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The Gender Dimension in German Knowledge and Technology Transfer: A Double-Edged Sword

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Introduction

> A relatively equal gender balance in technology transfer masks the structural gender bias of German society and becomes a double-edged sword. (Ranga and Etzkowitz 2010)

Effective knowledge and technology transfer (KTT) is a crucial element of a nation's innovativeness and economic position (Teece 1977; Poirson 2013). In Germany, substantially fewer women than men participate

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in research and development (Frietsch et al. 2012), which weakens its capacity for innovation (European Commission 2013b; Commission of Experts for Research and Innovation 2014). In a similar way, women's potential remains largely untapped in many other industrial countries (Ranga et al. 2008; European Commission 2009)—"a waste of human resources" (Ranga et al. 2008, Research Global, 8(2): 5, 2008).

Studies have shown several advantages for mixed-gender teams inside and outside of research and development—among other things, a significantly higher likelihood of introducing an innovation (Østergaard et al. 2011), more constructive interactions (Kochan et al. 2003), reduced communication barriers (Schone et al. 2010), and greater analytical effectiveness (Woolley and Malone 2011). Higher success was observed, for instance, by measuring patent citation rates (Ashcraft and Breitzman 2007) and the impact of Ph.D. holders' commercial work (Bunker Whittington and Smith-Doerr 2005). While industry has increasingly recognized the economic benefits and the potential for creativity and innovation of mixed-gender teams (Thomas and Ely 1996; Gratton et al. 2007), in 2011, <25% of 450,000 researchers were women (Frietsch et al. 2012). The few existing studies all also indicate low proportions of women in KTT, which decreases further with each successive stage of the process. For instance, women usually make up between 3.5 and 8.0% of all patent applicants in technology start-ups (Achatz et al. 2010; Busolt and Kugele 2009; Schone et al. 2010; Commission of Experts for Research and Innovation 2014).

Potential explanations for the existing imbalance can be found in a range of disciplines and in particular in sociological and feminist literature (e.g., Sonnert and Holton 1995; Connell and Messerschmidt 2005). The few existing studies, which focus primarily on Europe and the US, establish common "gender patterns" in technology transfer that disadvantage women in several industrial countries (Ranga et al. 2008; Ranga and Etzkowitz 2010). In their analysis of technology transfer organizations in Germany, Achatz et al. (2009, 2010) established that organizational and work structures and cultures disfavored women's success. Within the last 4 or 5 years, however, increasing political pressure (30% quota for female managers) and funding initiatives have been directed at mediating the gender imbalance in science—and in German

KTT. These dynamics may have contributed to increasing gender awareness in the KTT community; there has not been a recent in-depth analysis of gender-dimension integration in KTT.

Seeking to fill this gap and to analyze possible changes of KTT cultures and managers' mindsets, we therefore pose our research question: To what extent is the gender dimension integrated into KTT by decision-makers and (former) scientists? In order to answer this question, we first established a KTT model that is sensitive to current (external) influences, such as market pull and societal changes, as well as the current understanding of the gender dimension.

This chapter presents the theoretical and empirical background that guided our research, our method, and our findings. It concludes with a summary, implications for further research and potential recommendations for decision-makers, both inside and outside of Germany.

Empirical and Theoretical Background

Knowledge and Technology Transfer: Analytical Model and National Specifics

Occurring between the scientific and the business communities, knowledge and technology transfer, or KTT, aims to transform theoretical findings into highly marketable products. KTT consists of complex exchanges of ideas, discoveries, and methods between research institutions, industry, and the public. To make innovations viable, we assume that public preferences (of both women and men) must be accommodated in the full variety of their needs, preferences, and perspectives, both gender-specific and otherwise (Meißner and Sultanian 2007; European Commission 2013b). For the purposes of our research, we have developed our own process model; its stages and participants are shown in the following illustration.

Transfer has conventionally resulted in what is known as *technology push*, or the transformation of scientific findings into publicly accessible products. One relatively new and promising form of transfer is *market pull*, in which lay ideas and experiences initiate prospective scientific

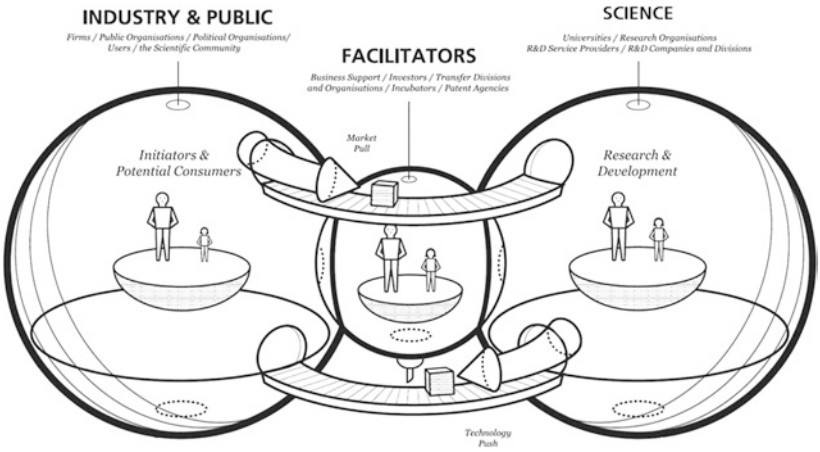

Fig. 2.1 Stages and participants of knowledge and technology transfer. *Source* Kline and Rosenberg (1986), Bessant and Rush (1995), OECD (1996), Reinhard et al. (1996), Bozeman (2000), Meißner and Sultanian (2007), Barjak (2011), supplemented by ideas from Jolly (1997), von Hippel (1988)

and technological advances; this maps onto the notions of "lead users" (von Hippel 1988, 2005) and "open innovation" (Chesbrough 2003). By adhering to the needs and values of laypersons (both gender-specific and otherwise), market pull can help orient innovations toward public preferences and foster innovation viability (Schraudner and Wehking 2012; Heidingsfelder et al. 2015). To date, however, this promising form of KTT has only been implemented in a small number of pilot projects. What makes technology push useful, the currently more widespread direction of transfer, largely depends on the male and female knowledge carriers and decision-makers in KTT.

KTT participants roughly fit into the following three major groups: (1) scientific organizations, (2) transfer organizations or facilitators, and (3) both industry and the public (see Fig. 2.1). Transfer (oriented) organizations, or TOs, are at the center of this article and include transfer departments at research organizations and universities and research and development (R&D) providers such as small-scale R&D service organizations and companies' R&D divisions (Achatz et al. 2010; Tintelnot et al. 2013). The wide range of TOs often support the entire KTT

process by mediating between scientific, industrial, and commercial organizations and helping identify, shape, and implement transfer ideas (e.g., Barjak 2011). Their interface function is particularly interesting for research on the gender dimension in KTT. Our KTT model provides an accessible starting point for exploring the gender dimension in KTT.

Interwoven national agendas and domestic shareholders' and organizational specifics partly influence KTT's trajectories and outcomes (Lundvall 2010). Given that we focus on the individuals involved in KTT, these processes are largely neglected within the scope of this article.

The Gender Dimension

> Women's potential is indispensable for securing and improving performance and innovative capacity in research and science. (The German Council of Science and Humanities 2012, p. 5)

In Germany, the scientific community has increasingly recognized the promotion of gender equality as one of its key responsibilities to the public and as a necessary contribution to the quality of its research. These tendencies match one of the six key principles of the European Commission's funding framework, Responsible Research and Innovation, and notions of Horizon 2020 (European Commission 2011, Article 15). National standard-setting institutions such as the German Research Foundation (2008) and the United States' National Science Foundation (2009), recognize "gender aspects", also referred to as the "gender dimension" or gender, as an important component of quality research (The German Council of Science and Humanities is similar in this regard). Scientific case studies of *Gendered Innovations*, a state-of-the-art European-American project, support recognition of the gender dimension to eliminate blind spots in research content and to foster new products, services, and infrastructures.

Additional funding to support women in science includes, among others, €300 billion provided by Germany's Federal Ministry of Education and Research to promote female professors and excellence in science (2006–2017) and €2.3 billion in research funding

provided annually by the German Research Foundation is connected to the successful implementation of the Foundation's standards. These "research-oriented standards on gender equality" published in 2008 aim to enhance (1) Female participation in science, while improving (2) Structural and (3) Personnel policies.

For the purposes of our analysis and in order to make the gender-dimension construct accessible, we distinguish between its quantitative and qualitative components.

1. *The quantitative component* refers to the gender compositions in groups and structures, which are involved in or related to KTT; these can include teams, decision-makers, the scientific community and its parts, funding organizations such as financial institutions and venture capitalists, and finally, a whole nation. According to the critical mass theory (Kanter 1977), as the percentage of a certain subgroup within a larger group reaches about 30%, this subgroup is no longer perceived as a minority and can "affect the culture of the group." The quantitative component can, therefore, be measured by analyzing data on women in KTT.

Increasing the proportions of women beyond a certain threshold, therefore, does not guarantee the full utilization of gender potential (Williams and O'Reilly 1998; Jackson et al. 2003; Horwitz and Horwitz 2007). Full utilization of untapped "gender potential" (with the aim of increasing Germany's innovative capacity) can only be achieved by "fully integrating" the gender dimension qualitatively (Kanter 1977, cited in Acker 1990).

2. *The qualitative component* refers to the quality of gender integration in KTT. According to gender-sensitive organizational theory, organizations are not neutral. Instead, gender norms as well as gender assumptions and stereotypes create the foundation for organizational processes while at the same time reproducing gender (Acker 1990). Additionally, occupations and job types have been identified as gendered, i.e., based on assumptions of male and female (Britton 2000). Within every organization, gender is therefore implicitly inscribed into processes but "covered up by equality" (Benschop and Dooreward 1998). Research shows that, while the general organizational discourse is based on equality of opportunities, stereotypical assumptions are

interwoven into ideas of qualification, innovative capacity, and performance and form a gendered substructure within organizations (Acker 1990; Billing and Alvesson 2000). Gender is naturalized and essentialized, and the ideal jobholder is based on maleness. Within these contexts, gender subtexts systematically (re)produce gender distinctions via sets of arrangements (Benschop and Dorewaard 1998), among other things in the form of interpretative repertoires. Women are, therefore, unacceptable by definition (Acker 1990).

The gender dimension is considered fully integrated in KTT when each of its components is integrated. In other words, when (1) groups of participants are fairly gender-balanced and (2) when the gender dimension is critically reflected and completely factored into organizations and individual processes (Acker 1990; Smith 1987). This integration manifests itself in the consideration of aspects of gender, the selection of research topics, and particularly in the integration of diverse perspectives (of men and women) and a not gender-biased definition of gender roles in relation to innovation, technical capacity, affinity for technology, and career opportunities (Sonnert and Holton 1995; Faulkner 2006; Ranga and Etzkowitz 2010).

The major purpose of such full integration is to foster quality of research and the global viability of transfer products. Such fostering has been equally emphasized by political initiatives (European Commission 2011), in theoretical findings (Ranga and Etzkowitz 2010; Bührer und Schraudner 2010), and in practical applications (European Commission 2013a). Market pull approaches are increasingly accepted as a means to accommodate public preferences and expand the realm of what is technologically and commercially possible (European Commission 2013a). Such alternative means of qualitatively integrating the gender dimension into KTT will be considered in the following.

Method

Our method combined a comprehensive literature review with key informant interviews (following, e.g., Eisenhardt and Graebner 2007). Whereas the literature review allowed for a retrospective analysis of the gender

dimension in KTT, the key informant interviews were intended to provide information from multiple perspectives and sources on intra- and inter-organizational settings in KTT (Kumar et al. 1993). The key informant interviews delivered insights on socially constructed identity and reproduction mechanisms in KTT (Lamnek 2008), including on their gender basis and the underlying logic (Acker 1990). The qualitative interview data are the focus of our research design. The multidimensional approach helped us comprehensively explore our research question and assess past, current, and possible future developments.

Literature review. We first reviewed existing publications from a range of disciplines to refine our understanding of the gender dimension in KTT. These disciplines included the natural sciences, engineering, economics, social sciences, psychology, innovation research, entrepreneurship research, gender studies, and research on small group behavior. We searched in published books, databases, and online journals for peer-reviewed publications and publications printed by renowned publishers. By combining certain keywords (related to knowledge and technology transfer and gender), we selected 350 publications for further review. We then comprehensively analyzed the abstracts of these publications and included 120 publications with relevant insights into the gender dimension in our pre-final selection (search strategy according to Hart 1998; Isaac et al. 2009). The final selection of relevant scientific publications comprises 60 titles published between 1999 and 2014. According to Hart (1998), these reviewed articles were evaluated with regard to important variables relevant to women in KTT, new and/or gender-related perspectives, relationships between ideas and practice, and the structure of our subject.

Supplemented with KTT-related gender statistics, publications on national and European political resolutions, programs, and initiatives, the literature review allowed for analysis of the quantitative component and for developing theory-based interview guidelines.

Key informant interviews. For our interviews, we selected 22 specialists based on theoretical sampling criteria (Eisenhardt and Graebner 2007): eight (former) researchers/scientists involved in KTT, eight TO specialists, and six senior managers. All interviewees either worked (formerly) as scientists or occupied KTT leadership positions in science

(e.g., head of a transfer-related business division), in transfer organizations or among shareholders (e.g., government employees). Interviewees were selected for their profound, long-term experience in KTT and their power to either set KTT agendas (as senior managers) or for their active involvement in the process, often in a supervisory position (Gläser and Laudel 2010). To avoid biases, the sample was balanced with regard to gender (Acker 1990) and comprised various age groups (Jørgensen et al. 2009).

Each interview lasted approximately 90 min. The semi-structured guidelines encouraged the interviewees to speak freely and at length to capture their individual identity, femininity, and masculinity constructs in light of their respective organizational settings. The sets of questions covered individual background and professional development, the specifics of interviewees' teams and organizations with respect to processes, practices, and behaviors, and general questions regarding understanding and individual notions/definitions of gender, KTT, and possible interrelations. Theoretical saturation occurred (Lamnek 2008).

Each interview was recorded, transcribed, and coded by two researchers in order to increase the reliability of the data. With the aim of theory building (Eisenhardt and Graebner 2007), we analyzed the interviews with a special focus on statements regarding perception of self and others, gender-typical behavior, and gender-typical experiences within KTT departments in science and research organizations as well as other transfer organizations and transfer teams.

We deducted theory-based categories, which reflected the findings of the literature review, and inductively expanded and amended them along the (empirical) perceptions of the participants. This produced a category system for our qualitative content analysis (Mayring 2010), which we used to aggregate and condense the interview data accordingly—the interview data was categorized along, for instance, individual professional development, gendered behaviors, team interactions, organizational practices, and norms (Schein 1990). By structuring the aggregated and condensed data in their respective context (Mayring 2010), we were able to establish typical patterns and to identify illustrative (rather than representative) statements (Parker 1992), as presented in the next section.

Findings

> Why would we need to pay special attention to women? You have to be really careful with things like that. (Male stakeholder)

Most of the studies and statistics address the gender dimension in science either relatively abstractly or in a way that is not KTT-specific or else they look at very specific elements of the process. While the quantitative components of the gender dimension have already been examined by various actors on various levels (albeit usually indirectly), the qualitative components have scarcely been addressed and the work that has been done has come exclusively from social scientists. As a result, there is still no single, cohesive explanation for the quantitative decline in women's participation along the way. For that reason, we analyzed the qualitative components by investigating individual views of gender-specific perception and negotiation processes that determine the integration of the gender dimension in the KTT used by women and men in the social sciences.

Selected, typical statements intend to illustrate the argumentation. The sexes (for reasons of simplicity, male and female) and positions (specialist, transfer manager, (former) scientist) of quoted interviewees are revealed for each quote.

The Quantitative Gender Component

On the organizational level, no comprehensive national or cross-national studies on women's participation in KTT exist. In order to estimate the situation in Germany and, to some degree, compare it to the situation in Europe in general, we examined certain related percentages, which we selected based on our literature review. The following chart summarizes the percentages taken into account when analyzing the quantitative component of the gender dimension (Fig. 2.2).

Our evaluation of the available statistics indicates that the ratio of women in KTT in Germany is lower relative to other European countries, decreases with each successive stage of the KTT process, and is

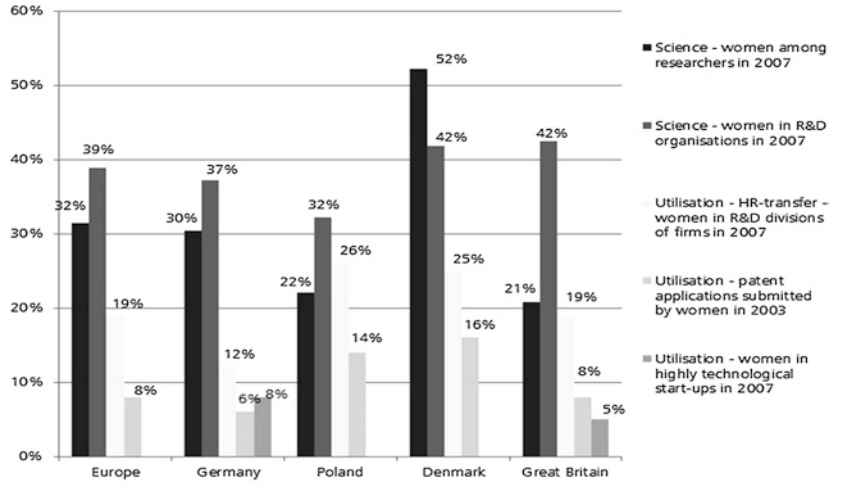

Fig. 2.2 Percentages of women in KTT in selected European countries. *Sources:* Eurostat (2014a, b, c), Busolt and Kugele (2009), European Commission (2008), Metzger et al. (2008)

probably low with respect to key positions. Both the literature review and the interviews indicate that the degree of qualitative gender integration in KTT is rather low. Overall, the respondents confirm a female participation rate of 10–30% in transfer organizations.

The Qualitative Gender Component

> We haven't really thought about that yet. You are probably asking the wrong person. I did find [it] very interesting, though. Gives you a change of perspective. We've never looked at it that way before, kind of just went with the flow. (Male transfer manager)

The very few relevant studies all indicate that the early stages of transfer processes, such as the identification of prospective research trajectories, do not yet sufficiently address the qualitative component of the gender dimension (Bührer and Schraudner 2006; Pollitzer 2013).

The interviews reflect this. Two characteristics stand out as a common thread in the key informant interviews: (1) There seems to be a "common" KTT culture in the large TOs that is supported by regular exchange among decision-makers and that is characterized by a high degree of gender blindness and (2) while some of the female interviewees reflected on the meaning of gender in at least their own development, most of the male participants thought about gender-specific issues only minimally or not at all. This was apparent not only in explicit statements about comprehension of the gender dimension ("That would be a question mark," male transfer manager) but also in observations of various interpretive models where comprehension and the role of women in KTT are concerned in general: While more than half of the participants posited equal treatment of women and men at the start of the interview, they described competencies, patterns of behavior, and career opportunities in issue-specific, gender-stereotyped ways upon further questioning during the interview. Many of the participants presented different interpretive repertoires (Wetherell and Potter 1988) simultaneously with respect to the gender dimension without consciously perceiving their own ambivalence.

Both genders' views of women and men in KTT are presented below. Particularly, large differences are apparent here within and between genders. The focus here is on personal characteristics and views of the gender dimension.

Definition of the Gender Dimension from the Perspective of the Interviewees

> The disembodied worker is definitely not neutral, but produces and is produced by gendered subtexts in organizations. (Benschop and Dorewaard 1998)

While the theoretical derivation of the gender dimension is a comprehensive (quantitative and qualitative) concept, the interviews show that its practical application has only been partially realized as yet: On one hand, aspects such as genders' relevance as a testing and assessment

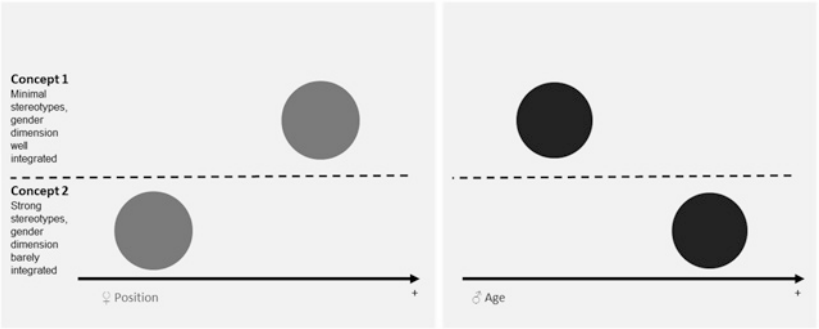

Fig. 2.3 Interpretative repertoires of women and men in KTT

criterion in science are obviously being implemented: however, they are currently classified as "inconceivable". This includes specifically addressing women's markets. According to almost all the interviewees regardless of gender, decisions regarding product orientation and target groups are made by the mostly male b2b employers without including the interviewees. All the participants appeared to be equally open to factoring in diverse perspectives at first, which was frequently reflected in decision-making structures that were described as participatory. But upon further questioning, various gendered subtexts (Benschop and Doorewaard 1998) and types of subjectivity had an effect on the contributory and decision-making levels (Acker 1990). These in turn produced different results in negotiation processes and in the various organizational structures (Dick and Casell 2002). Figure 2.3 shows the different concepts that interviewees supported with noticeable frequency broken down by group (although they could coexist in the mind of a single person) (Wetherell and Potter 1988; Talja 1999).

While the official organizational logic supports openness with respect to the gender dimension and gender equality (K1), inquiries (particularly where female employees and older men are concerned) reveal gendered structures (K2; Connell and Messerschmidt 2005). For example, men aged about 45 and older were particularly likely to ascribe traditionally female patterns of behaviour when they spoke about their female employees, professional contacts, and KTT colleagues. This group forms an old boys' network within the KTT culture described

above, in which traditionally male modes of behavior are part of the self-definition ("It's not that a woman couldn't do it. It's just a very, very male-dominated world," male transfer manager). The interviewees also ascribed traditionally male patterns of behavior exclusively to men in this age group. Younger men described themselves as "more sensitive" or "more cautious" but without examining those characteristics in light of traditional roles. By contrast, gender-specific self-attributions were mostly linked to hierarchical level, meaning that female managers (likewise without seeing any contradiction with gender-specific roles) ascribed traditionally male attributes to themselves.

Apart from neutralizing typically male behavior, many participants saw benefits ("atmospheric benefits" as well as greater structuring of processes and procedures, particularly in more openness) in introducing women into the KTT teams. Female managers, therefore, link an opportunity to the gender dimension relatively often and, unlike the male managers who we interviewed, were able to identify concrete advantages to their greater involvement, for instance via market pull approaches.

> But there too the tinkering engineers are all men. The idea that the customers are female is undoubtedly new there. Because suddenly there's the question of who is deciding what to buy. … And so we come back around to the women. (Female transfer manager)

According to the interviewees, openness requires new ranges of topics to be created and the integration of diverse perspectives, which may be necessary for innovation. The following gender comparison shows the constitutive negotiation process and intersectionality within and between genders with respect to the gender dimension (Davis 2008).

Women in KTT: Professional Position is Crucial

More recent studies as well as older ones (e.g., Wimbauer 1999; Bührer et al. 2009) show that women in the highly competitive scientific cultures of German research institutions feel that they are often not accepted or valued. Most of the women who participated confirmed

that assertion. However, people who work in KTT (more so than in "pure" science) are concerned with the "communication" of scientific results. Nonetheless, women, who are often perceived as "social, sensitive, and communicative" (Achatz et al. 2010), *cannot* thereby positively set themselves apart in KTT, according to many of the participants. They are still hired mostly in administrative areas.

Among the interviewees, whether or not women adopt these traditional, stereotypically "female" characteristics depends primarily on their position. Female interviewees with leadership positions were consciously tough, venturesome, and confident. Those characteristics typically carry masculine connotations (Connell and Messerschmidt 2005), but they were common traits among the female KTT managers who participated in the survey. Typical statements include, "When I do something, something happens" (female former scientist). These women gladly augmented this with additional self-characterizations, such as "very freedom-loving, independence-loving" or "entrepreneurially oriented" (as men according to Achatz et al. 2010) and provided biographical examples:

> One reason [for coming] was that I am also such an entrepreneurially oriented person. Because there is nothing. There is no position, there is no idea, there are no resources. (Female TO manager)
>
> For me it was always that I thought I would always get through. Regardless of what happened. (Female former scientist)
>
> I never had trouble getting respect or whatever even outside. … It was much harder at the university. (Female TO manager)

Women in managerial positions also spoke confidently about the respect they have received. Professional biographical elements that they identified, such as their parents' home or their education, point toward a relatively high frequency of socialization in male-dominated and/or technologically oriented environments. Macha and Klinkhammer (2000) and Geenen (2000) have already identified this as typical of successful women in the MINT disciplines. The fact that the women who were interviewed were not discouraged by a competitive environment and frequently proved to be indifferent to other people's appreciation

also had a career-enhancing effect. They were happy to emphasize their felt and consciously experienced mental independence from social norms. The following quote illustrates this with reference to the discussion of social ascent/descent, which is described as incidental:

> Financial security … has never been an issue for me. So my favorite saying is that when everything stops working, that's when I come through as the cleaning lady. (Female former scientist)

Women in male-dominated areas typically have to fight for influence and for their positions (Acker 2006; Billing and Alvesson 2000). Many female managers have explicitly addressed discouragement by both male and female colleagues but simultaneously dissociate themselves from the interpretation that they are being discriminated against as women: "The idea that [as a woman] someone might not give me credit was never up for discussion either" (female TO manager). Instead of feeling disadvantaged, they deliberately make us of their status as tokens (Zimmer 1988). They also perceive opportunities to exercise influence regardless of how they come about—even if they are based on quotas (which are currently pursued on a voluntary basis): "It makes no difference to me at all why they're inviting me [to join the committee]. They're doing it. And then I can get involved" (TO manager). At the same time, the women we interviewed were satisfied with their high workload of approximately 50–70 h per week (comment from a leading female manager: "It's within reasonable limits"). Alongside this conscious rejection of traditional roles, there are also gender-specific attributions among women in leadership positions as the example of communication makes particularly clear. According to these women, they are much more "intuitive" and "better" among women, as the following quote illustrates:

> Yes, more intuitive. There's not all that much to say about it. Maybe it's like that among [men] as well. But in any case, it's not between men and women. That is absolutely clear. Totally clear. (Female former scientist)

In sum, both the work-history elements and the self-assessment of women in leadership positions provide information to the effect that

success factors in KTT are male-oriented (Acker 2006; Billing and Alvesson 2000). The male participants confirmed that perception.

At the same time, female managers tend to be unaware of traditional role models, according to which women dedicate a great deal of time to their families and, for example, spend about a year (standard in Germany) with their child after giving birth. As such, they also emphasize the difference between themselves and "normal" female KTT workers:

> [Many women], how can I say this, don't even allow themselves a babysitter. … And I – I've said, no – I'm doing a fulltime job here and I'm traveling in Europe. (Female transfer manager)

Female workers of the same age (between 38 and 59) reveal completely different attributes. In comparison with emancipated managerial figures, it is striking that these women ascribe traditional female characteristics ("emotional", "less rational", "weak-willed", etc.) to themselves and other female workers, as the following statement about the role of women in science illustrates:

> Scientific thinking among men is sometimes a bit different that way. They look for reasons so they can verify things while women might sometimes say, "Yeah, I think that's the right way, that's how I feel, that's my experience." … People often say that women sometimes look at things more emotionally, even in science. (Female TO)

The gender-stereotyped behavior that women try to fulfill is a career disadvantage for them (Achatz et al. 2009), even though some interviewees also named advantages to femininity that were success factors:

> Women often taken on the role … of mother hen, I would say, so they really operationally keep the whole thing together. And they recognize interpersonal tensions early too, but can also organize things very efficiently. (Male shareholder)

The higher degree of structure and the production of functionally significant "cohesion" (see also Ranga and Etzkowitz 2010) are ostensibly

positive but they indicate persistent stereotypes that in aggregate have a negative impact, as demonstrated for example by frequently asserted "typically female" risk aversion, which is associated with lower visibility.

> Women lack courage. I think they don't – they don't have self-assurance, self-confidence. … Although they probably have great ideas too. (Female transfer manager)

In sum, observation of women in KTT shows that women in managerial positions systematically display various and more masculine-connotative characteristics than KTT employees. They do not identify with socially ascribed female gender roles but with the ideal of their workplace. Successful women are still the ones who exhibit male-connotative characteristics as "showpieces" (Benschop and Doorewaard, Organization Studies, 19(5): 792, 1998) and deny gender-based discrimination. They meet the requirements of the "disembodied job model," which are oriented to male career backgrounds (Benschop and Doorewaard 1998). The "gender filter" (1995) (which prioritizes masculine, "linear" work histories) has a similar effect here as in science. Despite more open organizational structures, women in KTT do not have more career opportunities available to them.

Men in KTT: Perceptions?

> The head of an institute is a small king. (Male scientist)

In KTT, men are still the majority in a relatively homogenous, exclusive group of decision-makers who, according to statements by women in management positions, only reluctantly integrate (female) rivals and their views and/or support their ideas and/or changes initiated by new people. According to most of the interviewees, standard, stereotypically male, mildly aggressive behavior is only diminished when women are no longer perceived as tokens/isolated phenomena (Kanter 1977; Zimmer 1988).

> Communication among those of us on the executive board has gotten better since a second female director was integrated. And the results are

> better because of that, of course. Because just a lot of meaningless petty wars that used to – what people always like to call cockfights don't happen anymore at all. Or if they do, everyone looks annoyed and the new colleague learns quickly, hmm, that's not okay. (Female TO manager)
>
> Because I don't respond to territorial markings … it suddenly doesn't work anymore. … Then they listen too. (Female TO manager)
>
> It doesn't have to be exactly equal, but certain behaviors are just neutralized. (Male shareholder)

The men we surveyed noted similar patterns: If several or "competent' women are in the team, "the man becomes more of a gentleman, right?" (Male transfer manager). While men talk about "cockfights that happen even in all-male teams" (male shareholder), most of the female managers we surveyed describe these situations as "astonishing". Nonetheless, typically male behavior still has advantages—or other behavior has disadvantages, as the following quote exemplifies:

> If you're in this environment now, [reserved behavior] is a disadvantage. Because no one sees you. That behavior and its external effect is a sharp difference between women and men. (Female transfer manager)

Mostly older male decision-makers refuse to think about a gender dimension in their work in the future. According to a few statements made by such men, that also applies in a gender-nonspecific way to all leading managers.

> When I think about my selection committee now and these generally somewhat older man of course have no desire to consider it. And the women who managed to reach certain positions, they also don't want to push the issue. You just can't say that gender is a women's issue. It's not like that. (Male shareholder)

That is not the case among our interviewees. The (male) managers cite multiple reasons why the gender dimension has so far not been discussed: Lack of time, lack of resources to implement new ideas, the novelty of thinking about gender (and its negative connotations), minimal

acceptance among male and female colleagues, and not least of all a low chance of success. In addition, the men we interviewed were the only ones who appeared to be disinterested:

> I am very passionate about KTT. I really found myself there. And it's almost charity work, what I do. But this gender thing … I have never really concerned myself with that. To some degree maybe because I already to live in a gender-balanced world. (Male transfer manager)

Younger men in our sample (along with successful women) particularly distanced themselves from gender stereotypes. In contrast to the older men, they do not perceive gender as a decisive factor:

> I think – so I don't know how women experience it, but for me it is not like there are [pause] women and men. Like that. (Male scientist)
>
> And so it's actually not a factor at all whether man or woman. (Male shareholder)

While women in KTT ascribe different characteristics to themselves and others according to their position, the negotiation process among male participants differs with the age of the participant. Younger men refer to stereotypes much less. The few men we surveyed who lead mixed-gender teams and are more mindful of the "type of person" than the gender also expressed greater openness. They were the only ones who defined gender as a possible delimitation of different forms of socialization and everyday realities (for example, differences in typical daily routines and in acquired "tacit knowledge"; Nonaka 1991). These are people who explicitly desire a diversity of perspectives and are very open to greater involvement of the gender dimension in the future in the form of qualitative assessment criteria, stronger product orientation to female customers, or more participation by women. Also noteworthy was the fact that these performance-minded men were able to define selection criteria and processes relatively clearly (according to those who were asked about this) and bring more women into their team.

Conclusions

The objective of the present investigation was to determine the extent to which contemporary male and female knowledge carriers and decision-makers in KTT have integrated the gender dimension. The research focused on transfer organizations and transfer-oriented research departments at the interfaces that characterize KTT culture. Based on a KTT model that we developed ourselves and a current definition of the gender dimension, comprehensive research and 22 key informant interviews have shown that the gender dimension has not yet been adequately integrated although the odds of a cultural shift in KTT are good.

The low degree of gender-dimension integration in all KTT procedural steps has been demonstrated and important variables and structures have been revealed through an analysis and summary of current studies and statistics. Within that framework, the qualitative survey provided valuable overriding insights into the reasons and background for gender blindness beyond the individual level. In the process, it became apparent that stereotyping greatly inhibits successful integration of the gender dimension because traditional ideas about gender ascribe less technical competence to women and support one-dimensional attribution of gender-specific needs and abilities. While stereotyping of that kind pervades statements made by men as well as by women, a closer look reveals noticeable differences: While age appears to be a deciding factor for the degree of stereotyping by men, for women it is the hierarchical level. The qualitative survey therefore showed that older men and women at the sub-management level reproduced traditional stereotypes with noticeable frequency and showed less drive or power to change or implement comprehensive gender-dimension integration. By contrast, in our sample, younger men and women in leadership positions dissociated themselves from gender stereotypes. KTT's work-history openness and the possibility of profitably applying traditional female characteristics (Achatz et al. 2009), however, are not as yet expressed in greater career prospects. The so-called high performance culture (Sonnert and Holton 1995), the most common working culture in German research

organizations, also standardizes career opportunities in KTT. Our research, therefore, also explains why female representation in KTT decreases with each process level and in managerial positions.

In aggregate, the results can be regarded as a sign of a lack of qualitative integration given that KTT decision-making structures, cultures, and formal as well as informal forms of work and interpretive frames are implicitly oriented to male models (Matthies 2001; Acker 1990; Faulkner 2006).

The existence of various interpretive concepts (K1, K2) appears to be a double-edged sword for gender-dimension integration into KTT: On one hand, is shows the persistence of stereotypes on the individual and organizational levels despite a putative equality of opportunity. On the other hand, it can be seen as an opportunity: The growing number of women in management positions and younger men (both of which are more open to complete qualitative gender-dimension integration) implies a possible impending cultural shift. This is supported not least of all by the altered self-assessment of young men who include characteristics with female-connotative characteristics and views.

The present investigation has helped to close a gap in the existing research but it has opened new ones as well, particularly in the research on the international comparability of the results. Moreover, criteria for testing the integration of the qualitative components of the gender dimension still need to be developed. In its high degree of ambivalence between simultaneous gender concepts and its key position between economy and science, KTT can be regarded as a model and testing ground for additional parts of the full system.

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