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Framing risky ventures with trust – Findings from an empirical study on Sino-German science collaborations

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Abstract

Background. This paper deals with international scientific cooperation. Using the example of German-Chinese research cooperation, it shows that – contrary to the positive expectations that are widely placed on international scientific cooperation – from the point of view of the scientists involved, such collaborations are associated with great uncertainty and often perceived as a risk. In such settings, trust becomes particularly important.

Methodology. Based on a systematic metaphor analysis conducted as part of a qualitative interview study with German and Chinese STEM researchers, it becomes clear that different types of trust exist in Sino-German scientific collaborations.

Results. The empirical material will be used to show that the framing with one or the other type of trust has an influence on how scientists organize their respective collaboration in practice.

Conclusion. The study contributes to shifting the focus of research on scientific cooperation to the interpersonal level in addition to the organisational level. Besides contractual framework conditions, collaborations need one thing above all: trusting relationships on a personal level.

Keywords

Risk and Uncertainty; Cross-Cultural Studies; Collaboration; Science

1 Introduction

Today, cooperative work is so much state-of-the-art in almost every area of modern work, Olechnika, Ploszaj and Celinska-Janowicz (2018) even speak of a "collaborative turn" in this respect. There is hardly a project that does not derive its significance through the importance of collaboration (cf. Groth & Ritter, 2019). Yet, the almost ubiquitous requirement for scientists to organize their work cooperatively to receive funding, "even if this merely involves a greater expenditure of time and coordination, but no gain in knowledge" (Münch, 2009, p.173, own translation), is based primarily on widely assumed positive expectations of the results of cooperation.

When people cooperate with each other - no matter in which field - they agree to work together with their partner to achieve a certain goal (Laudel, 1999). At the same time, they have to rely on their partners to keep their word and not to betray them - because this possibility of behaving contrary to an agreement is always present when actors cooperate voluntarily (Gambetta, 2001). This circumstance results in a certain degree of uncertainty, a risk which is inherent in all human action (Luhmann, 2001) and thus also in cooperation (Blomqvist et al., 2005).

Various contributions have explored collaboration within scientific organizations, but also between science and political, business or societal collaborators (e.g. Dahlander & McFarland, 2013; Peterson, 2007; Wuchty, Jones & Uzzi, 2007; Georghiou, 1998; and, in German-speaking countries, Münch, 2009; Thomas, 2003; as well as Laudel, 1999). There already is quite a number of papers dealing with both intraorganizational (e.g. social network researchers' works like Coleman, 1974; Levi Martin & Yeung, 2006) and interorganizational collaborations (e.g. Ingram & Torfason, 2010; Gulati & Gargiulo, 1999), but most of the existing literature is rather one-sided focused on the formation of ties and factors that help to build up *new* relationships (cf. Dahlander & McFarland, 2013, p. 70). There is „almost no research on the *stability* of interpersonal relationships“, as Burt (2002, p. 343, emphasis by the author) notes critically.¹

This article makes an important contribution here by examining the topic of German-Chinese scientific cooperation - which is the present and continuous subject of lively political debate (cf. Heilmann &

¹ Notable exceptions here are the contributions by Ulnicane (2015) as well as Shrum, Chompalov and Genuth (2001).

Kaschke, 2024). In Germany, national science policy has undergone a considerable change in recent years. Established norms that have long governed international science collaboration (e.g. the principle of openness) are questioned and increasingly challenged, especially when it comes to research collaborations with states that the German government perceives as 'systemic rivals' and 'competitors'. Cases of espionage and concerns about Sino-German collaborations supporting the Chinese military (c.f. Correctiv, s.a.) have fueled mistrust on the side of German collaborators. These issues do have strong influence on Sino-German science collaborations at all levels. This article examines the micro-level of interpersonal cooperation between researchers, with particular regards to trust. The question to be investigated is: What role does trust play in the context of German-Chinese scientific cooperation for the scientists involved?

The starting point will be a literature review on the special features that characterize international science collaborations and the challenges they pose for the scientists involved. After a brief overview of the methodology of the qualitative-empirical study on which this text is based, the results section will show what role trust plays for the researchers in the implementation of German-Chinese scientific cooperation and how it is reflected in the descriptions of the scientists interviewed. The concluding synopsis places the empirical results in the research context and formulates starting points for further research.

2 Uncertainty as a 'normal state' of international scientific cooperation

International scientific cooperation poses numerous challenges for its players. Apart from the 'normal' requirements of cooperative action (one may think here, for example, of the coordination of certain goals and the distribution of tasks and roles), it often demands additional skills and abilities from the participants. This can be, for example, communication in a foreign language; above all, however, it is the cooperation partners' increased (national, disciplinary, cultural) heterogeneity that makes the negotiation of a common action framework more difficult compared to mono-national cooperation (Weidemann, 2007, p. 671; Chen et al., 2013; Fan et al., 2014; Weidemann et al., 2019; Dusdal & Powell, 2021). Unlike in business collaborations, where these insights have long been accepted, in scientific circles the widespread assumption still persists that scientific action and collaboration operate according to universal rules and are not subject to any culture-specific influence (Thomas, 2003, p. 291; Weidemann, 2007). Scientific cooperation is always associated with different interests, which, however, by no means have to be exclusively scientific. In addition to economic interests (Leclerc & Gagné, 1994, p. 261; Hwang, 2008, p. 104), these include especially power political considerations that exert far-reaching influence on international scientific cooperation (Weingart, 2003, 2008). These political and economic interests in international research cooperation are usually very different from those of the scientists themselves (Georghiou, 1998; Weingart, 2003; Weidemann et al., 2019), which in practice sometimes means that 'cooperation' falls short of the expectations placed in it or even tends to be avoided (Paul, 2020).

Another aspect that complicates scientific cooperation in general and international research cooperation in particular is the simultaneity of cooperation and competition - sometimes referred to as 'coopetition' (Weidemann, 2018; Bröckling, 2014). For example, Sandra Beaufaÿs notes, that although there is much talking about networks and collaborations, scientists used these occasions not so much to show interdependence, but rather to position themselves within the community (Beaufaÿs, 2003, p. 228).ⁱ

The constant presence of competition at all levels of international scientific cooperation, together with the great heterogeneity of the participants and the numerous (partly contradictory) interests, contributes significantly to the fact that scientific cooperation is very much perceived as a *risk* by the researchers involved (Luhmann, 2001; Gambetta, 2001, 1988; Blomqvist et al., 2005; Paul, 2020, 2021). In this respect, uncertainty is not so much a *new* development for the field of international scientific cooperation as it is the *normal* condition with which researchers have to cope – although, of course, there are differences and variations regarding the levels and sources of uncertainty among research disciplines and nations.

Based on co-authorship data, Aksnes and Sivertsen (2021) provide insight into developments in international scientific cooperation from 1980 to 2021 and find that factors such as "country size, income level, and geopolitics" can explain the different developments (Aksnes & Sivertsen, 2021, p.26).

In the recent years, geopolitical factors in particular have made a noticeable contribution to international scientific cooperation with partners from the People's Republic of China being perceived as increasingly uncertain. First, the political course under which, since Xi Jinping took office in 2013, power in educational and scientific institutions has increasingly shifted towards party functionaries and scientific

freedom has been further restricted², has also had a noticeable impact on international cooperation (Fulda, 2021; Kaiser, 2024, p.136). Second, the COVID-19-pandemic caused unprecedented disruptions in mobility and this sudden loss of all direct communication options put a strain on all international scientific cooperation, as digital communication can only replace personal contact over a longer period of time to a limited extent. In the field of medicine in particular, any collaboration with Chinese partners a few months after the outbreak of the pandemic was also massively hampered by China's information embargo (Maher & Van Noorden, 2021, p.318). The strict quarantine measures or the digital surveillance of citizens by the Chinese government were also viewed very critically, especially in Western democracies (The Lancet, 2021, p.1325): "Internationally though, there is a high level of scepticism towards China. Anti-China sentiment has intensified. With respect to science, transparency over data is a continuing point of contention" (ibid.). Third, the revelations of the so-called China Science Investigation (cf. Correctiv, s.a.; Matthews, 2022) about the cooperation of European universities and research institutions in dual-use technologies (e.g. drones, positioning systems) as well as cases of scientific espionage have led not only to discussions about how to protect security and integrity in research (cf. MERICS, 2023) but also to increased mistrust of cooperation with the Chinese in general (BaZ Online, 2024; Tagesspiegel, 2023; Rembold, 2025).

The above-mentioned points have contributed to the fact that the feeling of uncertainty regarding scientific cooperation with Chinese partners has become much stronger in recent years.

3 Empirical research on the micro-level of international research collaboration

This article and the empirical data presented here comes from a larger empirical grounded theory study with 26 qualitative, semi-structured interviews conducted between 2014 to 2020 as part of my doctoral thesis (Paul, 2020; literature on grounded theory: Glaser & Strauss, 1967; Strauss & Corbin, 1996).ⁱⁱ In order to explore international (specifically, German-Chinese) STEM collaborations, I interviewed sixteen German and ten Chinese scholars on the experiences they had made in their respective collaboration. The theoretical sampling³ in the selection of the interview partners was done in the sense of the greatest possible heterogeneity in terms of *organizational background* (different universities and non-university research institutes), *type of cooperation* (publicly funded or industry-funded; research project, bilateral scientist exchange program, joint research lab), *research field* (applied research, basic research), and *hierarchy* in the research institution (professor, project manager, project staff, doctoral student). As there was hardly any qualitative research on Sino-German scientific cooperation at the time the data collection began, this exploratory approach was intended to investigate whether different groups of people revealed contradictory experiences within their respective collaborations. The theoretical sampling was guided by the assumption that intercultural challenges and possible misunderstandings could be related to the organizational, disciplinary and/or administrative background. Furthermore, it seemed important to interview researchers from different hierarchical levels, as tasks in collaborative projects are usually highly distributed and people may have very different perspectives on the same collaboration: While the institute management, for example, is more involved in the initiation and negotiation of a cooperation agreement, the scientists in the project team can report on the operational challenges of interaction and communication with the partners. Language barriers or intercultural differences may pose less of a challenge at the level of institute management than at the level of project staff.

The interviews were transcribed, anonymised and inductively coded. The codes were then summarized into categories. Important categories were, for example, the self-images and external images of the cooperating scientists, the significance of the cooperation relationship, contracts and financing of the

² Duffy (2025, p. 13) provides valuable insights these developments from the perspective of international academics at UK and US offshore campuses in China as follows: „This environment, marked by sensitive topics and censorship, fosters apprehension [...]. These challenges contribute to feelings of isolation and disempowerment, which can diminish faculty morale and engagement“ (ibid.). In addition to (self-)censorship, Kaiser (2024) also describes the increasing uncertainty perceived by researchers due to the tightening of the legal framework, e.g. through the Data Security Act (中华人民共和国数据安全法, 2021) or the 'Anti-Spying Act' revised in 2023 (中华人民共和国反间谍法) (Kaiser, 2024, p. 82-83).

³ The theoretical sampling was based on the suggestions of Glaser (2004) and Charmaz (2006) with the aim of obtaining quality results from the saturation of categories for a theory that is anchored in the data material.

cooperation. In addition, a systematic metaphor analysis (cf. Schmitt, 2017) was conducted for the interviews with German native speakers.

When analysing the data material, two things in particular stood out. First, all interviewees talked only little about what happens within their cooperation (i.e. the joint work on and with scientific knowledge). Of far greater importance to them in the interview was the collaboration's formal-organisational framing (e.g. addressed in connection with funding, project initiation, contract, rights/patents) as well as personal relationships. Secondly, although the interviewees described cultural differences that they had noticed in their cooperation (e.g. different communication and working styles), the different cultural background of the scientists involved does not – as one might assume – explain the observed phenomena, conflicts and challenges of the cooperations. What is much more important instead is how the researchers 'frame' their respective collaborations.

In this article, I would like to focus exclusively on the interviews with the German scientists and examine the data material with the question of how the interviewees address the uncertainty currently associated with research collaboration with Chinese partners and the role trust plays in this context.

4 Findings and discussion

Science cooperation in general is associated with a great deal of uncertainty for those involved and therefore is perceived as a risky venture. Throughout the interviews, this risk was evident in the interviews to varying degrees of intensity. In terms of language, for example, it was reflected, when German interviewees stated that one had to be particularly "careful" and "cautious" when cooperating with Chinese partners. It is striking that large parts of the interviewees' descriptions deal with how they try to arm themselves against the risks of their cooperation – rather than they talk about benefits or positive aspects of it.

However, it was also noticeable that there were two different strategies the researchers used to derive a feeling of security and to establish security. Here, trust plays a central role. Trust is "one of the most important synthetic forces within society" (Simmel, 1992, p. 393) and plays an important role especially with regard to risky contexts: "When we say we trust someone or that someone is trustworthy, we implicitly mean that the probability that he will perform an action that is beneficial or at least not detrimental to us is high enough for us to consider engaging in some form of cooperation with him" (Gambetta, 2001, p. 217).ⁱⁱⁱ

According to the interviews, two main types of trust were applied by the interviewees to frame their collaborations: while some of them put their trust primarily in contractual agreements (and the associated possibility of sanctioning breaches of contract), others trusted in specific individuals.^{iv}

During the research process, it became apparent that there is a strong correlation between the nature of trust and how the researchers experience and describe their collaboration: On the one hand, there are collaborations that are based on a long-standing, personal relationship between the cooperation partners. These collaborations are characterized not only by the fact that the actors have a more positive image of their partner (including his or her institution and country of origin), but also by the fact that they perceive the collaboration as less risky and focus more on what they have in common with their partner than on the difficulties or challenges of the collaboration (which do exist). On the other hand, there are collaborations that have no such relationship as a basis but are primarily based on contractual agreements. Here, cooperation is often heavily burdened by negative images of others and stereotypes; there are far more conflicts, some of which cannot be resolved, and the focus is more on what separates than on what connects. These collaborations are generally perceived as risky by the scientists interviewed.

Trust plays a key role in shaping collaborations. Contractual trust and personal trust thus represent two ways of framing a scientific collaboration and creating a sense of security among the actors. Therefore, in the following two chapters, I would like to examine in detail how contractual and personal trust manifest themselves in German-Chinese research collaborations.

In research on intercultural topics, trust has not been dealt with a lot so far. As a result, there are few conceptual contributions on how to research trust. One approach was presented in 2024 by Pan and Chen, who propose to investigate trust based on its effects at cognitive, affective and conative levels (Pan & Chen, 2024, p.8). For each of these three levels of impact, the authors identify key factors that they have determined from expert interviews with German and Chinese specialists and managers. For the cognitive level, Pan and Chen refer to 'knowledge' (e.g. information about people and backgrounds) and 'understanding' (e.g. predictability, intercultural understanding) as key factors. On an affective level, trust is shown above all in the form of 'sympathy' (e.g. openness, positive attitude, personal closeness, security),

'tolerance and empathy' (e.g. sensitivity, dealing well with criticism) and 'respect and appreciation' (e.g. interest, appreciation). On a conative, i.e. behavioral level, trust is shown in 'competence' (e.g. language and professional competence), 'attitude and commitment' (e.g. ability to work in a team, flexibility, willingness to help) and 'action' (e.g. drive, keeping promises) (ibid.). I would like to use these key factors proposed by Pan and Chen to discuss the results presented in sections 4.1 and 4.2.

4.1 Personal Trust in Sino-German Science Collaborations

How does personal trust manifest itself? The interview transcripts display four indicators for personal trust (see Figure 1). The interviewees not only frequently mentioned their collaborative partner (and did so by referring to him or her by name, not by the partner's organization) and talked a lot about what they had in common with him or her, they also share the understanding of research as something that is jointly produced, for example as an achievement of the research group to which the collaborating scientists belong. In the interviewees' descriptions, this is reflected linguistically by means of "system metaphors", expressing that research is an interplay of many and that the researcher is part of a large whole.^v

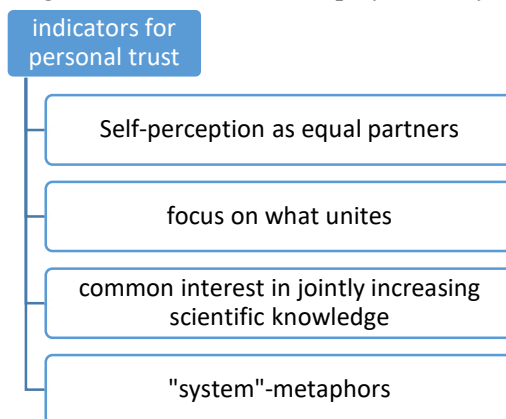


Figure 1. Characteristics of Personal Trust in Sino-German Science Collaborations (own illustration)

Basically, one can perhaps best imagine the "system" as a technical device or machine. The system metaphors used by the interviewees convey several meanings. On the one hand, the researchers see themselves as a "part" of something larger (e.g. „when you understand which part you play in the system“ [Dr. Krause⁴]). This means that the individual system components, i.e. the scientists, play an important role, albeit a subordinate one to the overall system („that over the years, you simply understand ... your place in the system“ [Dr. Krause]). An important function of the system is to establish ORDER, that is, each has its place and its task. The individual parts are relatively firmly connected to each other, although the nature of the connection may show differences, for example in terms of its strength or the duration of its existence. This can be seen, for example, in phrases such as "close intergrowth", "entanglement", "historical intertwining" of the collaboration partners [Dr. Krause], or the expression that the collaboration is „irrevocably linked with my person“ [Prof. Meier]. The German interviewees from basic research used such system metaphors particularly frequently. Their focus was clearly on the connections that make up and hold together the system. These connections, which are sometimes very "tangled" [Prof. Schumann], are based primarily on personal relationships between individual scientists and play a significant role for the interviewees: "My belief is that you need to have *private connections* [for working in such a collaboration]" [Prof. Meier]. At this point, at the latest, the "system" can no longer be clearly distinguished from a network, and the interviewees themselves sometimes spoke directly of connections in networks: „I have network with them and expanded this to *other* Chinese colleagues. [...] Once you *have* this connection, then you can really have collaboration. One thing leads to another.“ [Dr. Baker]. It is known that networks play an important role in science in general (cf. Latour, 1987; Knorr Cetina, 2012 [1984]), that is, in both applied and basic research. It was noticeable, however, that the interviewees reflected differently on the importance of the other people in the network or how good the relationship with them must be.

⁴ The names of all interview partners mentioned here have been pseudonymized.

Within the collaborations studied, personal trust was primarily based on sympathy as well as the (at least temporary) existence of a shared lifeworld.^{vi} The interviewees gave examples of this, such as a shared "history" with the collaborative partner as colleagues in the same laboratory, or a jointly produced publication that reflects the successful collaboration of the two researchers.

If you have had very intensive experiences together in life - and that is often the case when someone did a doctorate with someone, or if he was a group leader and then got a professorship somewhere - then you can, for example, talk about old times and how it was back then [...] that is a piece of your own life. [Prof. Carsten Meier]

Shared experiences, shared successes - in the conversations with the researchers, for whom a trusting partner relationship was very important, showed a clear focus on such common points with their partners, rather than concentrating on what separates or distinguishes the partners.^{vii} One reason for this may be that these scientists communicated a lot with each other overall. They spend a lot of time simply staying in touch, but also, for example, exchanging views on their own expectations and ideas with regard to research as well as their collaboration as such:

I think, if people want to really have really close collaboration, you should understand each others, not only about research, but about their culture [...] their philosophies and their research. That is very simple. So, for example, I also invite our German professor to contact me often, so I try to look along, you know, contact a little bit so he knows how the things happen in China and then we could, you know, understand each other. Then it will make things simple. So this is what I try to do. [Prof. Zhang]

For Professor Zhang, the desire to „understand each other“ is a guiding principle for communication. For him, this also includes the expectation towards the German scientists to make an effort to understand the Chinese view of things. From this, we can also conclude that a personal trustful relationship helps to ensure that cooperation takes place more on eye level and that the scientists see themselves as equal partners.

Another characteristic of collaborations based on personal trust is that the collaboration is indeed strongly motivated by a common scientific knowledge interest.^{viii} By combining the different resources of the partners (knowledge, skills, technological capabilities, data material), a "win-win situation" is created, according to Dr. Baker. In addition, it is striking that the interviewees do not seem to have any reservations about the integrity of the partner in dealing with the knowledge disclosed in the cooperation.

4.2 Contract trust in Sino-German science collaborations

In addition to personal trust, a second form of trust stood out in the study of German-Chinese scientific cooperation, namely trust in contractual agreements. There are differing views in the literature as to whether contracts represent a separate form of trust or whether they are simply indicators of a *lack* of personal trust.^{ix} For researchers such as Piotr Sztompka, a

contract not only safeguards meeting trust in its specific domain (e.g., supplying some goods, or returning debt), but also by raising the trustworthiness of the trustee facilitates more open relationships pervaded with trust in other domains, not explicitly regulated. It provides a border security of a whole field of activities, which then can proceed more freely (Sztompka, 1999, p. 90).

Mari Sako even uses the term "contractual trust" and emphasizes that „[a]ny business transaction relies on ‚contractual trust‘ for its successful execution“ (Sako, 1992, p. 37). However, in her comparative research about business practices and strategy, she found that the importance of contractual trust varies greatly internationally: in Germany and Japan, for example, it is much more pronounced than in other countries (Sako, 1997). Contractual trust is based on shared moral norms of honesty and keeping promises (Sako, 1997, p. 3). It refers not only to written agreements, but also to oral ones, which are an even stronger expression of contractual trust (Sako, 1992, p. 37).

In the descriptions of the interviewees, contractual trust was particularly pronounced when personal trust between the cooperating scientists was absent or only present to a limited extent. Figure 2 presents indicators of contractual trust which had a lasting effect on the design and implementation of the science collaborations in question.

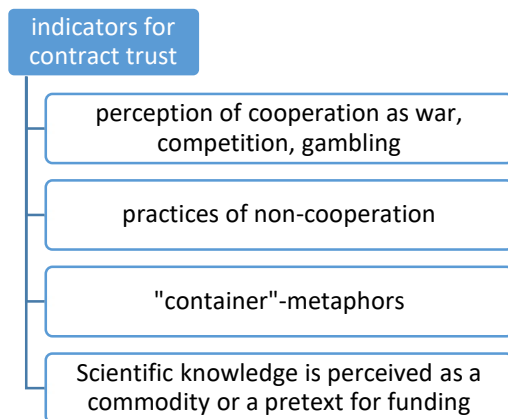


Figure 2. Characteristics of Contract Trust in Sino-German Science Collaborations (own illustration)

Since the scientists on both sides usually did not know each other well before the cooperation, they often started the collaboration very reserved and distrustful. This is particularly evident in the descriptions of the German interlocutors from applied research. Again and again they describe their cooperation with the Chinese partners with the help of „*container metaphors*“. Such metaphors describe the scientist, sometimes also the research institute to which he or she belongs, as a vessel or container. Such metaphors have multiple meanings. Of importance here is, on the one hand, the idea that there is an 'inside' and an 'outside'. The inside of the container has a certain content - what exactly this content consists of is usually not explicitly stated, in most cases, the interviewees refer to knowledge or know-how. Connected to the separation of inside and outside is the emphasis on what is "in between": there exists a border formed by the walls of the container. Boundary metaphors play an important role in connection with the image of the container. Another issue related to the container metaphor is the question, whether the container is open or closed. This sometimes results in difficulties, because on the one hand it is important that something "has to come out" of the container [Mr. Lauermann] and "success" is defined, for example, as "what comes out in the end" [Dr. Hauser]. On the other hand, many efforts revolve around keeping the container *closed*, because the fear that something might leak out unintentionally or uncontrollably is very present among the German interviewees at the institute: „then perhaps something can diffuse away from time to time“ [Prof. Jürgens] or „knowledge could flow off to China“ [Dr. Schönherr]. In other words: if the container is too open or the container walls are too permeable, this is perceived as a serious risk to the contents. This strong perception that knowledge, which once "flows out" of the container, is irretrievably lost, since it would be immediately "absorbed" [Dr. Schönherr] outside, is at odds with the fact that passing on knowledge does not reduce the 'quantity' of knowledge in the person who has passed it on. The fact that the interviewees associate such a bitter loss with it suggests that the significance or 'value' of knowledge decreases the more people have it - scientific knowledge is understood as an exclusive good, so to speak. The fact that knowledge often has the character of a commodity, especially for the interviewees from applied research, can also be seen in numerous metaphors of economic action. For example, knowledge can be "exchanged" [Mr. Lauermann], "bought" [Dr. Schönherr; Dr. Hauser] and "sold" [Prof. Jürgens; Dr. Hauser], "exported" [Dr. Schönherr] and "transferred" [Mr. Lauermann]; furthermore, the commodity has a price, that means, you have to "pay something for it" [Prof. Jürgens]. However, this idea of knowledge as a commodity also has a flip side: knowledge can also be "taken away" [Mr. Lauermann; Prof. Werner]. Such formulations, expressing the danger of loss of knowledge for its owner, represent a content overlap of container metaphors and metaphors of economic action.

The fact that especially the interviewees from applied research used container metaphors so frequently, may be due to the fact that collaborations on applied research topics are under strong pressure both from the (sales) market and from potential competitors due to the proximity of the research topics to commercial exploitation. Under these conditions of competition, building personal relationships and trust is a challenge for scientists. The closer a research or cooperation topic is to industrial exploitation, the greater the risk for the scientists involved of being exploited or deceived.

In addition to the strong sense of risk and the lack of a personal relationship with the partner, it was noticeable that the interviewees, who relied primarily on contracts, often also did not have high expectations of the added value for their own side resulting from the cooperation. This was particularly noticeable in the interviews with the Germans from applied research: they spoke in great detail about various kinds of efforts aimed at maintaining their own knowledge or expanding their own (supposed) knowledge advantage. In this context, the analysis of the data material made it possible to identify several practices that I would like to call "strategies of non-cooperation". Previous research on the topic of cooperation always assumes that the respective actors have a positive interest in cooperation, that they *want* to cooperate. However, the statements of the application researchers rather indicate that this does not necessarily have to be the case and that it may even be quite attractive for the actors to cooperate as little as possible, or even just to *pretend* to cooperate. Such *non-cooperation* seems particularly attractive to scientists when

- the subject of the collaboration is very close to a possible economic exploitability of the research, and/or
- the cooperating parties see themselves as competitors rather than as partners (which manifests itself, for example, in mistrust or fears regarding the protection of property rights), and/or
- it is *possible* due to systemic differences (such as separate application deadlines, separate third-party funding, etc.), and/or
- the expectations of the know-how gain for the own side are low.

The descriptions of the interviewees indicate that the cooperation was designed and conducted very "carefully" from the very beginning and that the German researchers endeavored to cooperate as little as possible with the Chinese partner. Some of the efforts not to cooperate were directed against the partners. For example, the German institute actively tried to exclude the Chinese partners both in advance and during the research process and also to limit the exchange of data, information and know-how to the lowest possible level. Other efforts described in the interviews aimed more at communication with the research-funding institutions, to whom the scientists had to account for the use of the funding they received:

Our partner university made a certain part, new development of a component, and we made a certain part, development of another component in another spectral range, for other applications [...]. It was presented as a total system, so to speak, as a whole. [Mr. Lauer mann]

The term "present" here implies that justification was given to the research funding organization for a cooperative effort that did not actually take place as such - and which, incidentally, was never intended to take place in this way (at least by the German side).^x

Another common feature of the interviewees, who relied primarily on contracts in their respective cooperation, is the frequent use of metaphors that allow conclusions to be drawn about certain power relationships. Examples of this are impressive linguistic images whose source are the areas of war, (sporting) competition, and (gambling) games.

The metaphors of war^{xi} and competition^{xii} used emphasize above all the perceived antagonism between the two sides. The use of these metaphors shows that the cooperation with the Chinese partners is strongly connected with feelings of threat, danger and fear. This is based primarily on the fact that there is sometimes great uncertainty about the partner - people do not know each other, perceive each other as very different and feel alienated.

The interviewees from applied research in particular perceived their collaboration very much as competition, which can be explained primarily by the proximity of the research results to the market: The closer the research or cooperation object is to industrial usability, the 'heavier' (because more concrete) the risk of being exploited or deceived weighs for the participants – Bröckling refers to this as the "logic of the market", which

creates a justification problem and thus an increased need for metaphorization. A competitive society is not a meritocracy, and it certainly does not create social justice. [...] [Competition metaphors] defuse the intolerable by suggesting that it is the same in the marketplace as in the sports arena, where supposedly the most proficient always wins (Bröckling, 2014, p. 80).

A third group of metaphors comes from the field of (gambling) games. The central question with these metaphors is the honesty of the (Chinese) players, which (from the perspective of the German interviewees) is in question. A lack of transparency and honesty in the game seem to be basic problems on both sides: "no one wants to be shown their cards" [Prof. Jürgens]. On the German side, there is a great deal of caution; the Chinese player is, to a certain extent, under general suspicion of playing particularly (deceitfully) cunningly and not always playing by the rules, so one has to be careful not to get cheated. Kriz and Keating (2011, p. 38) report from a survey on the importance of trust that some respondents said they did not expect personal trust in (business) relationships, „because business is a game – a kind of competition where cheating is acceptable.“

In summary, the use of metaphors that refer to war, competition or game expresses the extent to which science collaboration is characterized by a deep distrust towards the partner - rather than personal trust.

4.3 Discussion, outlook, need for further research

Trust appeared in two forms in the interview material examined: personal trust in the person of the cooperation partner, and trust in contractual agreements as the basis for cooperation.

If one compares the manifestations of trust presented here with the key factors proposed by Pan and Chen (2024), it is noticeable that the interviewees speak more about affective and cognitive aspects of trust: while those interviewees who base their cooperation more on personal trust talk a lot about the person of the partner, the shared history and the feeling of connectedness, the interviewees who rely more on the effect of contracts tend to emphasize the strangeness of the partner (which partly results from a lack of knowledge about the person) and feelings such as fear and anxiety (which partly results from a lack of knowledge about the person) and feelings such as fear and insecurity. According to the systematization of Pan and Chen (2024, p.8), the aspects presented could be assigned primarily to the key factors 'knowledge' (cognitive), 'sympathy' (affective) and 'respect and appreciation' (affective).

However, the addition of the option of contractual trust already shows that the possible effects of trust, which Pan and Chen list in their systematization, only depict personal trust. For example, the key factor 'sympathy' for personal trust can be experienced in the form of a positive attitude, the feeling of personal closeness, openness, security and safety (ibid.) - in the case of contractual trust, it is rather a skeptical attitude or feelings of strangeness and insecurity that become clear in the interview data. Questions that future research should address are, for example What are the effects of different types of trust (e.g. organizational trust, system trust)? Are there key factors of trust that are more important than others and to what extent is such a weighting influenced by factors such as culture (e.g. Guanxi culture in China, cf. Luo, 2013) or politics (e.g. greater importance of personal trust as social capital in authoritarian countries, cf. Roßteutscher, 2015)?

The study presented here is of course very limited with a focus on German-Chinese STEM cooperation in the period from 2014-2020 and a very limited number of interviewees.

An empirical follow-up study, which also uses qualitative interviews to examine the development of German-Chinese science cooperation in the last few years (from a German perspective), is currently being conducted. The study focuses on the question of which strategies scientists use to cooperate with their Chinese partners despite the more difficult conditions. Scientific cooperation has become more challenging over the past ten years, as is clear from the interviews. This is especially true since, in the wake of the Corona pandemic, the lack of personal contact could only be compensated for by a virtual exchange that was politically strongly controlled on the Chinese side. Both massively hindered the cultivation of interpersonal relationships and thus brought many cooperation projects to a standstill. It emerges from the interviews that science cooperation with Chinese partners is more strongly associated with a sense of insecurity (especially with regard to administrative-organisational and legal aspects) than during the previous study. Personal trust seems to become all the more important when the political framework becomes more complicated to compensate for the increasing uncertainty. This of course needs further scientific validation, but could be significant for the design of future cooperation with authoritarian states, which will increasingly represent a challenge for Western democracies in the coming years.

International science cooperation has so far been viewed and studied primarily at the organisational level; the interpersonal level is largely neglected by both science researchers and policy-makers - with serious consequences. In Germany, for example, research funding organisations attach great importance to networking of as many actors as possible when issuing calls for proposals. The empirical findings presented

in this article, however, show that scientific exchange flourishes especially where trusting relationships exist between individual scientists (cf. Weidemann et al., 2019, p. 124). Against this background, the practices of non-cooperation presented above can certainly be understood as scientists' attempts to undermine the cooperation requirements that are demanded by politics (but perceived as inadequate by the scientists). If policy dictates that cooperation should include as many people or organisations as possible, science complies with this up to a certain point (due to its own dependence on funding) - but then finds its own ways to circumvent the required type of cooperation.

There is still a great need for empirical contributions to the study of trust. Since interviews can only be used to collect interpretations and knowledge about trust, it would certainly be worthwhile to use other methodological approaches as well – ethnographic survey methods such as participant observation seem particularly promising here, since they focus more on the non-verbalised knowledge and the actions of the people involved. Especially in the field of intercultural communication and cooperation, trust is a topic that research has only marginally been dealt with so far. If at all, trust is seen as the *result* of successful intercultural interaction. However, future research should not only focus on trust as a result, but also explicitly as a *prerequisite* for successful intercultural encounters.

5 Conclusion

This study has shown that German-Chinese scientific collaborations are often marked by a high degree of perceived uncertainty and risk among participating scientists, challenging the generally positive assumptions surrounding international scientific cooperation. By applying systematic metaphor analysis, different types of trust that researchers draw upon to navigate these uncertainties were identified, and it was shown how these ideas of trust have a direct impact on the implementation of cooperation in practice. These findings highlight that sustainable and productive international research cooperation relies not only on formal agreements and institutional frameworks but also on cultivating robust interpersonal trust relationships. This underscores the importance of addressing the human and relational dimensions of science diplomacy more explicitly in policy and practice.

Nonetheless, the study has certain limitations, particularly its focus on a specific group of STEM researchers and on German-Chinese collaborations, which limits the generalizability of the results. Future research should expand to other disciplinary and national contexts and explore longitudinal perspectives on how trust develops and evolves in international research partnerships over time.

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References

- Aksnes DW, Sivertsen G (2023): Global trends in international research collaboration, 1980- 2021. *Journal of Data and Information Science*, 8(2), 26–42. (DOI: 10.2478/jdis-2023-0015).
- BaZ Online (2024): Sicherheitsbedenken: Auch an Basler Hochschulen herrscht Misstrauen gegenüber China. (www.bazonline.ch/kooperationen-mit-china-hochschulen-in-der-region-basel-478397432233, 04.07.2025).
- Beaufaÿs S (2003): *Wie werden Wissenschaftler gemacht? Beobachtungen zur wechselseitigen Konstitution von Geschlecht und Wissenschaft*. Bielefeld: transcript. (DOI: 10.25595/201).
- Blomqvist K, Hurmelina P and Seppänen R (2005): Playing the collaboration game right – balancing trust and contracting. *Technovation*, 25: 497-504. (DOI: 10.1016/j.technovation.2004.09.001).
- Bröckling U (2014): Wettkampf und Wettbewerb. Semantiken des Erfolgs zwischen Sport und Ökonomie. *Leviathan*, 42, Special Edition 29/2014: 71-81.

- Burt RS (2002): "Bridge decay." *Social Networks*, 24: 333–363.
- Charmaz K (2006): *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. London: Sage.
- Chen WT, Shiu CS, Simoni JM, et al. (2013): Challenges of cross-cultural research: Lessons from a U.S.-Asia HIV collaboration. In: *Nurse Outlook*, 61(3): 145-152. (DOI: 10.1016/j.outlook.2012.11.004).
- Coleman JS (1974): *Power and the Structure of Society*. New York: Norton.
- Correctiv (s.a.): China Science Investigation. (<https://correctiv.org/themen/china-science-investigation/> 24.03.2026).
- Dahlander L, McFarland DA (2013): Ties That Last: Tie Formation and Persistence in Research Collaborations over Time. *Administrative Science Quarterly*, Volume 58, Issue 1: 69-110. (DOI: 10.1177/0001839212474272).
- Dusdal J, Powell JJW (2021): Benefits, Motivations, and Challenges of International Collaborative Research: A Sociology of Science Case Study. *Science and Public Policy*, 48(2): 235-245. (DOI: 10.1093/scipol/scab010).
- Endreß M (2002/2015): *Vertrauen*. Bielefeld: transcript.
- Fan C, Christmann-Budian S and Seus S (2014): *Evaluation and Innovation Cooperation between the EU and China. Study for the European Commission DG RTD by Fraunhofer ISI*. (DOI: 10.2777/4860).
- Fulda A (2021): Rote Linien längst überschritten. *Forschung & Lehre*. (<https://www.forschung-und-lehre.de/politik/rote-linien-laengst-ueberschritten-3992>, 01.04.2026).
- Gambetta D (1988): Can We Trust Trust? In: Gambetta D (ed.), *Trust: Making and Breaking Cooperative Relations*. Basil Blackwell, 213-237.
- Gambetta D (2001): Kann man dem Vertrauen vertrauen? In: Hartmann M and Offe C (eds.), *Vertrauen. Die Grundlage des sozialen Zusammenhalts*. Frankfurt a.M.: Campus, 204-237.
- Georghiou L (1998): Global cooperation in research. *Research Policy*, 27: 611-626.
- Glaser B (2004): Remodeling Grounded Theory. *Forum Qualitative Sozialforschung* 5(2). (DOI: 10.17169/fqs-5.2.607).
- Glaser B and Strauss A (1967): *The Discovery of Grounded Theory: Strategies for Qualitative Research*. New York: Aldine de Gruyter.
- Gulati R and Gargiulo M (1999): "Where do interorganizational networks come from?" *American Journal of Sociology*, 104: 1439–1493.
- Hardin R (1991): "Trusting persons, trusting institutions". In: Zeckhauser RJ (ed.), *Strategy and Choice*, Cambridge, Mass.: MIT Press, 185-209.
- Heilmann S and Kaschke M (2024): Wirtschafts- und Wissenschaftskooperation: Made with China. In: *Internationale Politik* 3, Mai/Juni 2024: 98-103. (<https://internationalepolitik.de/de/wirtschaft-und-wissenschaftskooperation-made-china>, 28.03.2026).
- Horkheimer M and Adorno TW (1947/1993): *Dialektik der Aufklärung. Philosophische Fragmente*. Frankfurt a. M.: Fischer.
- Hwang K (2008): International Collaboration in Multilayered CenterPeriphery in the Globalization of Science and Technology. In: *Science, Technology, & Human Values*, 33 (1): 101-133 (DOI: 10.1177/0162243907306196).
- Ingram P and Torfason MT (2010): "Organizing the in-between: The population dynamics of network-weaving organizations in the global interstate network." *Administrative Science Quarterly*, 55: 577–605.

- Kaiser A (2024): *Einführung in die Wissenschaftsfreiheit in der Volksrepublik China. Institutionelle Autonomie und Lehr- und Forschungsfreiheit*. Erlangen: FAU University Press. (DOI: 10.25593/978-3-96147-725-8).
- Kirchhoff T (Hrsg.) (2015): *Konkurrenz. Historische, strukturelle und normative Perspektiven*. Bielefeld: transcript
- Knorr-Cetina K (1984/2012): *Die Fabrikation von Erkenntnis. Zur Anthropologie der Naturwissenschaft*. 3., erw. Auflage. Frankfurt a.M.: Suhrkamp.
- Kriz A and Keating B (2011): Business Relationships in China: Lessons about Deep Trust. In: Warner M and Rowley C (eds.), *Chinese Management in the 'Harmonious Society': Managers, Markets and the Globalized Economy*. London, New York: Routledge.
- Latour B (1987): *Science in Action. How to follow scientists and engineers through society*. Cambridge, MA: Harvard University Press.
- Laudel G (1999): *Interdisziplinäre Forschungsk Kooperation: Erfolgsbedingungen der Institution "Sonderforschungsbereich"*. Berlin: Rainer Bohn Verlag. (<http://hdl.handle.net/10419/122898>, 03.05.2019).
- Leclerc M and Gagné J (1994): International Scientific Cooperation: The Continentalization of Science. *Sciencetometrics*, 31/3: 261-292.
- Levi Martin J and Yeung KT (2006): "Persistence of close personal ties over a 12-year period." *Social Networks*, 28: 331–362.
- Luhmann N (2001): Vertrautheit, Zuversicht, Vertrauen. Probleme und Alternativen. In: Hartmann M and Offe C (eds.), *Vertrauen. Die Grundlage des sozialen Zusammenhalts*, Frankfurt a.M.: Campus, 143-160.
- Luo X (2013): „Guanxi competence as intercultural competence in business contexts: a Chinese perspective.“ *Interculture Journal* 12(20), 69-89. (<https://nbn-resolving.org/urn:nbn:de:0168-ssoar-454271>, 30.03.2026).
- Maher B, Van Noorden R (2021): „The Challenges Facing Research Collaborations. The pandemic and political tensions might slow the march towards more globalized science.“ *Nature*, Vol. 594: 316-319.
- Matthews D (2022): „European universities under fire over work with Chinese military.“ *Science Business*. (<https://sciencebusiness.net/news/european-universities-under-fire-over-work-chinese-military>, 04.07.2025).
- MERICS (Mercator Institute for China Studies) (2023): In research collaboration, drawing red lines with China isn't easy. Comment. (<https://merics.org/en/comment/research-collaboration-drawing-red-lines-china-isnt-easy>, 04.07.2025).
- Münch R (2009): *Globale Eliten, lokale Autoritäten. Bildung und Wissenschaft unter dem Regime von PISA*, McKinsey & Co. Frankfurt a. M.: Suhrkamp.
- Olechnicka A, Ploszaj A and Celińska-Janowicz D (2019): *The Geography of Scientific Collaboration*. New York NY: Routledge.
- Pan Y, Chen Y (2024): "Vertrauensbildung unter Mitgliedern chinesisch-deutscher Teams bei virtuellen Meetings aus interkultureller Sicht." In: Jia W and Casper-Hehne H (Eds.), *Interkulturelles Forum der deutsch-chinesischen Kommunikation* 3(2). DeGruyter. (DOI: 10.1515/ifdck-2023-0016).
- Paul, Tina (2020): *Vertrag(en) oder Vertrauen – Wie gelingt deutsch-chinesische Wissenschaftskooperation?* Dissertation, TU Chemnitz, Dr. Kovac, Hamburg.
- Paul, Tina (2021): Konkurrenz in der Wissenschaftskooperation: eine metaphernanalytische Betrachtung deutsch-chinesischer Forschungsprojekte. In: *interculture journal* 20/34, S. 75–90. (<https://www.ssoar.info/ssoar/handle/document/76343>, 01.04.2026).

- Peterson MW (2007): "The study of colleges and universities as organizations." In: Gumpert PJ (ed.), *Sociology of Higher Education: Contributions and Their Contexts*, Baltimore, MD: Johns Hopkins University Press, 147-186.
- Rembold M (2025): "Zwischen Misstrauen und Kooperation – Forschungsspionage." *Laborjournal online*. (www.laborjournal.de/rubric/hintergrund/hg/hg_25_01_01.php, 01.04.2026).
- Roßteutscher S (2010): "Social Capital Worldwide: Potential for Democratization or Stabilizer of Authoritarian Rule?" *American Behavioral Scientist* 53(5): 737–757. (DOI: 10.1177/0002764209350835). Sako M (1992): *Prices, Quality and Trust, Inter-firm relations in Britain & Japan*. Cambridge: Cambridge University Press.
- Sako M (1997): *Does Trust Improve Business Performance?* (www.researchgate.net/publication/37592846_Does_Trust_Improve_Business_Performance, 02.04.2026).
- Schmitt R (2017): *Systematische Metaphernanalyse als Methode der qualitativen Sozialforschung*. Wiesbaden: Springer VS.
- Shrum W, Chompalov I and Genuth J (2001): Trust, Conflict and Performance in Scientific Collaborations. *Social Studies of Science* 31(5), 681-730.
- Simmel G (1903/1995): Soziologie der Konkurrenz. In: Kramme R, Rammstedt A and Rammstedt O (eds.): *Aufsätze und Abhandlungen 1901-1908*. Band I. Frankfurt a. M.: Suhrkamp, 221-246.
- Simmel G (1989): Philosophie des Geldes. In: Simmel G (ed.), *Gesamtausgabe* Bd. 6, hg. v. David P. Frisby/Klaus Christian Köhnke, Frankfurt/M.: Suhrkamp (Erstausgabe 1900).
- Simmel G (1992): Soziologie. Untersuchungen über die Formen der Vergesellschaftung. In: Simmel G (ed.), *Gesamtausgabe* Bd. 11, hg. v. Otthein Rammstedt, Frankfurt/M.: Suhrkamp (Erstausgabe 1908).
- Sztompka P (1999): *Trust. A Sociological Theory*. Cambridge: Cambridge University Press.
- Tagesspiegel (2023): Misstrauen statt Euphorie: Wenn Forschungsk Kooperationen mit China plötzlich zum Risiko werden. (www.tagesspiegel.de/wissen/misstrauen-statt-euphorie-wenn-forschungsk Kooperationen-mit-china-plotzlich-zum-risiko-werden-9861815.html, 30.03.2026).
- The Lancet (2021): China's response to COVID-19: a chance for collaboration. Editorial. *The Lancet*, 2021, Vol. 397.
- Thomas A (2003): Interkulturelle Wissenschaftskooperation. In: Thomas A, Kammhuber S and Schroll-Machl S (eds.), *Handbuch Interkulturelle Kommunikation und Kooperation. Band 2: Länder, Kulturen und interkulturelle Berufstätigkeit*. Göttingen: Vandenhoeck & Ruprecht, 290-308.
- Ulnicane I (2015): Why Do International Research Collaborations Last? Virtuous Circle of Feedback Loops, Continuity and Renewal. *Science and Public Policy* 42(4), 433-447.
- Weber M (1919/2002): Wissenschaft als Beruf. In: Weber M (ed.), *Schriften 1894- 1922*. Stuttgart: Kröner. (<https://nbn-resolving.org/urn:nbn:de:0168-ssoar-59862-0>, 30.03.2026).
- Weidemann D (2007): Wissenschaft und Forschung. In: Straub J, Weidemann A and Weidemann D (eds.), *Handbuch interkulturelle Kommunikation und Kompetenz. Grundbegriffe – Theorien – Anwendungsfelder*. Stuttgart/Weimar: Metzler, 667-678.
- Weidemann D (2010): Challenges of International Collaboration in the Social Sciences. In: Kuhn M and Weidemann D (eds.), *Internationalization of the Social Sciences. Asia – Latin America – Middle East – Africa – Eurasia*. Bielefeld: Transcript, 353-378.
- Weidemann D (2018): Schwierige Internationalisierung: Globalisierung und transnationale Kooperation in den Sozialwissenschaften. In: Chakkarath P and Weidemann D (eds.), *Kulturpsychologische Gegenwartsdiagnosen: Bestandsaufnahmen zu Wissenschaft und Gesellschaft*. Bielefeld: Transcript-Verlag, 259-282.

- Weidemann D, Paul T and Brandl-Naik A (2019): Interkulturelle Herausforderungen transnationaler Forschungsprojekte. Erfahrungen in der chinesisch-deutschen Wissenschaftskooperation. Stuttgart: ibidem. Weingart P (2003): *Wissenschaftssoziologie – Sociology of Science*. Bielefeld: transcript.
- Weingart P (2008): Ökonomisierung der Wissenschaft. *NTM Zeitschrift für Geschichte der Wissenschaften, Technik und Medizin*, 16 (4): 477- 484.
- Werron T (2009): Zur sozialen Konstruktion moderner Konkurrenzen: das Publikum in der „Soziologie der Konkurrenz“. (Workingpaper des Soziologischen Seminars, 05/09). Luzern: Universität Luzern, Kultur- und Sozialwissenschaftliche Fakultät, Soziologisches Seminar.
- Werron T (2019): Form und Typen der Konkurrenz. In: Bürkert K, Engel A, Heimerdinger T et al. (eds.): *Auf den Spuren der Konkurrenz: Kultur- und sozialwissenschaftliche Perspektiven*. Münster/ New York: Waxmann, 17-44.
- Wuchty S, Jones BF and Uzzi B (2007): “The increasing dominance of teams in production of knowledge.” *Science*, 316: 1036–1039.

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- i Although the duality of competition and cooperation is well known and competition is one of the most important organizational and developmental principles of modern societies (Kirchhoff, 2015; Horkheimer & Adorno, 1947/1993), the phenomenon has so far been rather neglected by research on intercultural cooperation. Max Weber defined competition as a "peaceful' struggle," which is "conducted as a formally peaceful application for one's own power of disposal over opportunities that others also desire" (Weber, 1921-1922/1980, p. 20). Georg Simmel (1903/1995) also described the mechanism of competition as a "struggle", or more precisely: a "struggle for scarce goods". If one follows his explanations, it becomes clear that it is about the "parallel efforts of both parties for one and the same struggle price", competition is ergo triadically structured: there is a "third thing" - the "struggle price" - which "is not in the hands of one of the opponents" (Simmel, 1903/1995, p. 225) and which nevertheless constitutes their interaction. Competition thus means a triadic interaction of two (or more) actors pursuing goals that contradict each other (cf. Kirchhoff, 2015, p. 15; Werron, 2009, 2019).
- ii The present article summarises the most important findings of the mentioned doctoral thesis (published only in German), thus presenting them for the first time to an English-speaking audience.
- iii Although academic contributions have repeatedly pointed out the importance of trust (as well as mistrust), Martin Endreß (2015, p. 6) diagnoses an obvious lack of "explicit communication about trust in everyday life".
- iv In the sociological literature, there are various attempts to typologize different types of trust, e.g. Simmel's distinction between personal and generalized trust (Simmel, 1989: 669) or the seven types of trust that Piotr Sztompka classifies according to their respective reference points (Sztompka, 1999: 41ff.). An overview of various empirical studies investigating trust can be found in Endreß (2015: 51ff.).
- v The emphasis on the common, the cooperation of researchers, not only in international collaborations, but also within a research group or an institute, is in clear contrast to the statements of researchers who primarily place their trust in contracts: They hardly ever talk about the "commonality" of scientific work, and if they do, it tends to be in order to demarcate a common we-group, which usually refers to their institute or country of origin, from the others (this usually means "the Chinese" in general or the Chinese partners in particular).
- vi In some cases, the interviewees also based their trust in the cooperation partner on the trusting relationship that another person (close to the interviewee) had already established with him or her. The latter was the case, for example, in the cooperation between researchers Dr. Baker and Prof. Bao: Dr. Krause, who did not meet Prof. Bao himself until much later, trusted him because of the good experiences Krause's research group leader Dr. Baker had had with her Chinese colleague Bao.
- vii This does not at all mean that there were no differences or disagreements in these cooperative relationships. Several interviewees did mention differences between German and Chinese researchers, for example in terms of working methods or publications. However, it was noticeable that those interviewees who had a trusting cooperative relationship with their partner perceived such differences, but not as something separating them. Rather, the differences were accepted by the scientists involved and a joint approach or compromise was actively sought in communicative negotiation processes.
- viii This is by no means as self-evident as one might think. It becomes particularly clear in comparison with the cooperations that are primarily built on contractual trust (see next section of this article).

- ix E.g. "When we have to trust strangers in important matters, we commonly prefer to bind them through contracts under law" (Hardin 1991: 190). Fischer and Huhnholz refer to contracts as an "alternative" to trust: "Trust has options and knows alternatives. In uncertain situations, there is no need to trust; one can also take more complicated paths, for example through contracts" (Fischer/Huhnholz, 2010: 24f., own translation).
- x Although it would have been "theoretically possible" to combine the two components, Mr. Lauermann expressly states that the project was "deliberately" designed in such a way that, firstly, the German side would not be dependent on the contribution of the Chinese research group and, secondly, it was also not necessary to release a lot of own know-how due to the separate areas of responsibility - "otherwise we would not have done it".
- xi The interviewees recurrently describe their cooperation as a struggle, emphasizing above all that it is a protracted and energy-sapping process ["that is an eternal struggle," Dr. Hauser]. Characteristic is the counterplay of attack [one "tried to wrest understanding from us," Dr. Krause] and defense ["there we then counter-fired," Dr. Krause; protective rights "defended, Mr. Lauermann; "retreated," Mr. Lauermann]. Along with this, it is also noticeable that the German interlocutors increasingly present themselves in a defensive (almost victim) position, in which one has to defend oneself against an attack. Another central theme is the securing and observance of *borders*, in the sense of - existing or desired - demarcation from the partner. These demarcations refer in part to the scientific content of the cooperation (e.g., "that's how it was separated [in terms of content]," Prof. Jürgens), to the willingness or possibilities to compromise or make concessions (e.g. "sometimes you also come to the *borders*" Dr. Schönherr). At times, the interviewees even talk about *fronts*: "the fronts are hardening" [Dr. Schönherr]; "[our Chinese collaborator has] changed fronts" [Dr. Krause]. Sometimes, border metaphors are also used to express the strangeness and distance to the counterpart perceived by the interviewees (e.g. "language barrier", Dr. Schönherr).
- xii In the interviewees' accounts, metaphors from the world of sports fulfill two functions. On the one hand, they emphasize the team idea, the cohesion of the scientists among each other (e.g. "we are all pulling in the same direction", Dr. Hauser) and - with regard to a successful project completion - the 'sporting' ambition to achieve great things together ("we try to tickle the best out of the best", Dr. Hauser). Both, however, refer exclusively to their own group. Ulrich Bröckling, who studies the use of sports metaphors in business contexts, uses the term "cooperation within" (Bröckling 2014: 75). Besides this cooperation on the inside, sports metaphors, on the other hand, often convey the idea of a "regulated struggle[s] on the outside" (ibid.), which is reflected in numerous comparisons of cooperation with a race: "Of course, a lot has fallen by the wayside" [Dr. Krause]; "they are far behind", "we have a big head start" [both Mr. Lauermann]; "they have already caught up" [Mr. Lauermann]. Analogous to the war metaphors, it is also noticeable in the competition metaphors that they exclusively provide for two possible scenarios, namely victory or defeat. The metaphors in this source area clearly show that the German interviewees perceive China's development into one of the world's leading scientific nations and, along with it, the change in the previous global balance of power very strongly as a threat: One's own victory is suddenly challenged by an opponent who quickly catches up and increasingly poses a threat to the experienced runner. In this sense, conspicuous tendencies of demarcation and othering also manifest themselves in the metaphor of competition. The emphasis on the team concept (see above) and the recurring reference in the interviews to a (German) "we", accompanied by the demarcation "the Chinese", gives rise to the image of political action or scientific cooperation as a "conflict between peoples" (Di Fabio 2013: 15). Unlike the war metaphors described above, however, the linguistic images from the world of sport lack the existence-threatening component, since here the "means of confrontation [...] are strictly regulated" (Bröckling 2014: 75). So even if it is not a matter of life and death - the above examples nevertheless indicate that something is 'at stake', victory over the other(s) is sought, defeat is not an option.