Transfer scouts: from intermediation to co-constructors of new knowledge and technologies in Germany

Anika Noack [a,*], Heike Jacobsen [b,1]

[a] *Academic staff in the area of Vice-president for knowledge and technology transfer, Innovation Hub 13 – fast track to transfer, Brandenburg University of Technology Cottbus - Senftenberg, Erich-Weinert-Str. 1, 03046 Cottbus, Germany*
[b] *Chair economic sociology and sociology of work, Brandenburg University of Technology Cottbus – Senftenberg, Erich-Weiner-Str. 1, 03046 Cottbus, Germany*

ARTICLE INFO

ABSTRACT

The increasing relevance of scientific knowledge for production and innovation requires new instruments for establishing closer relationships between academia and industry. In order to strengthen such relationships, higher education institutes (HEIs), including universities, have institutionalized intermediary organizations such as technology transfer offices (TTOs). It is only recently that research on these organizations has extended its focus from analyzing their functions and performance to the internal processes and practices of their work. Based on qualitative data derived from a process-related focused ethnography, this paper presents insights into the practices of a group of "transfer scouts". Their distinctive feature is that they are deployed explicitly on the basis of their own scientific and engineering expertise to intensify the university-industry linkages in an East German region. Apart from mere mediation, these transfer scouts become co-creators of new knowledge and technologies in transfer processes. Their orientation towards science, their thematic specialization, their development of digital transfer instruments, their explicit intention to contribute to regional development, as well as their cross-institutional acting keeps them involved in co-creational and multidirectional knowledge-production and makes them active participants in those processes. For transfer intermediaries, these insights offer an extension of their identity as brokering actors between the academic and the business sectors. Since diverse actors operate in the regional transfer system and confront transfer scouts with tensions between cooperation and competition, negotiation processes can be fiercely contested, met by resistance, and accompanied by conflicts. With regard to complementary practices, as well as in the case of constructive relationships, a durable cooperation between TTOs and transfer scouts promises to generate potentially innovative impulses. But this is less a stable setting than an ongoing process that requires many additional functional competencies and supporting structures to be provided by the organizations. The question arises, whether such complex KTT structures can be successfully institutionalized outside the frame of a fixed term project. Only then is it possible to create realistic expectations towards KTT-intermediaries and establish transfer scouting as an attractive profession in its own right in the entrepreneurial university.

1. Introduction

The relationship between academia and the economy has changed fundamentally over the past decades. The principles of scientific knowledge production as assessed by Robert Merton (1973) -universalism, communism, altruism, and organized skepticism - became challenged by greater expectations placed on universities and publicly funded research institutes with respect to the production of more directly economically relevant knowledge to contribute to economic growth and regional development (Fisher and Atkinson-Grosjean, 2002; Friedman and Silberman, 2003; Muscio, 2010; Weingart, 2016). Thus, universities were required to add entrepreneurial ambitions to their strategies. Knowledge and technology transfer (KTT) became increasingly established as their "Third Mission", alongside basic research and teaching (Etzkowitz, 1998).

The most direct path to transfer knowledge are personal contacts between individual scientists or groups of scientists and entrepreneurs (Debackere and Veugelers, 2005; Hassink, 1997; Kesting, 2013). As a

---

more systematic approach, universities and research institutes have been developing intermediary organizations to pave the way for successful university-industry linkages (for an overview of formats see Clayton et al., 2018). Over the past two decades, research on these organizations mainly focused on conditions of their effectiveness for KTT (Giuri et al., 2019; Pollard, 2006; Siegel et al., 2004; Vinig and Lips, 2015). Thus far only little is known about working practices in such intermediary organizations (Villani and Phillips, 2020). Champenois and Etzkowitz (2018) conclude: "Recent research advocates shifting from strict performance to the internal practices of these organizations (…)"(Champenois and Etzkowitz, 2018: 28). These practices should be investigated on the analytical level, that is by observing situated activities and interactions rather than by correlating outcome data to structural variables.

The paper approaches this task by investigating the activities of eight people employed as transfer scouts on the basis of a process-related focused ethnography. The study is part of an ongoing research and development project that aims to intensify the transfer relationships between higher education institutes (HEIs) and the regional economy in an Eastern German region. The paper asks the following questions: What functions, roles, and activities do these transfer scouts fulfill? What are their motives and orientations? How do their activities and occupational self-conceptions change over time? Answers to these questions are designed to contribute to a better understanding of practices of intermediary work, and therefore support conceptual considerations on new forms of knowledge and technology transfer.

The paper starts by describing the roles and functions of transfer intermediaries on the basis of a literature review of the state of KTT (section 2). To investigate practices of intermediation in university-industry linkages, a social constructivist perspective is used as a theory lens. This calls for a process dynamic for closely observing the daily practices of intermediating persons by employing the methodological approach of focused ethnography (Knoblauch, 2005) (section 3). Empirical data will show that activities carried out by transfer scouts encompasses a particular self-conception of their occupational role that goes beyond intermediation as it processes towards the co-construction of new technological knowledge (section 4). This extends up-to-date knowledge on KTT-intermediaries insofar as transfer scouts become active participants in co-creational and multidirectional knowledge-production. For transfer intermediaries, these insights offer an extension of their identity as brokering actors between the academic and the business sectors (section 5). The changing role of transfer scouts finally refers to situational context factors and their integration into competitive settings of the regional transfer system and with it to further research (section 6).

2. Literature review, research gap and theoretical perspective: Practices of KTT intermediaries

Within the broad field of research on university-industry linkages, analyses of intermediary organizations that bridge the distance between academia and the world of business make an important part. Technology Transfer Organizations/Offices (TTO) (Bessant and Rush, 1995; Czarnitzki et al., 2001; Pollard, 2006; Siegel et al., 2004), Technology Transfer Agencies (Hassink, 1997), Industrial Liaison Offices (ILOs) (Fisher and Atkinson-Grosjean, 2002; Muscio, 2010), advisors of technology transfer (Skalecki and Vieten, 2014) and other institutionalized actors are set up to build up co-operative or transactional relationships between scientists and entrepreneurial actors and organizations.

The key role of transfer intermediaries is described as mediation between science and industry (Agogué et al., 2017: 7; Comacchio et al., 2012: 945; Fisher and Atkinson-Grosjean, 2002: 450). So far, most research on these KTT "intermediaries" emphasizes questions of their effectiveness (Clayton et al., 2018; Debackere and Veugelers, 2005; Rogers et al., 2000; Siegel et al., 2003; Siegel et al., 2004). Important measures for the effectiveness of technology transfer are, in particular,

the results of expenditure for these organizations in the form of licenses and royalties, patents and sponsored research agreements (Siegel et al., 2004: 127).

Beyond such indications of favorable structures, these studies again and again point to fundamental obstacles to successful KTT that are based on the diversity of cultures, norms, interests, experiences and expectations on both sides of the university-industry linkage. Sung and Gibson (2000) address this when proposing that KTT intermediaries need to "understand the values, attitudes, and ways of doing things" of the involved actors. Siegel et al. (2004) state: "Cultural misunderstanding reduces the effectiveness of the university's efforts to market university-based technologies to firms" (p. 139). Debackere und Veugelers (2005: 325) describe this problem as a "lack of understanding of the other partner's culture." It is their task to balance various languages, objectives, expectations, and procedures and negotiate transfer barriers (Kloke and Krücken, 2010: 38; Skalecki and Vieten, 2014).

This quest for translation is often conceptualized as boundary spanning between diverse social systems. According to Tushman (1977: 587), a "boundary spanner" is able to combine existing knowledge with new external knowledge sources, and to mediate, translate, and ultimately integrate divergent interests. In complex transfer processes, boundary spanners connect third parties who can benefit from each other and advance their cooperation. To fill this role, transfer intermediaries need to understand the coding schemes on both sides of the border and be well connected both internally and externally (Tushman and Scanlan, 1981).

Recently, studies conceptualize this boundary in a less dualistic manner. Villani et al. (2017) propose a conceptual understanding of how intermediary organizations bridge different institutional logics by reducing social, cognitive, geographical and organizational distances between scientific and economic partners. They claim that cognitive proximity issues should be considered more profoundly. Cognitive proximity can be reached by employing individuals with experience in both spheres, that means scientists with biographical data outside academia. Champenois and Etzkowitz (2018) stated in an analysis of "hybrid organizations" within the triple or quadruple helix in regional innovation systems that individuals in prominent positions are necessary to gain legitimacy from all actors in the diverse fields. However, these outstanding figures are dependent on a team of employees, who in turn are firmly anchored in all the spheres between which they should mediate. The hybridity of these organizations means that they legitimately represent norms, interests, and cultures of all of the spheres. Champenois and Etzkowitz (2018: 37) describe the role of these boundary spanners as creating a consensus by integration rather than balancing out conflicts between academic and entrepreneurial orientations.

These contributions overcome the otherwise widespread and very generalized assessment that successful mediation and translation relies on the composition of the staff and their qualifications: Intermediaries should be "managed by individuals with marketing experience and skills" (Siegel et al., 2004: 139). Experience in the scientific system as well as in companies is considered beneficial (Kloke and Krücken, 2010: 46). By referring the structural tension between academia and industry to the individual level, the analytical depth will be compromised. Instead, a new level of analysis is necessary. "As reviews of the literature have shown, most analysis of academic entrepreneurship [as one of the fields of activity for intermediaries] has been based on a 'macro' (institutional or firm) perspective. A key implication of the evolution of this field is the need to apply more 'micro' theories and concepts to this phenomenon (…)" (Siegel and Wright, 2015: 590). There are additional authors who call for more rigorous micro-foundational analyses of the intermediaries' roles (Champenois and Etzkowitz, 2018; O'Kane et al., 2015). Micro-foundation in a sociological sense does not only mean to analyze individuals' qualifications and orientations, but to inquire into the practices performed in the course of mediating and translating.

A current study offers an interesting starting point for this: Villani

and Philipps (2020) follow a "request in the recent literature to further explore […] the actions undertaken by catalysts". Based on a qualitative study, activities of catalysts operating in "interstitial spaces", set up and maintained by universities or technology institutions with the mission to facilitate KTT, are analyzed. They situate certain activities in a line of four phases of a transfer process, beginning with matching patterns of the potential partners and defining resources necessary for collaboration, to development and implementation. The activities reported in each of these phases are then examined to ascertain the extent to which they are linked or accompanied and supported by the rules, institutions, and activities of the respective organizations on whose behalf the catalysts act. It is evident that this formal institutional support is of great importance. However, according to the authors, it is also the specific characteristics of the catalysts themselves that determine the course of a transfer process. Focusing on the micro-interaction level, however, they mainly look at catalysts as boundary spanning actors in their roles "as moderators and facilitators of interactions between academics and industry people" (Villani and Philipps, 2020:10-11). Our interest in transfer scouts also starts at the micro level of intermediating practices, but extends the perspective from Villani and Philipps by studying the processing of activities and roles of intermediaries like transfer scouts in KTT processes. This process analysis not only refers to interview data, as they are also used by Villani and Philipps, but also to ongoing participant observations that enable this new process-accompanying perspective.

This paper studies the activities of mediation between the spheres of scientific knowledge production on the one hand and the economic exploitation of scientific knowledge on the other hand as work activities of persons in defined organizational and institutional contexts. As Sung and Gibson (2000) state, "the ways of doing things", the changing tasks of boundary spanners between balancing conflict and creating consensus and striving for cognitive proximity shall by studied "in vivo" in order to draw further conclusions for successful KTT. But the focus on dualism and potential conflict as it is implied by the concept of boundary spanning, shall be accompanied by a view on "new modes of knowledge production" (Gibbons et al., 1994). Whereas boundary spanners, brokers, catalysts, border point managers or process promoters are defined by their mediating role (Comacchio et al., 2012; Fisher and Atkinson-Grosjean, 2002; Kloke and Krücken, 2010; Pollard, 2006; Schmauder, 2012), our interest is directed to a type of intermediary actor that is more prone to realize transdisciplinary knowledge production in co-creative and co-evolutionary working processes.

In Science and Technology Studies, co-construction represents the user and/or societal participation in the social construction of new knowledge and technologies (Pinch, 1996; Pinch and Bijker, 1984; Schulz-Schaeffer, 2019). Thus, co-construction also plays a crucial role in KTT insofar as it refers to processes of recursive and reflexive knowledge generation (Wissenschaftsrat, 2016). Co-evolutionary knowledge production allows for "exchange processes between transfer partners, which should be bi- or multidirectional and recursive" (Wissenschaftsrat, 2016: 11; translated by the authors).

Our case study focuses on such exchange processes by analyzing transfer scouts as participants in "a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem defined in a specific and localised context" (Gibbons et al., 1994: 3) of the regional transfer system. The regional transfer system is a dynamic construct which is constantly under re-construction, even if it appears institutionalized although less physically fixed. With this, besides scientists and business people, transfer scouts aim at becoming an active party in processes of multidirectional knowledge production and strive to contribute to the (re-)construction of the regional transfer system. To analyze this, a micro-sociologically oriented social-constructivist approach towards communication is followed (Christmann, 2016; Knoblauch, 2020), considering negotiation processes in different actor constellations (Schulz-Schaeffer, 2019: 5) within transfer processes with a focus on the process dynamics of practices and the role(s) of transfer

scouts within them. This will be elaborated by the methodology of focused ethnography.

3. Using focused ethnography for a process analysis on transfer scouting

Our research is part of a research and development project funded by the German Federal Ministry of Education and Research. The aim of the project is to strengthen the role of HEIs in the regional innovation system (Cooke, 2008) by assuming a central position as a mediator and translator between science on the one hand and business, politics, and civil society on the other. The project area is located between the metropolises of Berlin and Dresden. Thus, the project integrates regions that benefit from the immediate appeal of large cities through population growth, settlement, and economic development and those that are described as being peripheralized (Kühn and Weck, 2013) regions in remote areas that, like Lusatia, are undergoing structural change. Against this background, the research and development project should function as a hotspot of regional development. "Transfer scouts" are a central node in this project. Eight, mainly scientifically socialized employees have been engaged. Each of them is affiliated with one of three academic institutions in the federal state of Brandenburg: four scouts are connected with a university of applied sciences, three are linked to a university, and one scout is working for a non-university research institute. They are expected to initiate and accelerate transfer processes between science and industry.

The study is based on an extensive process-accompanying research into the functions, roles, and activities of these transfer scouts that are analyzed over a longer period (so far one and a half years). The methodology of focused ethnography (Knoblauch, 2005) was used to examine the unfolding process of the transfer scouts' occupational experience during the course of their work activities. According to Knoblauch (2005), "focused ethnography" goes beyond the time-intensive method of participant observation as undertaken by representatives of "conventional ethnography" (Malinowski, 1922), but is temporally limited and concentrated on a comprehensive (not holistic) process-oriented exploration. "In addition, the lack of intensity of subjective experience in conventional ethnography is compensated for by the large amount of data and the intensity and scrutiny of data analysis" (Knoblauch, 2005). Hence, focused ethnography does not seek to test hypotheses but instead pursues an inductive approach which is highly appropriate for the study of new research objects such as transfer scouts.[i] Focused ethnography allows for the integration (triangulation)[ii] of diverse qualitative data. Here, we combined focused participant observations with problem centered interviews, literature analyses, workshops, and evaluation methods in order to gain a comprehensive and process-oriented understanding that takes into account multiple perspectives: *First*, participant observation data were collected in "ordinary" settings of communication

---

[i] Our methodological approach also enables to observe how intermediary actors cope with structural conditions and organizational factors that can hardly be influenced by them, like the legal context, incentive schemes and institutional settings in universities, the entrepreneurial climate, and the presence or absence of large technology industry in the surrounding region (Debackere and Veugelers, 2005: 328; Friedman and Silberman, 2003: 29). The university organizational practice is one of the key factors that fundamentally influences the incentives for transfer activities as well as the promotion of a clear focus and mission for transfer (Friedman and Silberman, 2003: 29). Insofar as the institutional and policy environment, culture, and history shape and configure the norms, values, and attitudes of researchers towards transfer, these must be borne in mind (Debackere and Veugelers, 2005: 328).

[ii] Despite or even because of the need to become familiar with different qualitative methods and to methodologically control their triangulation – which poses a challenge in this approach – the triangulation of qualitative procedures is instructive with respect to the use of a single method (Kelle, 2008).

Data Table 1
Process Analysis on categories and codes (Sept. 18 to April 20).

Categories and Codes	9/18	10/18	11/18	1/19	2/19	3/19	4/19	5/19	6/19	8/19	9/19	10/19	11/19	12/19	1/20	2/20	3/20	4/20
Intermediation																		
Organizing Events	x		x	x	x	x	x	x	x	x	x	x	x		x	x	x	x
Initiating Transfer Projects	x	x	x	x			x	x	x		x	x		x	x			x
Addressing Entrepreneurs	x		x			x	x		x	x			x				x	x
Support on Funding				x	x	x						x	x					
Co-Construction																		
Thematic Focusing								x		x		x	x					x
Developing Digital Transfer Instruments	x				x	x	x	x	x	x	x	x	x		x	x	x	x
Contributing to Regional Development		x		x														
Cross-Institutional Acting				x					x					x				
Developing Prototypes and Demonstrators								x	x			x	x		x		x	x
Situational Contexts																		
Performance Indicators	x					x		x	x		x	x	x	x		x	x	
Role' Dependency				x			x	x	x	x	x				x		x	
Cooperation/ Competition				x	x	x	x	x	x	x	x	x	x	x	x	x		
Critical Voices							x	x	x			x	x		x	x		
Trust		x						x		x					x		x	

in which the transfer scouts meet each other, during public events such as exhibitions, or while accompanying transfer projects. Here, the authors perceived themselves as observers (rather than group members), interested in "generating [a] more complete understanding" (Kawulich, 2005: 9) of the scouts' practices. Over a period of one and a half years, to date a total of 45 observation sessions have been undertaken, each with a duration of two to five hours. Of these, 34 sessions were internal scout (or project) meetings, which the scouts use regularly to coordinate their practices. Six observations were made at public events during which the transfer scouts gave presentations themselves or co-designed parts of the meetings. In addition to these meetings, five sessions were observed in which scouts brought scientific and business partners together with a view to future cooperation. In total, to date more than 150 pages of observational material has been produced in the form of memos and minutes. They were all coded and organized via MaxQDA which enables to follow the processing of codes from September 2018 to April 2020 (cumulated monthly) to analyze the appearance and (temporary) disappearance of various codes as well as potential reasons for it (see data table 1). *Second*, qualitative problem centered interviews (Witzel, 2000) with all of the eight transfer scouts were conducted, audio recorded, and transcribed as text in order to learn about their respective motives, values, aims, and intentions.[iii] Questions were raised to get to know more about the scouts' experiences, abilities, challenges, and occupational perspectives. We were interested in their networking capacities and strategies, in the institutional settings, in how scientists and businesspeople regarded them in terms of social recognition as well as in their personal reflections about opportunities and limits of their role in KTT. In terms of data analysis and interpretation, qualitative content analysis and grounded theory were used to analyze and interpret the qualitative data and thereby to (re-)construct the role(s) of transfer scouts in complex transfer processes. To represent the process of analysis and interpretation from natural quotes or examples, to codes and main categories, data tables are included in the next section.

With regard to the consistency and validity of the interpretation, the method of communicative validation (Stracke, 2009) was used. In our case, the communicative validation was implemented through the mutual control of the researchers (one researcher in the empirical field, the other with a necessary distance to the field), who mutually compared their analyses to reach agreement about codes in order to group similar ones into categories. Furthermore, the transfer scouts were re-interviewed and confronted with the results (among others, in the context of a focus group discussion) to check their validity.

4. Findings: transfer-scouting from intermediation to co-creation

The section starts with a brief description of the transfer scouts and analyzes their orientation towards science as well as their motives for taking on this position (4.1). We then present a tabular overview of the occurrence of codes (intermediation, co-construction and situational contexts) obtained from interviews with the scouts and the minutes of their team meetings, matching, and public events over the course of one and a half years (4.2). In the following section, we interpret the statements of the scouts behind these codes with special attention to the changes in their statements over time to illustrate that there is a transition from intermediation to co-construction in the self-conception and occupational role of the transfer scouts (4.3). We then show how this transition is related to certain factors of the organizational integration of the scouts in the situational context of the research and development project (4.4).

4.1. Occupational biographical backgrounds and motives of transfer scouts

The transfer scouts who have been studied are, in the majority, biographically based in the scientific system. Their training in various disciplines such as logistics, biotechnology, physical chemistry, physical engineering, chemistry, informatics or engineering economics, made part of the prerequisites for their appointments to the position of a transfer scout. Four of the eight scouts spent about ten years in academia after their Master's degrees and gained PhDs. Their working experience is limited to academia but includes cooperation with non-academic partners in applied research projects. Only one of these four scouts with PhDs had also comprehensive working experience outside the scientific environment (from when he worked for various companies as a transfer intermediary). Two other scouts are also from a scientific background but had some experience with consultancy for start-up companies. One of them is still interested in following an academic career and is writing his doctoral thesis while working as a transfer scout. Only one scout collected comprehensive experience in the business sector following the establishment of his own company. When asked about personal motives for choosing the job of a transfer scout, prima facie they generally cite pragmatic reasons, such as extending

---

[iii] Apart from literature reviews on KTT and workshops, the methodological setting integrates evaluation methods to measure local awareness of transfer scout projects and to investigate social impact of these projects on regional economic development in the respective regions. Those evaluation methods will be used in a later project phase.

their employment contracts with the university, as well as the chance to remain in a scientific work environment.

"[…] before, I still had six-month, seven-month project contracts and, um, that gave the perspective on a five years' contract" (Scout 3).

"I thought that was quite good, um, that fits well and, as I said, that could be a second new mainstay. You are not completely away from research." (Scout 6)

"I get a lot of new input and have the opportunity to really, well, get a lot of information, I think it's really good, but I can hardly imagine doing it for the rest of my working life, because you might lose the connection a bit [hesitates]. Although I am still well connected to the researchers." (Scout 2)

But the one scout who already had set up its own company, argued the other way round:

"Next to my business, I needed safety. We had to reduce the cash flow from salaries […] that was the pragmatic reason" (Scout 8).

Thus, motives for taking up this position varied, however, closeness to academia was important for all of the respondents as well as the opportunity to learn new things and to invent new ideas as a prerequisite for the scouting itself but also for a future career.

"Um, and yes, every day that I can continue to work here in this job, I'm learning new things [...] well, I find it a very satisfying job where you can also try out yourself." (Scout 1)

"I am now very motivated and I really like it, because I get a lot of new input and have the opportunity to really obtain broad information. So I find that very, um, I find it totally good" (Scout 2).

"Well, I can see that I learn a lot, just media skills and uh, creating the website and we have to be present somehow and we have to organize events what I've never done before, yes?" (Scout 3)

These assessments of the scouts with regard to gaining new skills go along with making extensive contacts that could potentially promote a career outside of science or even foster start-up activities:

"[…] to span large networks and get to know a lot of people, where you can, um, maybe could gain a foothold elsewhere, that's a bit of an idea." (Scout 4)

"I am building my network and receiving a lot of inputs. Since then I developed four to five business ideas" (Scout 1).

Right from the start of their work as scouts they refer to their occupational possibilities after the end of the project. As they gained most of their prior work experience in science, contacts with business people are quite new for the majority of them. Typically, they see themselves approaching companies in a specific role to which they need to adhere – as "salesperson":

"Somehow, I think, I'm not born for this. We are not necessarily sellers. We come, I think, almost all from science, I think, maybe more." (Scout 6)

"I'm not the sales type of guy, at least not the oral sales guy, and then if you have, um, [a] foot in the door with, with some discussion starter, then it just [...] will be easier, right? [...] Now you can find your ways and means and just try it out." (Scout 4)

Here, we already find first attempts to combine the requirements of actively offering scientific knowledge for economic purposes with one's own scientific interests and not to detach oneself completely from the scientific system. Scout 6 in particular is aspiring to a future academic position as a professor in a university of applied sciences. As

organizational members of the university and given their professional academic experience, the scouts remain part of the science system. Thus, they have to meet that system's expectations, especially those of the research groups, as well as the expectations of the project situated in the scientific field. In contrast to what would be expected from intermediaries as boundary spanners, the transfer scouts partially engage in scientific activities. Their scientific biographical background not only contributes to their understanding of the research groups' subjects, but also forms a latent frame of reference for their occupational orientations.

4.2. Occurrence of codes over the period of observation

To give an overview of the empirical data in its processing, table 1 informs about the changing primary activities and roles of transfer scouts over the period of investigation: organizing events, initiating transfer projects, addressing entrepreneurs, support on funding, thematic focusing, developing digital transfer instruments, contributing to regional development, cross-institutional acting, developing prototypes and demonstrators. These activities (codes) are assigned to two different roles (categories) that transfer scouts assume: intermediation and co-construction. Although "typical" intermediating activities continue during the observation period, self-conceptions and interactions are more and more oriented towards the active contribution of transfer scouts to new digital transfer formats, prototypes, demonstrators, or ideas for problem-solving (analytically defined as co-construction). This development towards co-construction is closely related to and partly explained with the help of specific situational context factors (benchmarking, role dependency, cooperation and competition, critical voices, trust) that to some extend emerge from the overarching framework of the research and development project, of which the scouts' functions make up a part. Occurrences of all of these codes in the observations (as a semantically explicit part of the interactions and/or observable activities) are marked as a cross in the table and cumulated monthly.

4.3. Changing self-conceptions of transfer scouts

When starting with their new job in 2018, the transfer scouts describe themselves as an interface between different actors from university and industry.

"Now I'm just like a catalyst somehow, and try to accelerate or improve everything a bit […] we want to bring different partners together, bundle competencies, and that should result in transfer activities and create innovations" (Scout 2).

"So I am [...] this interface between companies. At some point, it will be the working group [of the university that takes over this task], because then they will not need to communicate via the triangle, but can communicate directly. But now at the beginning [...] we definitely accompany this initiation phase while they are still sniffing around each other, until the process gets started." (Scout 4)

"I see a transfer scout more like a networker, um, who can communicate interdisciplinary and can also communicate well between science and business, has a translating function, um, and someone who mainly does matchings." (Scout 7)

Initially, the scouts' self-conceptions mainly focus on their role as intermediating figures, including such activities, considered typical, as visiting and organizing transfer related events, matching different partners with the aim of initiating transfer projects, and collecting information about public financial aids for university-industry cooperation. As interfaces between these spheres, the scouts exchange contacts, initiate the communication process, and facilitate the opportunity for mutual familiarization. Phrases such as "interface" (Scout 4), "contact person" (Scout 2), "gateway" (Scout 1) or "networker" (Scout 7) mark the border position of the scouts between science and industry and their

aspiration to establish cooperation between actors from heterogeneous systems.

Since mid-2019, however, the activities of the transfer scouts have expanded. They experiment with digital transfer instruments, develop demonstrators and prototypes, or introduce their own ideas for problem-solving, and with it their self-conceptions change.

> "During the last two jobs I did the parshipping until the numbers were exchanged. And then it was over, I couldn't do anything else. Now I can at least accompany the things and can also be supportive, if I see that there are problems or any gaps are opening. I can make people talk about the gaps and provide support to fill these gaps." (Scout 5)

> [being a transfer scout means being] technically trained, because you want to be able to meet with your partners at universities […] of course at eye level, with the professors" (Scout 7).

Increasingly, the scouts start to compare their competences with their colleagues in TTOs to find a distinctive meaning of themselves and build up strength with their technical expertise and scientific background as a competitive edge:

> "I think, that we don't want to build up competition [with the TTOs]. […] We want to relieve you, or cover your open flank, because everyone has limited resources. We know there are open flanks in certain areas and we want to cover them" (Scout 5).

We can contrast this with the reflection of an expert working for a technology transfer office at one of the universities where the transfer scouts are employed:

> "I can't achieve this technical depth, which the scouts bring in, because I don't have the education for it. You understand some things when the scientist can explain it well, but you can rarely give technical input and this would be the interface to the scouts." (TTO representative A of a HEI)

This recognition supports the identification of the scouts with their occupational role by acknowledging their technical expertise as their specific strength.

In the course of the project, the self-conceptions of transfer scouts and external perceptions increasingly focus on activities that are related to their academic background rather than to their role as mediators. They refer to their technical expertise (4.3.1), they engage in developing and deploying new digital transfer instruments (4.3.2), they emphasize an explicit intention to contribute to regional development (4.3.3), and, finally, they position themselves as actors across all of the HEIs that make part of the project (cross-institutional acting) (4.3.4). We allocate all of these codes under the category of co-construction, which means that the transfer scouts use their academic background to actually participate in the creation of new ideas and the development of new technological knowledge.

A comprehensive overview of anchor examples for the codes of the co-construction category can be gathered from this table:

4.3.1. Technical expertise and thematic focusing

The most prominent particular feature of transfer-scouting as compared to usual transfer intermediaries is thematic focusing. The transfer scouts are specialized experts in the trend topics lightweight construction, life sciences, and digital integration, and thus they primarily target research groups and companies that can be assigned to those fields. The scouts systematically contact all chairs and research groups of the HEIs matching their topic spectrum. Therewith, transfer scouts gain an immediate overview of the latest research and have access to different groups and information resources that give them advantages in transcending their usual interpretative schemes and adopting new contextualizations (Groys, 2002) for developing ideas with problem-solving potential in transfer processes.

This focus on a defined field of technology is recognized as a success criterion of KTT and considered a shortcoming of many TTOs (Hassink, 1997: 366; Wissenschaftsrat, 2007: 81).

> "But I see the advantage of the scouts in the fact that they are experts in the subject and are responsible for a limited thematic area and therefore can deal with a subject in such depth that they at least can take a consultative role" (Scout 5).

This is complemented by a technology transfer officer:

> The "scouts […] are experts. They can go much more directly into the discussions and really influence the project. We always need help then. […] We have, yes, a large proportion of our work is mediating activity, while the scouts themselves are already technically stuck inside in the subject" (TTO representative B of a HEI).

In light of the thematic specialization, the scouts want to contribute their own expertise to transfer projects and take on "advisory functions" (Scout 5). This becomes particularly evident with reference to Scout 1, who introduces his expertise when it comes to developing ideas between scientific and business partners for possible solutions for an ambitious 3D-printing project. Furthermore, the same scout introduces national and international delegations to the international research center for lightweight construction of one participating HEI. In cooperation with his former scientific colleagues, this scout also developed a complex lightweight component which has now received two awards. If nothing else, the scout works on a prototype for exhibiting at trade fairs and in the HEIs showrooms. This is also true for Scout 2 who developed a demonstrator to present a particular bio-technological methodology (including technical information, a do-it-yourself-kit, as well as a virtual reality tour through the respective laboratories) during events, and was recently granted a European patent together with a former research colleague. Scout 4 and 6 also claim to enrich the development of ideas and actively influence the content of project proposals developed between academic and business people, without claiming ultimate responsibility.

> "So that was about passing things over my desk, and then I've not just forwarded the question, but have already prepared something with my little bit of knowledge, prepared a few slides […] So I always prepare a lot so that you can realize something to feed both of them" (Scout 4).

> "I greatly enjoyed working on this current proposal, you can discuss the content again, but in the end you are not entirely responsible for it" (Scout 6).

This scout 6 keeps on publishing scientific papers in his free time. Also scouts 1, 2, 3 and 5 directly contribute to project applications between scientists and companies with content-related work, not only with administrative services which are typical for intermediaries. When it comes to self-organized matching workshops, where scouts invite researchers and business people to meet directly, scout 6 also displays aspirations to contribute with specialized expertise. Scout 6 not only liaises with contacts but gets involved in scientific debates about concrete solutions for articulated problems or research interests.

"The subject-specific skills are more important, of course. This is what I already see when you talk to the companies. Um, that's a different story when somebody comes in who says he's been working in biophotonics for ten years or someone from the general transfer service who may have been studying at some point but represents the broad university. Then, you do not have the same reputation. Then you will be laughed at a bit. So in that respect, it is quite important, that you really bring along these professional skills" (Scout 6).

Their thematic specialization involves recognition resources from entrepreneurial actors and enables the integration of the scouts' own ideas for problem solving in transfer projects. It also goes along with a control potential for the transfer scouts in transfer processes – as was also observed by TTO representative A of a HEI, who concludes that scouts "really influence the project." Thus, in view of the function of scouting it clearly goes beyond mere mediation and includes a problem-solving competence to respond with own ideas and solutions to the needs of companies. With regard to the occupational self-conception of the scouts, the use of their thematic expertise as well as the experience of being acknowledged for it, strengthens their position of remaining in between the spheres of academia and business in the regional transfer system.

4.3.2. Digital transfer instruments

Another feature specific to the transfer scouts with regard to their co-construction role is the development and usage of digital transfer instruments. The scouts dedicate a large part of their communicative exchange to the search for suitable digital tools e.g. for internal project communication, for presenting the HEIs' latest technological developments, or selecting a suitable costumer-relationship-management (CRM) system. After a test phase and the rejection of one CRM system by the scouts, individual scouts work together with project participants to write a syntax as the basis for procuring a better-adapted CRM system. Transfer scouts also experiment with manifold software tools to secure ideas generated in brainstorming processes, or to create an indicator that measures the time the scouts spend on their diverse activities. The scouts also seek digital support with the help of virtual reality tours through university laboratories, some of which they have filmed themselves, which are to be made available to companies in the region as test beds. Additionally, they employ transfer profiles, which briefly present the methods, technologies, software, algorithms, etc. of HEIs with (high) utilization potential for addressing companies. Cumulatively, such transfer profiles were integrated in innovation radars developed with the help of transfer scouts, which cluster the exploitation and market potential of various technologies in a sector-specific manner.

"With the technology radar we have a cool, new tool and it looks hip." (Scout 3)

"There are 20,000 tools here. There is a tool for everything. So I find so many tools totally confusing, and there's no such thing in the business sector" (Scout 8).

While the majority of scouts are more tool-savvy, it is primarily the scout with his own entrepreneurial experience who evaluates the multitude of tools as being less supportive in the scouting process. Nevertheless, this scout – similar to the other ones – also contributes his expertise to the search for a more suitable CRM system, the digital equipment for a showroom, as well as the creation of a digital matching platform.

"This matching platform should perhaps be a result […] so that the scouting is not too personal" (Scout 3).

"I don't think that such a platform will someday be able to replace the work of a scout somehow, because people, because people would have to pour their problems into such a portal first" (Scout 1).

"I always think it's such a, well, you need a credit of trust, but mostly, well, if you could rely on the other person, then you always know, ah yes okay, then I can refer to him" (Scout 2).

Nevertheless, the scouts are aware that such digital tools cannot completely replace personal and, above all, trust-based and stable relationships (Hassink, 1997: 53; Muscio, 2010: 186) in the transfer business. Accordingly, personal trust on the one hand, and the growing importance of digital tools on the other, indicate a new field of tension in KTT that needs further research (and will be part of our next paper). The corona pandemic offers almost ideal conditions to get to the bottom of this area of tension and analyze the possibilities of digital matching tools in relation to personal trust.

4.3.3. Explicit intention to contribute to regional development

The transfer scouts internalized the claim of the project to "develop cross-agency solutions to key societal challenges in the project region" (Project Report: 3) as well as to "strengthen the region's research and development skills" (Project Report: 28). As the Scouts 5, 4 and 2 exemplify, a potential contribution to regional development is part of the explicit motivation for their activity.

"Actually, we are an instrument of business promotion. It is true that we do not have the ministry stamp on it, but we want the region to make economic progress and be economically strengthened" (Scout 5).

"It's a nice thing for me, because I've grown up here in the region too, and that, um, I think it's very interesting, um, being a little part, being a cog […] in the increase of the economic performance of the region" (Scout 4).

"I always want to do something that makes sense or where I can see something develop that really brings added value to the region" (Scout 2).

Consciously, the scouts situate themselves in relation to regional development, for which they claim to be supporting "instruments" (Scout 5) and for which they want to initiate future prospects. There are at least two reasons why they strive to contribute to regional development. On the one hand it is because the project is publicly funded and the impact on regional development processes is one main factor in the evaluation matric. In this sense, some of the scouts perceive themselves as "instruments of business promotion" as Scout 5 explained it and maintain a relation to the region with reference to the project objectives.

"[…] but in principle, of course, we should also, yes, support the region" (Scout 1).

[The aim of the project is] "to strengthen the region and initiate innovations" (Scout 6).

"It would be nice, if all the capacities and resources that you put in there, can also advance the region" (Scout 7).

Scout 2 and scout 4, on the other hand, want to initiate development processes because of their regional belonging and space-related identification (Christmann, 2016).

"I've grown up here in the region" (Scout 4).

"Well, I'm from Lusatia and I know the whole story and also notice how frustration is pent up […] which I would like to counteract a

Data Table 2

category "co-construction", codes and representative quotes.

Category	Codes	Representative Quotes/Examples (selection)
Co-Construction	Thematic specialization	"But I see the advantage of the scouts in the fact that they are experts in the subject and are responsible for a limited thematic area and therefore can deal with a subject in such depth that they at least can take a consultative role" (Scout 5).
		"During the last two jobs I did the parshipping until the numbers were exchanged. And then it was over, I couldn't do anything else. Now I can at least accompany the things and can also be supportive, if I see that there are problems or any gaps are opening. I can make people talk about the gaps and provide support to fill these gaps." (Scout 5)
		"But if they [companies] say, we just have a problem, we do not know what we can do there, then I do not have to search for people, but have some ideas on my own, say we could do that and maybe that […] to help more quickly." (Scout 1)
		"The subject-specific skills are more important, of course. This is what I already see when you talk to the companies. Um, that's a different story when somebody comes in who says he's been working in biophotonics for ten years or someone from the general transfer service who may have been studying at some point but represents the broad university. Then, you do not have the same reputation. Then you will be laughed at a bit. So in that respect, it is quite important, that you really bring along these professional skills" (Scout 6).
		"So and that was about passing across my table and then I've not just forwarded the question, but have already prepared something with my little bit of knowledge, prepared a few slides […] So I always prepare a lot that you can realize something happens to feed both of them" (Scout 4).
		The "scouts […] are experts. They can go much more directly into the discussions and really influence the project. We always need help then. […] We have, yes, a large proportion of our work is mediating activity, while the scouts themselves are already technically stuck inside in the subject" (interview with a transfer office manager at a Brandenburg university).
	Digital transfer instruments	"With the technology radar we have a cool, new tool and it looks hip." (Scout 3)
		"There are 20,000 tools here. There is a tool for everything. So I find so many tools totally confusing, and there's no such thing in the business sector" (Scout 8).
		"The creation of a digital platform is one goal of the project to make the universities offers more visible and searchable, as well as to enable matching processes" (project coordinator).
		"This matching platform should perhaps be a result […] so that the scouting is not too personal" (Scout 3).
		"I don't think that such a platform will someday be able to replace the work of a scout somehow, because people, because people would have to pour their problems into such a portal first" (Scout 1).
		"I always think it's such a, well, you need a credit of trust, but mostly, well, if you could rely on the other person, then you always know, ah yes okay, then I can refer to him" (Scout 2).
	Explicit intention to contribute to regional development	"Actually, we are an instrument of business promotion. It is true that we do not have the ministry stamp on it, but we want the region to make economic progress and be economically strengthened" (Scout 5)
		"It's a nice thing for me, because I've grown up here in the region too, and that, um, I think it's very interesting, um, being a little part, being a cog […] in the increase of the economic performance of the region" (Scout 4).
		"I always want to do something that makes sense or where I can see something develops that really brings added value to the region". (Scout 2)
	cross-institutional acting	"Contact one scout and you get the expertise of three institutions." (Scout 3)
		"Although I'm a scout […] I cannot just exactly represent one group, but I have just ten groups here and we want to do the whole even across the organizations" (Scout 6).
		Conferring a request from Chamber of Crafts on behalf of an entrepreneur in search of a certain technological solution from the own university (1) to the partnering university (2).

little. [laughs] Yeah, well, I don't know, that's kind of a basic attitude, an idealistic on maybe" (Scout 2).

These intentions contribute to explanations why the scouts do not limit themselves to mediators of KTT but actively engage with their professional expertise in negotiation processes about new knowledge and technologies for the region.

Significant here is the considerable amount of political attention paid to Lusatia, where the Commission for Growth, Structural Change and Employment (2019) set up by the German Federal Government in June 2018 prepared recommendations for the social and structural development of the lignite mining region. Over the next two decades these recommendations shall pave the way for enormous state investments in order to cope with the decision to phase out coal by 2038 at the latest. In this field multiple actors are seeking funding, the use of which often requires cooperation with companies, and the scouts are very much involved in this competition for a limited number of companies in the region. Their involvement offers them opportunities to participate in the process of structural change and, potentially, to consolidate their new position in the regional transfer system.

4.3.4. Cross-institutional acting

"Contact one scout and you get the expertise of three institutions."

This is how Scout 3 describes the peculiar scouting concept. In general, TTOs mostly remain primarily committed to their own single organization. Evaluation research shows, however, that TTOs that build network relationships with other transfer organizations or intermediaries, are considered most successful (Schmauder, 2011). The advantages of cooperation between different universities are so far apparently not sufficiently recognized by the majority of TTOs. This is different in case of transfer-scouting, as exemplified by the involvement of various institutions in a transfer project: Transfer scout 3 was contacted by a Chamber of Crafts located in the federal state of Brandenburg. The Chamber had received a request from an entrepreneur who was looking for better technological solutions for his production. Knowing that HEI 1, with which Scout 3 is affiliated, specializes more in a not perfectly matching technology, but university HEI 2 had expertise in a more feasible technology, Scout 3 forwarded the inquiry to Scout 1, who belongs to HEI 2. Scout 1 got in touch with the entrepreneur and mediated contact with a working group of HEI 2. This resulted in a feasibility study that is subsidized by an innovation voucher, financed by the state of Brandenburg. This constellation can be taken as a positive example for cross-institutional transfer alliances. Nevertheless, the relatively small amount of state subsidies in this case initiated some quarrel between the two HEIs and points to the competitive dimension of transfer activities. For the scouts, this means that cross-institutional

cooperation as well as its resource potential will be liable to provoke frictions in future as the following section will illustrate.

4.4. Situational contexts of transfer scouting – explanatory factors for the transition from intermediation to co-construction

Over the course of our observations it became increasingly obvious how the transfer scouts were affected by factors that partly derive from the explorative character of the encompassing research and development project (see section 3), but also by general context factors that KTT professionals are confronted with: Benchmarking of outcomes of their work, dependency of their role, upcoming of critical voices, tensions between cooperation and competition, necessity of trust among heterogeneous actors (see table 1). These situational contexts contribute to the explanation why transfer scouts' self-conceptions and occupational orientations have changed over time from intermediation towards co-construction.

4.4.1. Performance indicators, critical voices and role dependency

Since mid-2019 (data table 1) in particular, self-conceptions have changed and new ones with regard to the category of co-construction have come to the fore. One facilitating aspect is the growing relevance of performance indicators and expectations from many sides (companies, researchers, project coordination/management, funding ministry). It was repeatedly observed at public events that scouts are concerned with questions from researchers such as "how do you measure success", and during internal meetings were faced with expectations to report "everything you had your fingers in […] in case of doubt, it is better to include too much rather than too little. It is important that we document how successful the scouting is" (project coordinator). This is complemented by increasing internal and external project criticism, for example with regard to the relationship between personnel capacity and external funds raised through the support of the scouts. A representative of an association for medium-sized companies criticized that "if a company acted like this, it could not exist on the market". Consequently, scouts increasingly deal with the measurability of their own success and try to establish themselves as legitimate actors in the regional transfer system. This also becomes relevant with regard to their role dependency. Their success requires a continual willingness to initiate cooperation on behalf of science and industry, as the following example illustrates. Scout 1 received a request from a company that needed an offer for the construction of a particular product. The scout immediately forwarded this request to a chair of the university whom he assessed as competent on the basis of his technical expertise. A few days later, when there had still been no response from the chair, Scout 1 vainly tried to make telephone or mail contact. After a few more days' delay he received an e-mail stating that the chair would be away on holiday for at least another week.

> "We fucked up. I don't think the company will get in touch again." (Scout 1)

The scout was disappointed that he had failed to mediate an academic partner for the company, especially since this could have been the prelude to a long-term cooperation, he told us, as the company would need a variety of similar products. This example highlights the different time rhythms in business and science. If the scouts fail to negotiate between the different values and attitudes, the chances of mediation fall. Here, the dependence of the scouts' success from the activities of others (motivation and reputation for transfer activities, corresponding time resources) becomes obvious, and this can be one of the reasons why they aim at strengthening their own technical expertise instead of reducing their activities to mediation.

4.4.2. Cooperation and competition with established transfer agencies

Another aspect facilitating the transfer scouts' changing roles and practices refers to their relationship to already established TTOs at the participating HEIs. This relation can be described as existing in a state of tension between cooperation and competition.

Such tensions are reflected by a project coordinator, and implicitly also by a transfer officer:

> "Internally, the communication is becoming increasingly difficult here. They only pass on information if they need professional advice. […] A division of labor according to which the TTO would take care of event management, whereas the scouts are responsible for the content-related work, does not take place […] They need a clear demarcation" (Project coordinator).

> "So yes, even internally we have been asked, who is my contact person for transfer now? Is it the project now? Is it the TTO?" (TTO representative B of a HEI).

The scouts themselves strive for a constructive relationship with the TTOs and deliberately "don't want to build up competition", but consider their services complementary ("cover open flanks") with regard to the development of new, potentially innovative transfer approaches.

> "I always say, um, we're not going to reinvent anything that the TTO does, I always say that. I always say, um, we provide support where the transfer office stops, and try to improve the transfer activity with innovative approaches" (Scout 2).

> "I think, that we don't want to build up competition. […] We want to relieve you, or cover your open flank, because everyone has limited resources. We know there are open flanks in certain areas and we want to cover them" (Scout 5).

> "I think it's important to find a good procedure with them, that's why I take part in the monthly meetings of the TTO" (Scout 3).

> "It's a disaster, if companies are addressed twice without the TTO, and the scouts knowing from each other" (Scout 8).

Given the "initial concerns of the TTO [of one participating HEI] that there could be competition between the scouts and the TTO" (project management), workshops have been held to clarify how the division of labor between TTOs and scouts will be organized. While such agreements work at one HEI, the exchange of information at the other HEI is not entirely successful according to a project coordinator ("They only pass on information if they need professional advice […] They are the ones who block"). At the same time, regular communicative exchange is maintained by the university management as well as by informal meetings as Scout 2 exemplifies. ("On Monday, I bumped into Mr. Lehman [from the TTO] in the hallway and we want to exchange ideas some time").

In view of the temporary funding of both the TTO and the scouts from public project funds, rivalries about power struggles with regard to the primary responsibility for KTT, as well as for a permanent and legitimate position in the regional transfer system, undermine a trustful and balanced communicative atmosphere. The established TTO therefore competes with the (self-attributed) experimental exploration and creative potential of the transfer scouts. Despite the diversity of perspectives and competencies, as well as the heterogeneity of actors, in the case of constructive relationships, a durable cooperation between TTOs and transfer scouts nevertheless promises to generate potentially innovative impulses.

This figure now graphically summarizes the processing of the transfer scouts from intermediation to co-construction with reference to different situational context factors in the regional transfer system.

5. Discussion

The paper contributes to the scope of empirical knowledge on microfoundational analyses of the intermediaries' roles (Champenois and Etzkowitz, 2018; O'Kane et al., 2015) as well as on how intermediaries
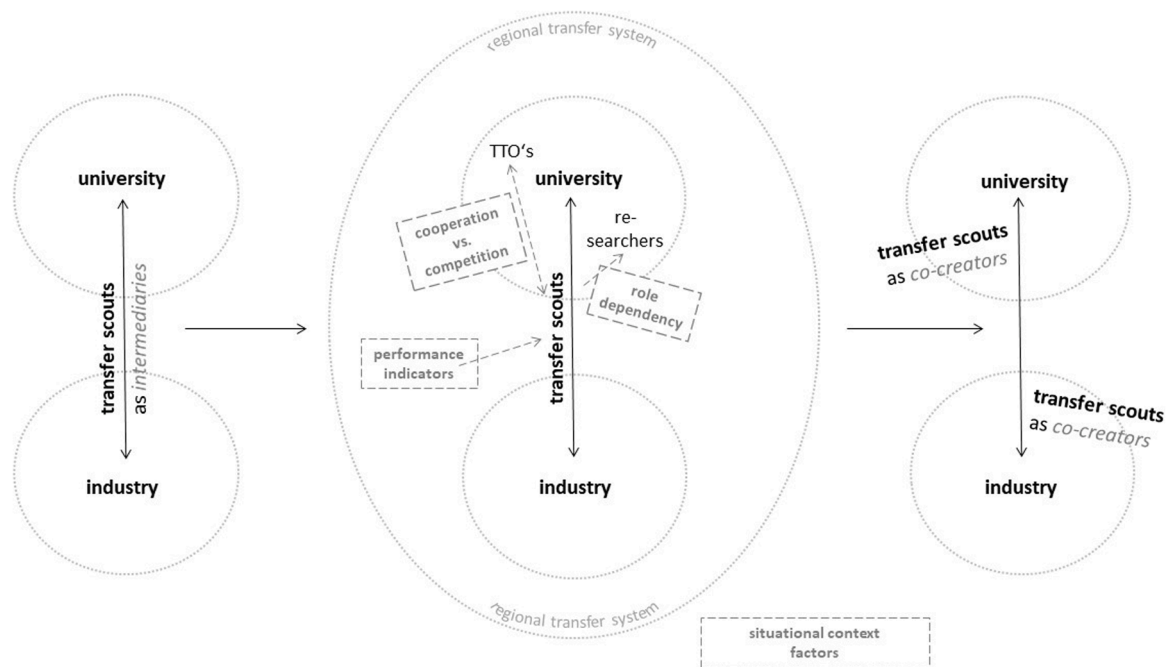
Figure 1. Processing of transfer scouts from intermediation to co-construction.
Source: Own figure

perform their practices (Furnari, 2014). The views of Villani and Phillips (2020: 24) who have already explored "the actions undertaken by catalysts" are taken up. Extending the scope of the study of Villani and Phillips (2020), our research on transfer scouts complement interview data by ethnographic methods, including various participative observations, as part of a longitudinal analysis over one and a half year. Thanks to this methodological endeavor, our analysis on roles and activities of intermediaries like transfer scouts not only focuses on encouraging, creating and managing (spaces for) university-industry-relations (Villani and Philipps, 2020), but moreover on their processing towards an active, constructive as well as co-creative part in KTT processes.

Therewith, it is shown that a focused ethnographic approach to the process analysis of professional roles and daily practices of eight scientifically trained employees who are engaged as "transfer scouts" offers novel insights to the academic debate on transfer intermediaries. On the one hand, as could be expected from traditional transfer professionals, transfer scouts fulfill the role of intermediators between HEIs and regional companies. Over the course of our observations, however, their orientation towards their possible contributions to knowledge production gets stronger. More than that, a shift of their dominant activities from intermediating functions to co-constructive knowledge production occurs. They participate with their own ideas and expertise in transfer projects and therewith actively take part in the co-construction of new technological knowledge. They engage themselves in developing specialized digital transfer instruments, they contribute to cross-institutional cooperation, notwithstanding conflicting interests of their own universities, and embed their activities in their explicit intention to contribute to regional development.

Empirically, the reasons for this change can be attributed to situational context factors of the transfer scouts' appointments within the framework of a fixed term publicly funded research and development project. A prerequisite for their appointment was their scientific specialization in one out of three technological areas. Therefore, they brought with them some experience in scientific work and displayed an orientation towards science. Over the course of the project they became aware of internal and external project criticisms as well as of the

increasing relevance of performance indicators in particular from the funding side of the project. In addition, the experience of being precariously financed on a temporary basis within a competitive regional transfer system[iv] with divergent actors whose relations are characterized by tensions between cooperation and competition contributed to a shift from intermediary to co-constructive activities.

Theoretically, these empirical findings can be explained with concepts of the sociology of work and the sociology of science. The sociology of work makes strong claims for the tendency of employees to ascertain the meaningfulness of their work (Bailey et al., 2019). While psychological accounts of meaningfulness focus the inner experience of workers, the sociology of work views meaningfulness as an outcome of a dialectic relation between individuals' agency and organizational or workplace structures. Pivotal factors for meaningfulness are seen in the workers' autonomy, in the recognition of others, and in the conviction to contribute to a wider good (Aguinis and Glavas, 2019; Laaser and Bolton, 2018; Nies, 2015). Against this backdrop, the transfer scouts emerge as employees who try to gain and maintain meaningfulness by making use of those competencies that differentiate them from other intermediaries in the field between business and academia.

In the sociology of science various social-theoretical paradigms are applied to grasp the specifities of science and the academia as compared to other realms of society. For our purpose here, a recourse to Bourdieu's theory of science as a social field is appropriate (Bourdieu, 1988). According to this theory, the "rules of the game" in the field of science prefer social positions with high "cultural capital", as it is acquired in particular by long lasting and ambitious academic training, over positions that are signified by other forms of capital. Therefore, it becomes understandable that transfer scouts, over the course of their work in between the lines of business and academia, tend to orient themselves to academia. They make the experience that they can contribute something

---

[iv] The regional transfer system encompasses many more actors (e.g. multipliers, such as associations and chambers, politicians, administrative representatives, civil society actors) than transfer scouts and TTOs, however this paper does not set out to examine their complex interplay.

that cannot be brought in by someone else in the field and this is derived from their "cultural capital" as academics. Comparable findings have been discussed with regard to "entrepreneurial scientists" in academic spin-offs (Braun-Thürmann et al., 2008). There the question arises whether it is possible to constantly identify oneself as scientist when an own enterprise, based on an original scientific invention, dominates the daily work activities (Möll and Jacobsen, 2008).

Practically, these findings differentiate the concepts employed in the literature for intermediaries (e.g., catalysts, boundary spanners, border point managers, process promoters, brokers). Transfer scouts evoke a professional exchange between potential partners and suggest solutions for diverse practical problems, develop prototypes, demonstrators or business ideas, experiment with digitals tools, contribute to project proposals with content-related work, and therewith actively participate in the co-construction of new knowledge and technologies. Predominantly rooted in academia, they have a feeling of belonging to the scientific community and use their technological know-how to build trustful relationships and competence credibility with heterogeneous actors. Thus, intermediation via technical expertise can be identified as one important micro-level mechanism for generating KTT.

Consequently, neither system theory (border point organizations) (Kloke and Krücken, 2010; Luhmann, 1964; Tacke, 1997) nor organizational sociology approaches to the concept of boundary spanning (Champenois and Etzkowitz, 2018; Comacchio et al., 2012; Tushman, 1977) will suffice to describe the role of diverse intermediaries in KTT. Here, a social constructivist perspective considering the practices of transfer scouts and their communicative negotiation processes in different actor constellations (Pinch, 1996; Schulz-Schaeffer, 2019; Christmann, 2016) teaches us more about the active role of transfer scouts in the construction of new technological knowledge and potential innovations. Since diverse actors are operating in the regional transfer system and confront transfer scouts with tensions between cooperation and competition, negotiation processes can be fiercely contested, met by resistance, and accompanied by conflicts – as we have seen – what emphasizes a continual struggle with innovation (Christmann, 2020). In that they break routines, such conflict may create opportunities for the emergence of innovation and catalyze processes of social change (Neuloh, 1977). On the other hand, conflict diminishes the odds of new ideas coming to fruition, especially when they are not grounded in rational arguments or negotiated in an atmosphere of mutual trust (Noack and Federwisch, 2019). Productively harnessing dissent and conflict moves the question towards communication. In processes of communication, heterogeneous perspectives and interests meet, ideas are discussed, exchanged, connected, and resumed in a way that may at times be conflictual. Thus, new ideas can be developed that result in new constructions of reality, which must again be communicated, transformed, and meaningfully linked in order to be most effective (Christmann, 2016). With regard to complementary practices as well as in case of constructive relationships, a durable cooperation between TTOs and transfer scouts promise to generate potentially innovative impulses. But this is less a stable setting than an ongoing process that requires many additional functional competencies and supporting structures to be provided by the organizations. The question arises, whether such complex KTT structures can be successfully institutionalized outside the frame of a fixed term project. Only then is it possible to create realistic expectations towards KTT-intermediaries and establish transfer scouting as an attractive profession in its own right in the entrepreneurial university.

6. Conclusions

A process-related focused ethnography on intermediary work in KTT is rare if not non-existent. With a focus on an empirical contribution, this article not only addressed this research gap in order to better understand intermediary actors and their changing practices and roles, but also evoked, thanks to this methodology, a new perspective on KTT-

intermediaries: Apart from mere mediation, transfer scouts become co-creators of new knowledge and technologies in transfer processes and get involved in co-creational and multidirectional knowledge-production (Gibbons et al., 1994; Jostmeier et al., 2014; Nowotny et al., 2001). Given this, it can be expected that closer bounds and new transdisciplinary cooperation between scientists and entrepreneurial actors can improve KTT. But such bounds nevertheless need to adhere to functionally diverse realms of academia and business. Conflicts and ambiguities remain relevant and need to be considered within the intermediating functions and organizations.

These arguments, on the basis of just one focused ethnographic case study, may appear somewhat generalizing. However, they should be regarded as structural hypotheses that require further testing. They have served to shed light on a research gap in the sense that neither a process perspective on intermediaries' practices, nor on their potentially changing roles, has been employed in detail. Consequently, further research questions arise: To what extent do co-productive practices in KTT influence the form, the course, and the outcome of transfer processes? How do institutional and structural factors of nationally or sectorally diverse university-industry-linkages impact on co-productive KTT practices? To what extent is the role of co-construction tied to the structural context in Germany, where careers in academia tend to be rather insecure, so that researchers experiment with new occupational opportunities – such as that of the transfer scout - in striving to stay in the academic system? In other words, can or should transfer scouting be established as an attractive profession in its own right in the entrepreneurial university? Which potentials, but also which risks, arise with regard to the role of co-construction assumed by figures primarily expected to be mediators?

At least with respect to the last question, our ongoing research illustrates that the scouts' thematic specialization facilitates translation between heterogeneous actors and goes hand in hand with control potential for the scouts. However, it may also entail the risk that researchers will feel threatened in their knowledge sovereignty by the scouts or, at least, perceive the substantive input of the scouts, beyond their mediation activity, as interference. This will not only reduce social recognition resources, which are central to scouting, but may disturb trustful relationships and cause transfer projects to fail.

This should help to create realistic expectations towards KTT-intermediaries, rather than providing abstract claims. With reference to a policy perspective, the paper illustrates that transfer scouts are confronted with manifold expectations with respect to increasing the effectiveness and efficiency of KTT by focusing on specific technology fields (Wissenschaftsrat, 2007: 81). This is especially due to evaluations that show that "traditional" transfer intermediaries like TTOs are often of little importance in establishing contacts between heterogeneous transfer partners (Hassink, 1997: 351; Kesting, 2013: 289). Thus, in Germany as well as in Europe, there is a gap between the high quality of scientific performance and the low intensity of industry-science links (the "European paradox") (Debackere and Veugelers, 2005: 323). These results have led to doubts about the usefulness of these institutions for KTT (Muscio, 2010; O'Kane et al., 2015) as well as for regional economic development (Hassink, 1997: 351). Respectively, transfer scouts are expected to fill this gap.

Author Contributions

A. Noack and H. Jacobsen contributed equally to the resubmittet manuscript "Transfer scouts: from intermediation to co-constructors of new knowledge and technologies in Germany"

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

References

Agogué, Marine, Berthet, Elsa, Fredberg, Tobias, Le Masson, Pascal, Segrestin, Blanche, Stoetzel, Martin, Wiener, Martin, Yström, Anna, 2017. Explicating the role of innovation intermediaries in the "unknown": a contingency approach. Journal of Strategy and Management 10 (1), 19–39. https://doi.org/10.1108/JSMA-01-2015-0005.

Aguinis, Herman, Glavas, Ante, 2019. On corporate social responsibility, sensemaking, and the search for meaningfulness through work. Journal of Management 45 (3), 1057–1086. https://doi.org/10.1177/0149206317691575.

Bailey, Catherine, Yeoman, Ruth, Madden, Adrian, Thompson, Marc, Kerredige, Gary, 2019. A review of the empirical literature on meaningful work: progress and research agenda. Human Resource Development Review 18 (1), 83–113. https://doi.org/10.1177/1534484318804653.

Bessant, John, Rush, Howard, 1995. Building bridges for innovation: role of consultants in technology transfer. Research Policy 24 (1), 97–114. https://doi.org/10.1016/0048-7333(93)00751-E).

Bourdieu, Pierre, 1988. Homo Academicus. Polity Press, Cambridge.

Champenois, Claire, Etzkowitz, Henry, 2018. From boundary line to boundary space: the creation of hybrid organizations as a triple helix micro-foundation. Technovation 76–77 (1), 28–39. https://doi.org/10.1016/j.technovation.2017.11.002.

Christmann, Gabriela B., 2020. Introduction: Struggling with innovations: Social innovations and conflicts in urban development and planning. European Planning Studies 28 (3), 423–433. https://doi.org/10.1080/09654313.2019.1639396.

Christmann, Gabriela B., 2016. Zur kommunikativen Konstruktion von Räumen. Theoretische Konzepte und empirische Analysen. Springer VS, Wiesbaden.

Clayton, Paige, Feldman, Maryann, Lowe, Nichola, 2018. Behind the scenes: intermediary organizations that facilitate science commercialization through entrepreneurship. Academy of Management Perspectives 32 (1), 104–124. https://doi.org/10.5465/amp.2016.0133.

Comacchio, Anna, Bonesso, Sara, Pizzi, Claudio, 2012. Boundary spanning between industry and university: the role of technology transfer centres. Journal of Technology Transfer 37 (6), 943–966. https://doi.org/10.1007/s10961-011-9227-6).

Commission for Growth, Structural Change and Employment (2019). Final report. https://www.bmwi.de/Redaktion/DE/Downloads/A/abschlussbericht-kommission-wachstum-strukturwandel-und-beschaeftigung.pdf?_blob=publicationFile&v=4; access 02.12.2019.

Cooke, Philip, 2008. Regional innovation systems: origin of the species. International Journal of Technological Learning, Innovation and Development 1 (3), 393–409. https://doi.org/10.1504/IJTLID.2008.019980.

Czarnitzki, Dirk, Licht, Georg, Rammer, Christian, Spielkamp, Alfred, 2001. Rolle und Bedeutung von Intermediären im Wissens- und Technologietransfer. ifo Schnelldienst 54 (4), 40–49.

Debackere, Koenraad, Veugelers, Reinhilde, 2005. The role of academic technology transfer organizations in improving industry science links. Research Policy 34 (3), 321–342. https://doi.org/10.1016/j.respol.2004.12.003.

Etzkowitz, Henry, 1998. The norms of entrepreneurial science: cognitive effects of the new university-industry linkages. Research Policy 27 (8), 823–833. https://doi.org/10.1016/S0048-7333(98)00093-6).

Fisher, Donald, Atkinson-Grosjean, Janet, 2002. Brokers on the boundary: academy-industry liaison in Canadian universities. Higher Education 44 (3/4), 449–467. https://doi.org/10.1023/A:1019842322513.

Friedman, Joseph, Silberman, Jonathan, 2003. University technology transfer: do incentives, management, and location matter? Journal of Technology Transfer 28 (1), 17–30. https://doi.org/10.1023/A:1021674618658.

Furnari, Santi, 2014. Interstitial spaces: Microinteraction settings and the genesis of new practices between institutional fields. Academy of Management Review 39 (4), 439–462. https://doi.org/10.5465/amr.2012.0045.

Groys, Boris, 2002. Über das Neue. Versuch einer Kulturökonomie. 2. Auflage. Fischer, Frankfurt am Main.

Gibbons, Michael, Limoges, Camille, Nowotny, Helga, Schwartzman, Simon, Scott, Peter, Trow, Martin, 1994. The new production of knowledge. The Dynamics of science and research in contemporary societies. Sage, London, Thousand Oaks, New Delhi.

Giuri, Paola, Munari, Federico, Scandura, Alessandra, Toschi, Laura, 2019. The strategic orientation of universities in knowledge transfer activities. Technological Forecasting & Social Change 138 (1), 261–278. https://doi.org/10.1016/j.techfore.2018.09.030.

Hassink, Robert, 1997. Technology transfer infrastructures: some lessons from experiences in Europe, the US and Japan. European Planning Studies 5 (3), 351–370. https://doi.org/10.1080/09654319708720404.

Jostmeier, Milena, Georg, Arno, Jacobsen, Heike, 2014. Arbeits- und Organisationsforschung im Verbund aus Wissenschaft und Wirtschaft: Praxis ko-evolutionärer Wissensproduktion für die Bewältigung gesellschaftlicher Herausforderungen. In: Jostmeier, Milena, Georg, Arno, Jacobsen, Heike (Eds.), Sozialen Wandel gestalten. Springer VS, Wiesbaden, pp. 9–30.

Kawulich, Barbara B., 2005. Participant observation as a data collection method. Forum Qualitative Social Research 6 (2). http://www.qualitative-research.net/index.php/fqs/article/view/466/996. access 14.02.2019.

Kelle, Uwe, 2008. Die Integration qualitativer und quantitativer Methoden in der empirischen Sozialforschung. Theoretische Grundlagen und methodologische Konzepte. VS Verlag für Sozialwissenschaften, Wiesbaden.

Kesting, Tobias, 2013. Wissens- und Technologietransfer durch Hochschulen aus einer marktorientierten Perspektive. Ansatzpunkte zur Gestaltung erfolgreicher Transferprozesse an Universitäten und Fachhochschulen. Springer Gabler, Wiesbaden.

Kloke, Katharina, Krücken, Georg, 2010. Grenzstellenmanager zwischen Wissenschaft und Wirtschaft? Eine Studie zu Mitarbeiterinnen und Mitarbeitern in Einrichtungen des Technologietransfers und der wissenschaftlichen Weiterbildung. Beiträge zur Hochschulforschung 32 (3), 32–52.

Knoblauch, Hubert, 2020. The communicative construction of reality. Abingdon-on-Thames, Routledge.

Knoblauch, Hubert, 2005. Focused Ethnography. Forum: Qualitative Social Research 6 (3). Art. 44. http://nbn-resolving.de/urn:nbn:de:0114-fqs0503440.

Kühn, Manfred, Weck, Sabine, 2013. Peripherisierung – ein Erklärungsansatz zur Entstehung von Peripherien. In: Bernt, Matthias, Liebmann, Heike (Eds.), Peripherisierung, Stigmatisierung, Abhängigkeit? Deutsche Mittelstädte und ihr Umgang mit Peripherisierungsprozessen. Springer VS, Wiesbaden, pp. 24–46.

Laaser, Knut, Bolton, Sharon, 2018. Core autonomy, respectful recognition, and derived dignity: towards a typology of meaningful work. In: Paper presented at the Work, employment and society conference in Belfast unpublished.

Luhmann, Niklas, 1964. Funktionen und Folgen formaler Organisation. Duncker & Humblot, Berlin.

Malinowski, Bronislaw, 1922. Argonauts of the Western Pacific. An account of native enterprise and adventure in the archipelagoes of Melanesian New Guinea. Dutton, New York.

Merton, Robert K., 1973. The sociology of science: theoretical and empirical investigations. University of Chicago Press, Chicago.

Möll, Gerd, Jacobsen, Heike, 2008. Wissenschaftler zwischen Akademie und Ökonomie. Zur Herausbildung neuer Formen wissenschaftlicher Beruflichkeit. In: Braun-Thürmann, H., Knie, A., Simon, D. (Eds.), Unternehmen Wissenschaft. Ausgründungen als Grenzüberschretung akademischer Forschung. Transcript, Bielefeld, pp. 73–114.

Muscio, Alessandro, 2010. What drives the university use of technology transfer offices? Evidence from Italy. Journal of Technology Transfer 35 (2), 181–202. https://doi.org/10.1007/s10961-009-9121-7).

Nies, Sarah, 2015. Nützlichkeit und Nutzung von Arbeit: Beschäftigte im Konflikt zwischen Unternehmenszielen und eigenen Ansprüchen. Baden-Baden, Nomos.

Neuloh, Otto, 1977. Soziale Innovationen und sozialer Konflikt. Vandenhoeck and Ruprecht, Göttingen.

Noack, Anika, Federwisch, Tobias, 2019. Social innovation in rural regions: Urban impulses and cross-border constellations of actors. Sociologia Ruralis 59 (1), 92–112. https://doi.org/10.1111/soru.12216.

Nowotny, Helga, Scott, Peter, Gibbons, Michael, 2001. Re-thinking science: knowledge and the public in an age of uncertainty. Polity Press, Cambridge.

O'Kane, Conor, Mangematin, Vincent, Geoghegan, Will, Fitzgerald, Ciara, 2015. University technology transfer offices: the search for identity to build legitimacy. Research Policy 44 (2), 421–437. https://doi.org/10.1016/j.respol.2014.08.003.

Pinch, Trevor J., 1996. The social construction of technology: a review. In: Fox, Robert, Scranton, Philip (Eds.), Technological change: methods and themes in the history of technology. Harwood, Amsterdam, pp. 17–35.

Pinch, Trevor J., Bijker, Wiebe E., 1984. The social construction of facts and artefacts: or how the sociology of science and the sociology of technology might benefit each other. Social Studies of Science 14 (3), 399–441. https://doi.org/10.1177/030631284014003004.

Pollard, David, 2006. Innovation and technology transfer intermediaries: a systematic international study. In: Beyerlein, Michael M., Beyerlein, Susan T., Kennedy, Frances A. (Eds.), Innovation through collaboration. Advances in interdisciplinary studies of work teams. Emerald Group Publishing Limited, Amsterdam, pp. 137–174.

Rogers, Everett M., Yin, Jing, Hoffmann, Joern, 2000. Assessing the effectiveness of technology transfer offices at U.S. research universities. Association of University Technology Managers. Inftp://ftp.unicauca.edu.co/cuentas/fiet/docs/Materias/Gestion_tecnologica/2005/Clase%209/research%20develop.pdf; access 15.10.2019.

Schmauder, Martin, 2012. Transferszenarien. Bedingungen erfolgreicher Kooperationsbeziehungen zwischen Wissenschaft und Wirtschaft in Innovationsprozessen. Technische Universität Dresden.

Schmauder, Martin, 2011. Technologietransfer. Anbahnung und Durchführung von Forschungskooperationen. Technische Universität Dresden.

Schulz-Schaeffer, Ingo, 2019. Innovation als soziale Konstruktion von Technik und Techniknutzung. In: Blättel-Mink, Birgit, Schulz-Schaffer, Ingo, Windeler, Arnold (Eds.), Handbuch Innovationsforschung. Springer VS, Wiesbaden, pp. 1–18.

Siegel, Donald S., Wright, Mike, 2015. Academic entrepreneurship: time for a rethink? British Journal of Management 26 (4), 582–595. https://doi.org/10.1111/1467-8551.12116.

Siegel, Donald D., Waldmann, David A., Atwater, Leanne E., Link, Albert N., 2004. Toward a model of the effective transfer of scientific knowledge from academicians to practitioners: qualitative evidence from the commercialization of university technologies. Journal of Engineering and Technology Management 21 (1), 115–142. https://doi.org/10.1016/j.jengtecman.2003.12.006.

Siegel, Donald S., Waldman, David A., Link, Albert N., 2003. Assessing the impact of organizational practices on the relative productivity of university technology

transfer offices: an exploratory study. Research Policy 32 (1), 27–48. https://doi.org/10.1016/S0048-7333(01)00196-2).

Skalecki, Petra, & Vieten, Anne (2014). Abschlussbericht für das Projekt "Technologie- und Wissensscouting". In: https://www.uni-mainz.de/forschung/Dateien/Abschlussbericht_Technologie_und_Wissensscouting.pdf; access 06.02.2019.

Stracke, Elke, 2009. Communicative validation of interview data. In: Chen, Honglin, Cruickshank, Ken (Eds.), Making a difference: challenges for Applied Linguistics. Cambridge Scholars Publishing, Newcastle Upon Tyne, pp. 188–198.

Sung, Tae Kyung, Gibson, David, 2000. Knowledge and technology transfer: levels and key factors. In: Proceedings of 4th International Conference on Technology Policy and Innovation. https://pdfs.semanticscholar.org/bb66/1af9708b4cc6b77b46d8c65819e1504eedcc.pdf?_ga=2.60879278.389986785.1571143176-1357711616.1571047685. access 13.09.2019.

Tacke, Veronika, 1997. Systemrationalisierung an ihren Grenzen – Organisationsgrenzen und Funktionen von Grenzstellen in Wirtschaftsorganisationen. In: Schreyögg, Georg, Sydow, Jörg (Eds.), Gestaltung von Organisationsgrenzen. Managementforschung. Wiesbaden, Gabler, pp. 1–44, 7.

Tushman, Michael L., 1977. Special boundary roles in the innovation process. Administrative Science Quarterly 22 (4), 587–605. https://doi.org/10.2307/2392402.

Tushman, Michael L., Scanlan, Thomas J., 1981. Boundary spanning individuals: their role in information transfer and their antecedents. Academy of Management Journal 24 (2), 289–305. https://doi.org/10.2307/255842.

Villani, Elisa, Phillips, Nelson, 2020. Formal organizations and interstitial spaces: Catalysts, complexity, and the initiation of cross-field collaboration. Strategic Organization. https://doi.org/10.1177/1476127019897235.

Villani, Elisa, Rasmussen, Einar, Grimaldi, Rosa, 2017. How intermediary organizations facilitate university–industry technology transfer: a proximity approach. Technological Forecasting & Social Change 114 (1), 86–102. https://doi.org/10.1016/j.techfore.2016.06.004.

Weingart, Peter, 2016. Wissenschaftssoziologie. In: Simon, Dagmar, Knie, Andreas, Hornbostel, Stefan, Zimmermann, Karin (Eds.), Handbuch Wissenschaftspolitik. Springer VS, Wiesbaden, pp. 141–155.

Vinig, Tsvi, Lips, David, 2015. Measuring the performance of university technology transfer using meta data approach: the case of Dutch universities. Journal of Technology Transfer 40 (6), 1034–1049. https://doi.org/10.1007/s10961-014-9389-0).

Wissenschaftsrat, 2016. Wissens- und Technologietransfer als Gegenstand institutioneller Strategien. Positionspapier.

Wissenschaftsrat (2007). Empfehlungen zur Interaktion von Wissenschaft und Wirtschaft. Oldenburg.

Witzel, Andreas, 2000. Das problemzentrierte Interview. Forum Qualitative Social Research 1 (1). http://www.qualitative-research.net/index.php/fqs/rt/printerFriendly/940/2056. access 14.02.2019.