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Tactics for overcoming challenges of institutional complexity in boundary crossing research environments

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Tactics for overcoming challenges of institutional complexity in boundary crossing research environments

Interdisciplinary research is intensely promoted, but challenged by academic field level demands that hinder the realization of its potential. This paper builds on a qualitative study and asks what means managers use to overcome barriers to interdisciplinary research. First, the study develops a conceptual framework that is based on an institutional logics approach and illustrates contradicting implications of a corporate logic and professional logic scholars are embedded in. Second, the study identifies three tensions that result from coexisting institutional logics and illustrates tactics used to overcome these tensions: Balancing epistemological tensions through boundary objects; Balancing identity tensions through identity work; Balancing evaluative tensions through performance indicators. These tactics help to overcome discrepancies between formal descriptions of interdisciplinary units and the activity structure within these units. Besides its practical relevance for research management and science policy, the results deliver reference points for theory-development in the field of higher education.

Keywords: research governance, interdisciplinary research; grand challenges; institutional complexity

Introduction

Interdisciplinary research, i.e. "research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance a fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline" (The National Academies 2005) supports the creation of major discoveries, shapes new scientific fields, and is frequently addressed for solving problems connected to 21st centuries "grand challenges". Due to its scientific and social impact, interdisciplinary knowledge production has gained in popularity in recent decades. Research funders have increasingly established projects, centers and organizational units to promote interdisciplinary research. Actors in science policy assume that

this development will continue. The experts for research, innovation and science (RISE) of the European Commission argue, for example, that the support of organizational structures that serve to promote interdisciplinary knowledge production should become a central priority of EU research and innovation policy (Allmendinger 2015).

However, interdisciplinary missions and labels alone by no means promise interdisciplinary research. Various studies point to discrepancies between official descriptions of formal structures and the activity structure, i.e. the actual research practices within these structures. Empirical findings show the latter are often rather characterized by coexistence than integration of different disciplines (Rhoten 2003). A constant tension between interdisciplinary research agendas and logics of the academic profession tends to hinder the realization of interdisciplinary research (Woiwode and Froese 2020; Leahey, Beckman, and Stanko 2017).

Although the causes of the barriers to interdisciplinary research have been discussed for several decades, there is still a need for action with regard to effective support of interdisciplinary research. Scholars complain about difficulties in being able to publish their results, research group leaders are overburdened with the supervision of interdisciplinary projects, and science managers are looking for suitable indicators to measure the quality and impact of interdisciplinary research (Yegros-Yegros, Rafols, and D'Este 2015; Gowanlock and Gazan 2013). Numerous studies thus highlight a need for empirically funded and instrumental knowledge that helps to cope with management problems “on both, epistemic and institutional levels” (Vienni, Vasen, and Villa Soto 2019) and increases the effectiveness of research management in interdisciplinary structures (Tress, Tress, and Fry 2007; König et al. 2013). Several authors stress that literature on interdisciplinary research lacks theoretically sound and empirical verified instruments that are particularly suitable for interdisciplinary research contexts (Yonezawa et al. 2020; Vienni, Vasen, and Villa Soto 2019; Donina, Seeber, and

Paleari 2017). Against the background of this gap, the present contribution asks by which means managers overcome barriers of interdisciplinary research.

The paper draws on the meta-theoretical institutional logics approach in order to first provide an analytical framework that systematically captures the tension between monodisciplinary demands prevailing in the scientific field on the one hand and the mission of promoting interdisciplinary research on the other. This perspective provides a link between the agency and cognitions of individual scholars and institutional rules. Based on a qualitative study that was conducted in several German and US research institutions this paper first illustrates three tensions that result from coexisting institutional logics and hinder the conduct of interdisciplinary research. Subsequently the paper illustrates how managers of interdisciplinary research units minimize these tensions. The results section illustrates three management techniques, each of which relates to one area of tension. The author concludes by elaborating on implications for policy and practice in higher education more broadly, illustrating limitations of the study, and pointing to avenues for future research.

Institutional complexity in higher education

The institutional logics approach assumes that individual decisions and behavioral outcomes are shaped by an interplay of institutional logics and individual agency (Thornton and Ocasio 2008). Institutional logics can be defined as patterns guiding decision-making within an organizational field, i.e. a set "of organizations that, in the aggregate, constitute a recognized area of institutional life; key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services or products" (DiMaggio and Powell 1983, 148). As "frames of reference that condition actors' choices for sensemaking, the vocabulary they use to motivate action and their sense of self and identity" (Thornton, Ocasio, and Lounsbury 2012, 2) they prescribe interpretation patterns, adequate forms of behavior, and criteria of success (Greenwood et al. 2011). They work across the societal-level, field-levels,

and micro-levels of individual behavior and constrain the means and ends of individual interests and agency (Greenwood et al. 2011; Larsen 2020; Vican, Friedman, and Andreasen 2020) Identities, interests, and values of organizations and individuals are thus always embedded within an institutional structure (Thornton and Ocasio 2008).

The institutional logics approach conceptualizes society as an inter-institutional system. Individual and organizational behavior are assumed to be located within a system of different societal sectors, each representing a specific set of expectations regarding organizational and human behavior. Thornton, for example, differentiated between six key sectors each of which with an own logic – markets, corporations, professions, states, families, and religions (Thornton 2004, 44–45). In a nutshell, the approach stresses that there are several sources of rationality and that logics of singular institutional orders tend to collide. Tensions on an agency level can be attributed to contradictions between different logics individuals are embedded in. They often result from a heterogeneity of institutional orders (Thornton and Ocasio 2008).

As any context, organizations also tend to be shaped by two or more logics (Friedland and Alford 1991). The presence of two or more logics "generating multiple institutionally given identities and mythologies that legitimate organizations, individuals, and groups" (Kraatz and Block 2008, 244) within an organizational field causes institutional complexity that shows itself in intra-organizational tensions between different logics incompatible prescriptions (Suddaby and Greenwood 2005). In this case guidelines on how the social world is to be interpreted collide. The logics "respective systems of meaning and normative understandings, built into rituals and practices, provide inconsistent expectations" (Greenwood et al. 2011, 321).

There is consensus that organizations within the field of higher education are confronted with challenges resulting from enduring institutional complexity. Literature points out higher education institutions are particularly affected by a tension between professional logics, i.e. goals, structures, beliefs and practices of the academic profession, and a corporate logic

characterized by a managerial rationale. These two logics prescribe different, partially incompatible behaviors (Greenwood et al. 2011). In its further course this paper argues that barriers hindering the conduct of interdisciplinary research result from a heterogeneity of institutional orders, more particularly, from a tense relationship between logics of the academic profession and the corporate logic.

Disciplinary logics of the academic profession

Professions are "organized group(s) that possesses esoteric knowledge which has economic value when applied to problems" (Pratt, Rockmann, and Kaufmann 2006, 235). Its knowledge bases become mediated through education and vocational training (Larson 1977). Academia can be regarded as one of the oldest professions (Hattke, Vogel, and Woiwode 2016); as "creative professionals" its members generate ideas and create cognitive frameworks (Scott 2008). As is typical for professionals, academics work processes are shaped by operational autonomy, collegiality and professional self-governance (Austin and Gamson 1983; Vican, Friedman, and Andreasen 2020). Academics carry out their core activities on the basis of highly specialized knowledge and control themselves within self-governing scientific communities (Mintzberg 1980). During peer review processes they confer each other "scientific capital" (Bourdieu 1988) - for example, publications in highly ranked journals or awards – that shapes their scholarly reputation and the course of their academic career (Whitley 2003).

The production of scientific knowledge is traditionally embedded in an academic discipline, namely a distinct set of theoretical, methodological and epistemological knowledge that is connected to specific area of expertise learned through instruction in courses of study and socialization in the academic profession (Hellström, Brattström, and Jabrane 2018). The cumulation of scientific knowledge is conditioned by "black boxes of (…) disciplinary culture" (Huutoniemi 2016, 166). Each discipline operates as a "separate machinery of knowledge" (Huutoniemi 2016), a self-controlling unit framed by specific norms of knowledge production

(Lamont 2009; Huutoniemi 2016). Due to a self-perpetuating disciplinary knowledge production cycle distinctive disciplinary perception patterns and knowledge stocks tend to be incommensurable with each other (Huutoniemi 2016; Knorr-Cetina 1999; Lamont 2009). Disciplines shape assumptions about which knowledge is valid and which methods are appropriate in order to gain scientific knowledge. They unify research practices by manifesting specific schemes of acknowledgement, perception, and practice and thus enforce cognitive and epistemological values. The meaning of scientific knowledge is rather "embodied" than transcendental (Huutoniemi 2016).

Taken together, academic disciplines are social entities characterized by a high selectivity concerning acknowledged contributions to its knowledge stocks (Huutoniemi 2016). They are the core units of a self-governing science and thus central elements of the science's social organization. Research is structured "around the competitive pursuit of intellectual reputations for scientists' published contributions to collective goals as judged by their colleagues/competitors" (Whitley 2003, 1017). Colleagues judging scientific contributions during peer review are predominantly shaped by disciplinary criteria and collective goals mainly defined within disciplinary boundaries (Woiwode and Froese 2020).

The corporate logics call for interdisciplinary research

The organizational structure of universities has a hybrid character. The administrative side employs bureaucratic procedures, policies, and structures. The operative academic level is focused on the acquisition of scientific capital through research and shaped by a collegial model. Traditionally, universities do not act as independent, corporate actors as they are not able to make strategic and operational decisions due to detailed government control (Baldridge 1971; Vican, Friedman, and Andreasen 2020). As a result of neoliberal restructuring and, particularly, the new public management reform agenda that took hold in Europe in the 1990s, however, the higher education sector is increasingly viewed as an industry (Gumport 2000).

The state focusses on regulating the infrastructural conditions and abstains from strategic control. Higher education organizations find themselves on a global market. They appear as corporate actors with own mission statements and make autonomous strategic decisions in order to position themselves in a global competition that is driven by rankings, evaluations, and performance indicators (Shin, Toutkoushian, and Teichler 2011). Output control, entrepreneurial orientations, organizational autonomy, and accountability to the public are new "rationality myths" shaping management practices within public funded research institutions (Hattke, Vogel, and Woiwode 2016).

The increasing relevance of the corporate logic is accompanied by a policy debate concerning 21st centuries grand challenges, and skills and knowledge higher education should deliver in order to cope with these challenges (Larsen 2020; Barry, Born, and Weszkalnys 2008; UNESCO 2005). Interdisciplinary research is a popular recipe for solving grand challenges and thus a pervasive research policy buzz-word (Gibbons et al. 1994). The declaration of willingness to promote interdisciplinary knowledge production is prevalent in calls for proposals for third-party funding, in target and performance agreements between universities and the states, and in mission statements of universities and research centers all across the globe. In their seminal work Nowotny et al. (2001) suggest this trend indicates a shift from disciplinary oriented Mode-1 science to Mode-2 science characterized by a transcendence of disciplinary boundaries, and a shift from a 'culture of autonomy of science' to a 'culture of accountability'. In a nutshell, interdisciplinary knowledge production. has gained in popularity during the last decades in line with the growing relevance of a corporate logic as its promotion is seen as a way for linking academic knowledge production and societal innovation. It is regarded as a research approach providing a stronger accountability of research to societal demands and links research output with market demands (Barry, Born, and Weszkalnys 2008). As result of growing political pressure to serve public demands and holding science accountable, the

formula thus shapes strategies and organizational structures all across the globe (Barry, Born, and Weszkalnys 2008). The use of the concept in strategies and mission statements lends legitimacy to research activities with regard to an increasingly relevant accountability to the public (Flink and Kaldewey 2018).

Governance dilemmas through colliding logics

Due to the disciplinary logic of the academic profession the operative core of research organizations is "legitimately guided by external interests, values norms and standards rather than by internally generated organizational policy" (Brunsson and Sahlin-Andersson 2000, 734). Disciplinary communities that are not bound to a singular formal organization exert far more influence on research activities than the formal organization scholars conduct their work in (Mintzberg 1980). The operative core of universities and research organizations thus tends to be fragmented into loosely coupled epistemic subgroups (Weick 1976). In this sense research organizations are no "coherent entities with unity of command and structural alignment around a core set of activities" (Jarzabkowski, Lê, and van de Ven 2013, 246). Scientific autonomy, professional self-governance, as well as decentralized power relationships limit the direct control of research activities and the translation of centrally defined goals on to the operative level (Hüther 2010).

Institutional complexity, i.e. tensions between logics of the academic profession and a corporate logic, confronts the management of universities, research centers, and projects aiming to promote interdisciplinary research with governance dilemmas that cannot be resolved through coercive control (Larsen 2020). These governance dilemmas cause several fields of tension that complicate interdisciplinary research. These tensions are discussed as a reason why research units labelled as interdisciplinary often "demonstrate more of an inclusion, rather than an integration, of different disciplines" (Rhoten 2003, 5). Several studies stress these tensions

require specific governance practices that still need to be developed and point to a limited empirical understanding of how organizational forms, institutional processes, and more general conditions help to create successful interdisciplinary spaces (Yonezawa et al. 2020).

In its further course, this article thus asks which means managers use to promote interdisciplinary research in the light of such governance dilemmas by drawing on data from a qualitative research project that focused the organization of interdisciplinary research. Following the description of the methodological approach, the results section first discusses three areas of tension-epistemological tensions, identity tensions, evaluative tensions-and explores subsequently through which tactics scholars in a leadership positions resolve these tensions.

Research setting, context & data

The aim of this study was to identify barriers for the attainment of interdisciplinary missions and managerial tactics of overcoming these barriers through an exploratory in-depth analysis of individual perceptions through qualitative interviews. The qualitative research design included field-level visits and document analysis. The main data set for the analysis consists of 53 semi-structured interviews with scholars conducted from October 2017 until September 2019. Each interview lasted between 40 and 120 minutes. Gathering interviews was stopped when saturation occurred, i.e., when newly collected data were redundant compared to the material collected so far (Glaser and Strauss 1967; Miles and Hubermann 1994). All interviews were conducted with an interview guideline, recorded with a digital device, fully transcribed and coded using MAXQDA 12. Facial expressions and gestures were noted in a conversation protocol if they were conspicuous and related to the interview. The findings presented are based on interviews with scholars who held leadership positions in formal units with an interdisciplinary focus. The interview guideline focused on the macro-, meso-, and micro-level

of interdisciplinary settings. It was designed in such a way that it was not necessary to adhere to a fixed sequence of given questions. Tactics were captured by asking questions like: ‘Could you please describe problems in a project in which you have worked in an interdisciplinary way?’ followed by questions like ‘Could you please illustrate how you solved problems in interdisciplinary projects?’ The interview partners were encouraged to respond freely by using open questions. The candidness of the interview partners influences the reliability of the findings. Before every interview, the author thus ensured the anonymity of the material.

Findings: resolving dilemmas of interdisciplinary research governance

These governance dilemmas cause several fields of tension that complicate interdisciplinary research. The following section focuses on epistemological tensions, identity tensions, and evaluative tensions, and sketches a coping tactic for each of the three tensions. These tactics are means research managers use to achieve the objective of fostering interdisciplinary research.

Epistemological tensions

> “I feel like, of uncertainty, like, sometimes I feel like I have no idea of what I'm doing, like trying to get these two things that don't really speak to each other to speak to each other. I think that also career-wise creates a lot of uncertainty. Like, I'm not sure whether, what I'm doing will make sense to an established discipline. And it does seem like in many cases hiring is quite linked to, you know, disciplines. And so if I, uh, can't make my work fit within the way that they're thinking or within their mental models, uhm, then I worry that I won't seem legitimate.” (I23: 6)

Epistemological tensions arise when the epistemology of interdisciplinary research collides with the disciplinary logic of scientific knowledge production. Academic disciplines structure interpretations and research activities (Whitley 1984). During interdisciplinary research epistemic languages and institutional groundings of "foreign" disciplines need to be absorbed and (re)-contextualized with scholars' familiar disciplinary world-views (Edelenbos, Bressers, and Vandenbussche 2017; Huutoniemi 2016). Interdisciplinary scholars are confronted with epistemological pluralism as the knowledge stocks, languages, theoretical frames and methods they integrate differ from each other (Leahey, Beckman, and Stanko 2017). Due to the cognitive barriers interdisciplinary research tends to be accompanied by higher time costs than monodisciplinary research (Kaplan, Milde, and Schwartz Cowan 2017; Cummings and Kiesler 2007). The formulation of research problems, the sharing of research methods, or the acquisition of different theoretical perspectives and concepts require special cognitive effort (Eigenbrode et al. 2007; Woiwode and Froese 2020).

Balancing epistemological tensions through boundary objects

> "I'll give an example of a report we produced in my early work on climate migration that sort of coupled field-based work with maps (…) these maps started a policy dialogue (…) they said, "This is an opportunity now to open the door on the discussion about sustainable livelihoods." (I15: 105)

Boundary objects are, by definition "objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites" (Star & Griesemer, 1989) – examples in the research context are methodological procedures, concepts, or termini with which scholars from different

disciplines are familiar. These objects produce shared understandings, translate between different thinking styles. and support scholars in working jointly towards a common scientific goal (Star & Griesemer, 1989). As is typical for boundary objects they allow actors located in different "social worlds" to communicate effectively by reconciling different meanings. Several scholars interviewed stressed that when it comes to planning interdisciplinary projects, boundary objects should be considered for enabling communication. They underlined these objects were cornerstones for high research productivity. In line with the literature on boundary objects they indirectly stressed that "the creation and management of boundary objects is key in developing and maintaining coherence across intersecting social worlds." (Star & Griesemer, 1989). They also pointed out that the definition of specific artifacts as boundary object-in-use needs to systematically involve all disciplinary groups represented in the project. In order to generate commitment towards this object different disciplinary groups need to reach a consensus concerning the boundary object-in-use. The management plays a key role in structuring the individual-site use by fostering this consensus and making boundary objects thus an effective means of translation. In this way they can maintain coherence across different disciplinary groups (Star & Griesemer, 1989).

Identity tensions

> „When the basic premises and pillars of your discipline are questioned by a sociologist who conducts interviews with people, it is of course irritating, provocative, problematic." (I17:52)

Identity tensions arise when norms, values, and beliefs, and demands inherent in scholars' disciplinary identities collide. The concept of professional identity refers to an

"individual's self-definition as a member of a profession (…) associated with the enactment of a professional role" (Chreim, Williams, and Hinings 2007, 1515). Professional identities are connected to a set of values, beliefs, and motives (Ashforth & Mael, 1989). They come up during cognitive reflections on questions like "Who am I as a professional?" and "How should I act as a professional?" (Alvesson, Lee Ashcraft, and Thomas 2008). They are part of an individual's social identity – i.e. "the individual's knowledge that he [sic] belongs to a social group together with some emotional and value significance to him of this group membership" (Tajfel 1972, 292) and based on a strong need for operative autonomy and commitment to certain professional values (Barbour and Lammers 2015; Kyratsis et al. 2017). Identity tensions arise when norms of scholars' professional identities collide with demands of interdisciplinary work environments. Incongruence between one's own disciplinary values and beliefs and the other groups' values and beliefs tends to lead to conflicts. For example, an economist's utilitarian focus might conflict with the aim of a sociologist to develop theories. Divergent expectations of what it means to be scholar cause experiences of identity threat. Such conflicts affect the motivation to conduct interdisciplinary research.

Balancing identity tensions through identity work

> "There is maybe a little bit of a separate identity. But for, like, the creative and the scholarly, I actually try to weave those together rather than separate them." (I14: 23)

Recent studies point to the dynamic nature and evolving character of professional identities (e.g. Kyratsis et al. 2017). Identity work perspectives stress that individuals are permanently "forming, repairing, maintaining, strengthening or revising the constructions that are productive of a sense of coherence and distinctiveness" (Sveningsson and Alvesson 2003,

1165) in order to maintain a “stable sense of self” (Marks, Abigail, and Thompson 2010, 321). The construction of professional identities is based on an interplay between individual factors and situational demands (Pratt, Rockmann, and Kaufmann 2006; Kreiner, Hollensbe, and Sheep 2006). Dynamics in work environments mediate, form and transform professional identities (Ramarajan 2014). Demands research organizations place on activities – for example, through mission statements or certain policies – may challenge self-images, requiring a reshaping and/or rebuilding of professional identities (King, Felin, and Whetten 2010). In case of identity tensions individuals are trying to repair their identity constructions in order to maintain a stable sense of their professional self. The tactic "Balancing through identity work" aims to moderate this process. It enforces an experience of positive emotions. Leadership scholars enforce the incorporation of new meaning elements into a scholar’s professional identity, or influence the self-evaluation process by attaching a positive value to being an interdisciplinary scholar. Inclusive leadership styles, mission statements, policies, or organizational control mechanisms foster this process and, therewith, the motivation to conduct interdisciplinary research.

Evaluative tensions

> “For me, the fact that I’m doing a lot of exhibitions counts as success, but nobody said, like, this would count as success. (…) The criteria for tenure, are extremely strict, and very narrow, and you have to publish, a lot. And it also depends on where you publish. You can’t just publish anywhere, you have to publish in the best journals, or the best presses.” (I14: 137)

Evaluative tensions arise when interdisciplinary research outputs collide with monodisciplinary review schemes and practices. The quality of research, teaching and

education is predominantly measured as quantitative productivity. Research performance is judged in particular by the journal impact factors (JIFs) of the journals researchers publish their results in (Woiwode 2020). Researchers thus have an incentive to focus on publishing in highly-ranked journals. The outcomes of these procedures constitute their 'market value' (Mäkinen 2019). Since peer reviews of highly-ranked journal publications often favor monodisciplinary research, i.e. monodisciplinary paradigms, epistemologies, and ontologies, the orientation towards dominant indicators tends to collide with interdisciplinary focuses (Leahey, Beckman, and Stanko 2017). Several studies illustrate that dominant systems of research evaluation bring down aspirations to pursue questions in ways that do not fit into conventional review schemes. Especially younger scholars tend to anticipate evaluations that are predominantly based on monodisciplinary criteria (Biancani et al. 2018; Mäkinen 2019). The academic reputation-market thus "disciplines" scholars research activities (Woiwode and Froese 2020). In a nutshell: Maneuvering within the impact-managerialism tends to keep scholars back from conducting interdisciplinary research (Boardman and Bozeman 2007). Even though there are several initiatives claiming to improve the way academic knowledge production is evaluated (DORA 2012), the evaluative practices seem to be very persistent (Curry 2018).

Balancing evaluative tensions through performance indicators

> "Some years go, the provost approved promotion criteria that allowed (…) to base promotions not just on your publications in high-impact journals, but to recognize what we call practice accomplishments. (…) So, an example (…) might be, you know, a seismologist on this campus, (…) spent two years in Haiti after the earthquake helping the Haitian government to improve their ability to respond to earthquakes. And the idea was, well, if somebody did that, they don't have time to publish five papers in Earth

Science Journal. Should they be penalized for doing good vs. doing academic work?" (I24: 34)

Dominant performance indicators collide with the epistemology of interdisciplinary research (Woiwode, Frost, and Hattke 2017). During "Balancing evaluative tensions through performance indicators", research managers define indicators that take particularities of interdisciplinary knowledge production into account. The tactic aims at compensating for the disadvantages of interdisciplinary research. Specific qualities of interdisciplinary research are used as indicators for performance evaluations. In this way, the specific quality of interdisciplinary research should be captured and disadvantages for interdisciplinary researchers should be overcome.

Research managers first try to identify the specific outputs of interdisciplinary work in its local context. For example, prestigious commercial collaborations with industrial partners, or the foundation of a start-up company. University president A, for example, asks group leader B: "What is the value of your work?"; "What it is that you bring to the table?". Group leader B then answers: "Based on our research, scholar X founded a start-up company". Subsequently research managers use the specific quality for defining new performance indicators. University president A, for example, denotes an award for founding start-ups with interdisciplinary knowledge. Several interview partners stressed that a diverse set of indicators incentivizing knowledge transfer activities, patents or startup activities is a helpful tool to increase motivation to conduct interdisciplinary research.

Discussion and conclusion

Against the background of the fact that literature on interdisciplinary research lacks theoretically sound and empirical verified instruments that are particularly suitable for

interdisciplinary research contexts, the present contribution asked by which means managers overcome barriers of interdisciplinary research.

The paper used the meta-theoretical institutional logics approach in order to capture the tension between monodisciplinary demands prevailing in the scientific field on the one hand and the mission of promoting interdisciplinary research on the other. This perspective provided a link between the agency and cognitions of individual scholars and institutional rules that are socially constructed and influence scholarly behavior. In its further course, the article asked which means managers use to promote interdisciplinary research in the light of governance dilemmas resulting from a tension between a corporate logic and the disciplinary logic of the academic profession.

Drawing on data from a qualitative research project that focused the organization of interdisciplinary research in several German and US research institutions, the results section first discussed three areas of tension that result from coexisting institutional logics and hinder the conduct of interdisciplinary research: Epistemological tensions arise when the way knowledge is created during interdisciplinary collides with the disciplinary logic of scientific knowledge production. Identity tensions arise when norms of scholars' professional identities collide with demands of interdisciplinary work environments. Evaluative tensions arise when outputs of interdisciplinary research collide with monodisciplinary review schemes.

Subsequently the paper explored through which tactics managers of interdisciplinary research units resolve these tensions in order to promote interdisciplinary research. The results section illustrated three management techniques, each of which relates to one area of tension:

Balancing epistemological tensions through boundary objects denotes the integration of knowledge stocks through the usage of artifacts. Balancing identity tensions through identity work denotes the targeted construction of professional identities in order to foster motivations to conduct interdisciplinary research. Balancing evaluative tensions through performance indicators denotes the definition of performance indicators which incentivize interdisciplinary research.

The papers main goal was to identify means research managers use to overcome barriers of interdisciplinary research. A constant tension between interdisciplinary research agendas and logics of the academic profession tends to hinder the realization of interdisciplinary research. As empirically funded and instrumental knowledge the tactics helps to cope with management problems, increase the effectiveness of research management in interdisciplinary structures, and promote the realization of interdisciplinary research. Our findings suggest the application of the tactics helps to overcome discrepancies between official descriptions of interdisciplinary structures and the activity structure, i.e. the actual research practices within these structures. The tactics distilled from the empirical material resolve areas of tension, considering professional norms, by successfully anticipating the interpretations and interpretations they shape. Their scholarly profession provides leaders with knowledge about what techniques and means are appropriate to advance interdisciplinary research.

The papers main goal was to explore such tactics and to provide an empirically funded, coherent framework. Further research could investigate on the process on each of the tactics in more detail, for example, by triangulating empirical findings with literature on social identity theory, boundary objects, and research evaluation in general. By focusing on the relationship between institutional demands and individual motivations on the organizational level further research could contribute to the theoretical discourse in the field of higher education research and provide important instrumental knowledge.

Taken together, the tactics help to ensure that interdisciplinary ideas actually become tangible knowledge that addresses and solves needs in science, business and society. The findings suggest that bearers of interdisciplinary knowledge whose challenges have been overcome by the application of the tactics transfer their findings to all sectors of society in which their knowledge adds value - in the form of consulting activities, inventions and patents, the publication of articles in journals and other media, company spin-offs, or by taking on activities in the private sector and public administration.

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