediately raise further questions that go deeper into the complex nature of sustainable development, for example, regarding the values underlying the concept of sustainability or the ambition of the specific transfer activity goals to achieve a great sustainability transition [35]. The 29 mini cases show that the criteria developed for describing sustainability transfer are suitable both for providing an overview of a HEI's sustainability transfer activities in general and for briefly outlining specific transfer activities.

5. Discussion

The research design served to test the operationalized concept of sustainability transfer with a suitable case study. We wanted to find out whether sustainability transfer as a specific form of transfer in teaching, research and third mission can be captured and described in its broad range. For this purpose, we used descriptive statistics as a basis for initial exploratory and explanatory analysis by presenting the data clearly and making them discussable. Although the sample of 35 datasets is statistically large enough to represent the population (= HNEE), the study did not aim to draw conclusions about the population within the framework of inductive statistics by forming hypotheses. However, we have formulated plausible assumptions A1–A5 based on the literature review, the conceptual framework developed and the interviews with the deans and vice-deans (see Section 2.5). Also, the questionnaire was not yet subject to any reliability, objectivity, or validity analysis in this first run so the danger of the study results becoming distorted with fluctuations in interpretation seemed too great (Section 3). Instead, the aim was to provide an explorative overview of sustainability transfer activities for an entire university. To this end, topics such as the work behind sustainability transfer, the (self-) organization,

obstacles and diversity of actors are discussed below. Furthermore, context, the expansion of the reference system for sustainability transfer and the evaluation and assessment of its impact will be further considered.

The study renders the transfer work more visible, especially the frequent work behind the scenes that is not directly visible. The effort involved in the transfer work depends in its depth and breadth, on the degree of difficulty of the sustainability problem and on the format, which in turn influences the intensity of the exchange. A decisive parameter for the effort is also whether and, if so, to what extent the tasks are institutionalized. Is it a pioneer work (not yet institutionalized, formalized), because contextualization work is always required anew, or are there already degrees of organization to fall back on? Important keywords here are depth and breadth of tasks, complexity and context as well as networking.

The results highlight the self-organization rate regarding sustainability transfer. It is evident that the respondents have by far organized more transfer activities themselves than they have been involved in. This shows the will and commitment of HNEE members (or at least of the respondents) to deal with topics, problems and challenges formulated by practitioners and in society beyond academia. The results show that they have the freedom to decide in the area of teaching and research to organize transfer activities flexibly according to need and personal assessment. Lecturers and researchers also bear the organizational responsibility for corresponding transfer formats sine qua non competence or assigned role, i.e., the involvement of practitioners. However, the survey does not provide further information about the prerequisites, the occurrence or the extent of this self-involvement in transfer processes. These would be interesting details that should be inquired about in further interviews.

The study collected and prepared information about obstacles and barriers to sustainability transfer activities. As such, sustainability transfer appears to be an extra task and liability for the participants, which is conducted in addition to the core activity of teaching and/or research and often in combination with them. A possible disadvantage could be that too much personal responsibility is carried by the initiators that could be eased by organizational support from, e.g., the transfer unit of the university. This information is prerequisite to paving the way for better managing these obstacles. It would, for example, be worth evaluating whether sustainability transfer can be integrated into job descriptions or even employment contracts to overcome such barriers and to incentivize.

These case study results refer to the framework of German universities. Including international studies and case studies with different topics and practice actors, e.g., on municipalities [36], ecovillages [21], supply chain management in engineering [37], or sustainable agriculture [38] can help to create a more differentiated picture. Additional impulses for further conceptual development are provided by [21,39].

Presumably a regional sustainability transformation requires a diversity of actors, of fields of action across all three missions of HEI and a variety of formats and degrees of complexity of interaction, etc., in order to be able to do justice to the diversity and complexity of sustainability problems, actor constellations and solution in the regional context [2]. The results show that a broad variety of practitioners are involved in transfer activities, thus reflecting the diversity and complexity of regional sustainability transformation. With these findings, assumptions A1–A3 (see Section 2.5) can be affirmed. In this regard, the role and potential of students as transfer agents on behalf of HEIs able to shape the image of the university in the region [9] seems to be underestimated by the HEIs. The same observations apply in regard to the practitioners, who are still conceptually and empirically undifferentiated when compared to the universities. Here, the practitioners' motives, formats, phases, and degrees of complexity for interaction are also of interest.

In order to obtain a differentiated picture of the actors in practice and the effects of sustainability transfer (in the region), it is necessary to contextualize the respective activities [20]. Then innovations, for example, are evaluated differently against the background of an explicit sustainability concept regarding "engaged university" or "co-creation for

sustainability" (e.g., due to rebound effects) than in the helix models or with regard to "entrepreneurial university", where such issues are hardly addressed and also do not need to be addressed, as they presuppose a different point of reference [16].

The consideration of context, points to the crucial aspect that HEIs engaged in sustainability transfer exceed the reference system of science, at least in part, and become involved in other reference systems of other social subsystems, as is inevitably the case in regional sustainability transformation. We learn a little about the motivation and experience with sustainability transfer from the transfer actors on the university side. From the evaluation of sustainability transfer, it may be possible to conclude that these experiences outside of science can also have an impact on scientific work. Since November 2020, HNEE has had a further developed transfer strategy focusing in particular on sustainability transfer. This shows that transfer strategies and sustainability transfer also contribute to the profile of the HNEE as a third pillar in addition to teaching and research. If a university wants to dedicate itself to the topic of regional sustainability transformation, this also seems appropriate. We were able to show that our assumptions A4 and A5 (see Section 2.5) are appropriate because both in teaching and in research there is a broad spectrum of formats for sustainability transfer with varying degrees of complexity. The ideal-typical transfer phases are also evident in the 29 sustainability transfer projects described.

Finally, when HEIs aim at enhancing their contribution to regional sustainability transformation through sustainability transfer a much more differentiated measurement of the outcome and impact is needed [20]. There are other qualitative characteristics that distinguish transfer activities, but for which no language, terms, or categories yet exist to adequately reflect, for example, different valences, levels of ambition or conceptual depth. What is needed are quality criteria. One of these criteria should be the scope of knowledge dissemination including multiplier effect. This hints at an inadequacy in conventional transfer surveys, such as those required by authorities or carried out at universities for statistical purposes. Lists of transfer activities are compiled [40]. However, it is always only a list. There is no weighting according to the quality and value of the transfer performance. Here, the level of difficulty of the sustainability problem, the associated effort as well as the actual transformation contribution would be a suitable set of criteria.

6. Conclusions

The research object of this study has been the in-depth discourse on sustainability transfer activities of higher education institutions (HEIs) and their contribution to a regional sustainable transformation. For this purpose, a heuristically-derived concept for sustainability transfer has been empirically tested with a mixed-methods approach at HNEE.

The case study of the HNEE identified the role of university-practitioner cooperation in teaching and research as two essential functions of universities that together with third mission activities may possibly contribute to a sustainability transformation. In this context the originality of the study is that it opens up a novel dimension for transfer potential at universities and their role in regional sustainability transformation. It also highlights that the interdependencies between HEIs and practitioners need to be contextualized in more depth with such quality criteria as value of the transfer performance or level of ambition.

The study enabled us to specify and differentiate the thematic, technical, and organizational conditions and prerequisites for sustainability transfer for the HNEE's departments and research areas. We gained insights into the motivation and experiences of university researchers and teachers and their views on sustainability transfer. Furthermore, the study allowed us to show the conditions and any obstacles for sustainability transfer. Overall, the empirical findings of the study generally support conceptual considerations presented in Section 2, at least in a qualitative, explorative way. In particular, the results deliver proof that the terms, definitions and approaches of the conceptual framework of this paper are suitable to make the phenomenon of sustainability transfer more tangible.

In addition, the study provides a rich picture of specific aspects of sustainability transfer: We were able to demonstrate a broad variety of practice partners and protagonists of sustainability transfer in a differentiated and much more profound manner than is the case in most accounts in literature. Transfer of HEIs is mostly understood to take place within the economic sector [2]. Our study shows that transfer activities go beyond business and happen in a variety of societal sub-systems and fields of action. A further insight that the study delivered is into the different ways of setting up cooperation. Based on the transfer formats, our empirical findings provide a differentiated image of transfer activities, i.e., divided by the complexity of interaction. These formats show the variety of interaction which can contribute to a sustainable regional development.

We were able to prove that sustainability transfer is part of all functions and fields of HEIs: Differentiating between teaching, research, and third mission appears to be useful and allows for a detailed description of transfer activities and specific formats. Accordingly, these go beyond the description of third mission, and mostly of science communication, which is often referred to as a typical transfer activity.

The description of the 29 case examples was conducted in line with the descriptive characteristics that were used for sustainability transfer in general. They give a first detailed representation of single activities and, at the same time, provide an easy to apply framework for an initial, pragmatic description of single sustainability transfer activities that may serve as a basis for further analysis and development. However, these cases point to a limitation in their profoundness raising deeper questions regarding, e.g., the value basis of sustainability transfer, the level of ambition, or the challenge of contextualizing sustainability transfer.

As mentioned in Section 3 there are certain study limitations that need to be taken into consideration. First, it must be pointed out that the study is exclusively focused on the HNEE with its specific profile. Therefore, its implications must be understood in the particular context of HNEE and cannot be directly transferred to other HEIs. The empirical investigation is therefore to be seen as a case study. The HNEE has a distinct claim to contribute to sustainable development in society and practice (explicitly also in the region) through transfer. Only when the concept and analysis criteria have been further developed does a representative empirical study going beyond purely descriptive statistics make sense.

With surveys, we can so far only show the university's work on sustainability transfer, not (yet) the effects in the region. In the discussion of the results (Section 4), a number of inadequacies are revealed, which in turn give rise to a need for further research. In subsequent surveys, for example, greater attention could be given to the phases and the results reflected in them. Above all, the very heterogeneous cases of concrete sustainability transfer activities make it clear that the characteristics and criteria must be further differentiated for a refined, context-sensitive description. In particular, ways would have to be sought to capture the sustainability orientation of the transfer even more specifically, e.g., through a common terminology and a more sophisticated use of sustainability transfer outputs.

In any case, the conceptual framework presented here already offers the potential for a common transfer terminology, enabling the analysis and reflection of sustainability transfer activities at HNEE and beyond. However, it should be noted that with such a language and subsequently with a corresponding operationalization, a normative attitude towards the sustainability claim will inevitably be adopted, which is also subject to justification and has to face the participatory exchange with criticism.

A further challenge remains namely how to empirically capture the context-specific effects of sustainability transfer in the context of regional sustainability transformation. It is necessary to look for indications of how the concept of sustainability transfer can be expanded theoretically in such a way that the effects of sustainability transfer in the region and thus also the transformative effects can be captured. It is also evident that impact analyses are necessary with a definition of success parameters [20,41,42].

Author Contributions: Conceptualization: U.D., B.N., W.C., and G.G.; methodology: U.D., B.N., W.C., and G.G.; data analysis: U.D., B.N., W.C., and G.G.; data curation: U.D. and G.G.; writing—original draft preparation: U.D.; writing—review and editing: U.D., B.N., and G.G.; visualization: G.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data is contained within the article or Appendix A. The data presented in this study are available in [22].

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Questionnaire

Survey on transfer at the HNEE

This survey is part of an inventory of transfer activities at HNEE and services their further development. The survey is conducted in addition to the data query of publication and transfer activities by the president. Our questions are designed to avoid duplication and to save your valuable time. It took pretesters 15–20 min to answer the questions. Thank you very much for your willingness to participate.

Part I: Questions about transfer in your field of activity

We understand transfer as the voluntary exchange of knowledge, technologies, ideas and experiences between actors from the university and practitioners. These cooperations between universities and practitioners primarily serve to deal with practical problems from society.

1. Please tick those formats in the field of teaching in which you were involved as part of your work as a teacher at HNEE in the period from January 2018 to December 2019 (Multiple answers possible).

Table A1. Transfer activities in Teaching.

Transfer Activities in Teaching	Organized by Yourself	Only Participated
Invitation of practitioners to lectures: Practice experts, stakeholders report		
Use of practical examples in the course (e.g., questioning, case studies, role-playing)		
Development of solutions for practitioners (practical questions)		
Team teaching with practitioners (common conception of courses)		
Use of teaching methods with explicit practitioners (research-based learning, project-based learning, service learning for practice)		
Practical advice/ guidance for study programs (e.g., practice advisory board)		
Project and thesis work: Development of solutions for practitioners (practical questions)		
Project & thesis work: Development of solutions together with practitioners (information from practice, joint supervision of the work).		
Project and thesis work: Development of solutions together with practitioners (joint development of the problem solving, joint supervision and validation by practitioners).		
Excursions to and with practitioners		
Career training (e.g., Certificates, Hunting License, certificate forest pedagogy, Quality Management TÜV)		
Arrangement and supervision of internships		

2. Please tick those formats in the field of research in which you were involved as part of your work as a researcher at HNEE in the period from January 2018 to December 2019 (Multiple answers possible).

Table A2. Transfer activities in Research.

Transfer activities in Research	Organized by Yourself	Only Participated
Popular scientific publications (articles in practice-oriented journals, brochures)		
Handouts for practitioners (guidelines, checklists, recommendations for action, etc.)		
Public relations for research content (websites, flyers, press releases)		
Public talks, panel discussions in the context of the practice		
Exhibitions based on research		
Provision of scientific expertise for politics and society (discussion paper, statements of scientific advisory boards)		
Consulting on behalf of companies, politics, associations (participation in advisory boards, expert discussions, expert appraisal)		
Development of patents, license agreement, models, proposals for standards, etc.		
Research workshops with practitioners on issues of implementation and validation of results from a practitioner's perspective.		
Transdisciplinary research projects with practice: joint problem definition, conception of research projects		
Transdisciplinary projects with practice: joint development of sustainability innovations, solutions		
Transdisciplinary research projects with practice: Testing, Trial of solution Approaches and Implementation		
Joint scientific publications with Praxis		

Part II: Questions specific to sustainability transfer in your field of activity

The following questions relate exclusively to your sustainability transfer activities.

We understand sustainability transfer to be a specific form of transfer that aims to contribute to sustainable development in society. Sustainability transfer defines sustainability goals and critically examines the contribution to sustainable development.

3. How high is the share of sustainability transfer activities in the total transfer activities you have implemented?

- No sustainability transfer
- Little sustainability transfer
- About balanced
- Predominantly sustainability transfer
- Only sustainability transfer

4. In which study programs at HNEE do you carry out sustainability transfer in teaching? (Multiple answers possible)

Study programs at the Faculty I of Forest and Environment

- Forstwirtschaft B.Sc.
- International Forest Ecosystem Management B.Sc.
- Global Change Management M.Sc.
- Forestry System Transformation M.Sc.
- Forest Information Technology M.Sc.

Study programs at Faculty II Landscape Use and Conservation

- Landschaftsnutzung und Naturschutz B.Sc.
- Ökolandbau und Vermarktung B.Sc.

Regionalentwicklung und Naturschutz M.Sc.
 Öko-Agrarmanagement M.Sc.
 Strategisches Nachhaltigkeitsmanagement M.A. (karrierebegleitend)
 Bildung-Nachhaltigkeit-Transformation M.A. (karrierebegleitend)
 Ökolandbau und Vermarktung dual B.Sc.

Study programs at Faculty III Wood Engineering

Holztechnik B.Eng.
 Holztechnik M.Sc.
 Holztechnik dual, berufs- oder praxisintegriert B.Eng.
 Mechatronik im Holzingenieurwesen dual, praxisintegrierender B.Eng.

Study programs at Faculty IV Sustainable Business

Unternehmensmanagement B.A.
 Nachhaltige Unternehmensführung M.A.
 Nachhaltiges Tourismusmanagement M.A.
 Kommunalwirtschaft M.A. (berufsbegleitend)
 Finanzmanagement (B.A.)
 Regionalmanagement (B.A.)

5. To which research areas of the HNEE do you thematically assign your sustainability transfer activities? (Multiple answers possible)

Research area: Sustainable rural development

Landschaft als ökologische Basis
 Waldökologie und Monitoring
 Land- und Waldnutzung mit unterschiedlichen Formen nachhaltigen Landmanagements
 Nachhaltiges Wald- und Ökosystemmanagement und Naturschutz

Research area: Sustainable production and use of natural products

Potenziale von Holz in der Bioökonomie
 Verfahrenstechnik, Mechatronik sowie Prozess- und Produktentwicklung entlang betrieblicher Wertschöpfungsketten
 Bauen mit Holz und moderner Holzbau

Research area: Sustainable management of limited resources

Die Gesellschaft mit ihren Ansprüchen an und Rahmensetzungen für die Landnutzung
 Nachhaltige Ökonomie, unternehmerische Verantwortung, Unternehmensentwicklung und -management
 Nachhaltiger Tourismus
 Umweltgovernance, Transformation und Ökonik

Other research areas? (Free text)

6. Which cooperation partners did you work with in the period 01/2018–12/2019 within the framework of sustainability transfer?

(The question refers to concrete cooperation in terms of content, not funding)

Politics and political-administrative system (multiple answers)

Political party
 Parliamentary organization
 Municipal government
 State government
 Federal Government
 Corporation, institution of the federal and state governments
 Experts, advisory board

Business enterprise (multiple answers possible)

Microenterprise
 Small enterprise

Medium enterprise

Large enterprises

Civil society and religious organization (*multiple answers possible*)

Business association

Environmental Association

NGOs, associations

Foundation

labor union

Church, religious community

Initiatives, networks

Education and research (*multiple answers possible*)

Childcare facilities, school

Professional school

HEIs

Further education, lifelong learning

Non-university research institution

State research institutes

7. How did you get in touch with the practitioners?

I specifically looked for practitioners and approached them.

I was approached by practitioners.

I knew the practitioners from previous collaborations.

The contact was established through an institution or colleagues at the HNEE.

The contact came about through an external institution or networks.

Other

8. What kind of obstacles have you experienced in implementing your sustainability transfer activities? (*Multiple answers possible*)

Lack of time

Lack of financial resources

Lack of contact to suitable practitioners

Requirements by HNEE regulations

General legal restrictions, e.g., liability issues

Lack of expertise and experience in dealing with practitioners

Others

9. What has been your experience in implementing sustainability transfer?

Table A3. Experience in implementing sustainability transfer.

	Fully Agree	Agree to a Limited Extent	Neutral	Rather Not Agree	Do Not Agree at All	No Reply
Deepen my understanding of practice, application contexts, and societal sustainability challenges.						
I can further develop my professional and methodological knowledge.						
I do unpaid extra work.						
My teaching is becoming more relevant to practice, competence orientation is increasing.						
My teaching and student learning processes become unpredictable and unproductive.						
I improve my professional reputation.						
I am socially effective with my transfer activities.						
I experience transfer activities as frustrating.						
I devote a large part of my working time to sustainability transfer.						

10. Do you have any comments or advice on sustainability transfer? Or do you have concrete ideas for sustainability transfer projects? (Free text)

Part III: Your examples of sustainability transfer

In the last part of the survey, we would like to ask you to describe examples of sustainability transfer. Please select one to a maximum of three examples from your activities which, from your point of view, make a particularly successful contribution to sustainable development. To do so, answer the following 9 short questions for each sustainability transfer activity.

11. How many examples of sustainability transfer would you like to describe?

12. What is the title of the sustainability transfer activity? (Free text)

13. To which field of action would you assign the sustainability transfer activity?

In Teaching

In Research

Others

14. What do you consider to be important as sustainability goals of the transfer activity?

Please name keywords. (Free text)

15. Please describe key sustainability transfer measures in keywords. (Free text)

16. What is the duration of the sustainability transfer activity described?

Short-term, e.g., one-time event, activities during a semester.

Medium-term, e.g., project period 1–3 years

Long-term, e.g., project or cooperation period longer than 3 years

Sustainability transfer is institutionalized, e.g., in the form of a cooperation agreement

Other*

17. Who are your partners in this sustainability transfer activity?

Politics and political-administrative system (multiple answers)

Political party

Parliamentary organization

Municipal government

State government

Federal Government

Corporation, institution of the federal and state governments

Experts, advisory board

Business enterprise (multiple answers possible)

Microenterprise

Small enterprise

Medium enterprise

Large enterprises

Civil society and religious organization (multiple answers possible)

Business association

Environmental Association

NGOs, associations

Foundation

Labor union

Church, religious community

Initiatives, networks

Education and research (multiple answers possible)

Childcare facilities, school

Professional school

HEIs

Further education, lifelong learning

Non-university research institution
State research institutes

18. How did you get in touch with the practitioners?

I specifically looked for practitioners and approached them.

I was approached by practitioners.

I knew the practitioners from previous collaborations.

The contact was made through an institution or colleagues at the HNEE.

The contact came about through an external institution or networks.

Other

19. How is this sustainability transfer activity funded? (Free text)

20. Would you provide us with your name and mail address for further contact?

Name:

Email:

Thank you for your participation.

Appendix B. Questions for the Interviews with Deans and Vice-Deans

Interview Structure and Questions

1. Welcome words, short introduction of participants, reason for the interview

2. Opening questions

What are the specifics of your field here at HNEE?

Can you give us some insights: What is worth mentioning in relation to your faculty or to characterize your faculty besides the available website information?

3. Detailed questions

How does sustainability transfer look like at your faculty?

What is your understanding of transfer?

What does the faculty offer in terms of transfer services?

In which of your areas does transfer take place the most (so called “hot spots of transfer”)?

Would you consider your faculty as one with a high transfer or transformation demand?

From your point of view: Which are signals that show the realization of transformation? In other words: When can one say something has been transformed?

4. Final questions

What are the barriers of transfer?

How could transfer be facilitated at your faculty?

What would be required/ what would you like to see happen?

What formats would you be interested in speaking of sustainability transfer/ sustainability transformation?

5. Outlook and Farewell

Reference to next steps/possible next meetings/further procedure/result in prospect/upcoming survey on transfer activities.

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