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Conducting a Business Ethnography in Global Software Development Projects of Small German Enterprises

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Abstract

Context: Studying work practices in the context of Global Software Development (GSD) projects entails multiple opportunities and challenges for the researcher. Understanding and tackling these challenges requires a careful and rigor application of research methods.

Objective: We want to contribute to the understanding of the challenges of studying GSD by reflecting on several obstacles we had to deal with when conducting ethnographically-informed research into offshoring in German small to medium-sized enterprises.

Method: The material for this paper is based on reflections and field notes from two methodologically different research projects: an explorative ethnographic field study, and a *Business Ethnography*. For the analysis, we follow a Grounded Theory-oriented coding and analysis approach in order to identify issues and challenges documented in our research notes.

Results: We introduce the concept of *Business Ethnography* and discuss our experiences of adapting and using this action research concept for our study. We identify and discuss three primary issues: understanding complex global work practices from a local perspective, adapting to changing interests of the participants, and dealing with possible micro-political frictions between the cooperating sites.

Conclusions: We identify common interests between the researcher and the companies as a challenge and chance for studies on offshoring. Building on our experiences from the field, we argue for actively conceptualizing struggles and conflicts in the field as well as for extending the role of the ethnographer to that of a learning mediator.

Keywords: Global Software Engineering, Qualitative Research, Business Ethnography, Offshoring, Small to medium-sized Enterprises

1. Introduction

Globalization has led to an increasing spread of geographically distributed software development teams [1]. Cooperating over barriers of different organizations, nations, languages, time-zones and cultures is a multifaceted field of partially inter-related problems, including communication, knowledge exchange, and the coordination of international work groups [2].

Studies in the field of Global Software Development (GSD) face a variety of methodological problems, as researchers entering this complex field face challenges to a similar extent than those faced by the practitioners themselves. Understanding and tackling the challenges of researching in distributed software development work requires novel research approaches as well as a careful application of data-gathering and analysis methods. Thus, reflecting on methodological approaches and their applicability in distributed context is an important topic for the growing GSD community.

In this paper, we discuss several challenges we had to deal with while conducting research in the context of offshoring in small to medium-sized enterprises (SMEs) of the German software industry. Our work is based on the methodological experiences we gained from a research project that used two different research designs to address various problems within the context of offshored software development work in SMEs [3,4,5,6]. The first part of the project was an explorative, ethnographically-informed field study on coordination practices in offshore software development in SMEs. The second part was conceptualized as a *Business Ethnography* and aimed at supporting flexible coordination practices and organizational learning in distributed software teams. This second study is going to be the focus of our paper, while we are also providing a brief discussion of the first study in order to draw some comparisons. In doing so, we argue for extending the role of the researcher to that of a learning process mediator. This approach is reflected in the concept of *Business Ethnography*[1] [7], which will be introduced and discussed from the angle of its applicability in GSD projects in this paper.

The paper is organized as follows: Section 2 gives an overview over related work with respect to literature on research methodology and introduces the conception of *Business Ethnography*. Section 3 describes the aims of our study and the methods we applied in relation to our research agenda. Section 4 describes how we conducted our *Business Ethnography* in practice, while section 5 identifies challenges that we encountered during our research, which are then analyzed with regard to the related literature in section 6. Section 7 concludes the paper.

2. Related Work

2.1 Qualitative Research in Software Engineering

Over the last decades, qualitative methods focusing on understanding work practices have received much attention in Software Engineering. Practices in relation to the use of software applications are still a major research area, as are the development of software and the deployment of related methods by development teams. Research focusing on software development teams has revealed that quantitative methods have their own limitations as the development work is mostly framed by specific situational and organizational contingencies [8].

[1] See http://www.business-ethnography.org

In this regard, Software Engineers expect qualitative methods to offer important and highly detailed insights into the contexts in which software development work takes place, which would not be accessible, for example, by applying quantitative data mining approaches [9].

The adoption of qualitative methods in Software Engineering has been largely influenced by neighbor disciplines such as Human Computer Interaction (HCI), Computer Supported Cooperative Work (CSCW), and Participatory Design (PD). Using qualitative methods is often equated with following an ethnographic research methodology, implying the use of (participant) observations and ethnographic interviews with the aim to understanding what activities mean to the people who do them [10]. In this regard, there has been a focus on ethnomethodological approaches, as well as of sociological accounts of ethnography aiming at understanding social structures in the workplace [11].

Software Engineering research based on (or informed by) ethnography and ethnomethodology has the potential to understand software development practices "from within". Such research is interested in how project team members order their work using their own methods, "that is, their mundane processes of interaction and action" [12]. However, understanding development practices is only one of the aims of Software Engineering research. It is usually also interested in actually improving poor or ineffective practices, for example by designing and introducing new information technology systems into an organization [13]. Qualitative research can be used in this respect for informing the design with regard to the organizational context as well as gaining knowledge about the users' work practices that are to be supported by the system [14]. However, the aim to support organizations (instead of "just" researching them) has many implications for the choice of the research approach, as well as the application of research methods [15]. As traditional ethnographic research is usually trying to avoid any influence of the researcher on the practices to be investigated, technology development projects are often deploying action research approaches which explicitly aim at the construction of a cooperative workspace encompassing the researchers and the development team. The underlying rationale is that one can understand social processes best by introducing changes to them and observing the effects of these changes [16]. While the descriptive nature of ethnography has been criticized to stress the status-quo instead of leading to new ideas in this regard, researches from the PD community have argued that the deep understanding that comes from ethnographically informed action research can also help to find and develop innovative tools [10].

Using ethnographic methods in organizational contexts entails many known challenges like getting access and obtaining immersion to the field under study, which are inherently linked to the relationship between the researcher(s) and the development and management teams [8]. When conducting ethnographic research in the context of Global Software Engineering, additional research challenges exist, which are related to the temporal, spatial, cultural and organizational barriers between the cooperating sites [17]. Dealing with such barriers while conducting research is everything but trivial, as the researcher can be subjected to similar challenges as the practitioners themselves. Known problems of conducting research into GSD teams include getting access to the research field in the first place [18] as well as limiting constraints such as organizational hierarchies and conflicting interests which may hinder a deeper immersion of the researcher in the environment [19]. With regard to action research approaches into GSD, further considerations have to be taken onto account, such as how to institutionalize results across organizational borders (i.e. in both of the cooperating companies), or even in the same firm across different projects [12]. This problem can be further aggravated as

the success or failure of newly developed methods does not only rely on the validity of the results, but also on the framing socio-political factors at work in the respective organizations [20]—which can be quite problematic in globalized software development teams [5].

As the implications and challenges of researching into GSD projects have hardly been discussed in Software Engineering so far [12], we want to present our experiences with conducting research in this field in our paper. In doing so, we will focus on our experiences with conducting ethnographically-informed action research in form of a *Business Ethnography*, which will be introduced in the next subsection.

2.2 The Concept of Business Ethnography

Business Ethnography is an action research approach that tries to overcome common problems in technology development projects. It is a further development of the Intergrated Organization and Technology Development (OTD) approach that was introduced by Wulf and Rohde in the 1990ies [21]. *Business Ethnograpy* is based on conceptions of *American Pragmatism,* especially the work of the logician Peirce [22]. Peirce argued that definitions (like software requirements) need to be related to both a theoretical frame and a practice field in order to be successfully applied. However, as people tend to understand definitions mainly as relations between symbols and theoretical meanings (and not necessarily with regard to practice fields), the need for practice-relation may be subject to failures. Even if developers succeed in consistently defining all elements of a planned technical system, practices of users are not per se subject-able to such arbitrary definitions, as practices are contingent forms of lifeworlds (*Lebenswelten)* [23]. This implies that what appears to be fully consistent from one perspective can look very different from another. Hence, definitions may always be differently connoted in different practice fields, and this can be a source of misunderstandings. For instance, the way a developer understands a requirement must not necessarily be identical with how a user or stakeholder understands it [24].

In order to avoid such problems, one could try to avoid any reference to specific lifeworlds in order to define the design of a technical system in an unambiguous manner; this would ideally help avoiding misunderstandings among those who adopt the defined vocabulary—but would exclude all others from communication. At the same time, such an avoidance of using references makes hardly any sense in times when users understand, tailor and appropriate IT systems to a large extent solely during their practical application. The tendency of many technology developers to deal with *use* only by attempting to define it is related to hesitations to leave "well-defined" ground: A developer can measure output effects of a technical system, but understanding the intentional side of activities such as use practices is a different matter, requiring different methods. The intentional side of use is the reference point for joy of use, satisfaction, frustration and failure. Simply ignoring the central, intentional dimension of use will make technology development projects problematic. Simply assuming use intentions and accordingly defining them arbitrarily is only a very tentative way of dealing with such problems.

Business Ethnography (BE) tries to overcome such problems by supporting reflexivity in making decisions in technology projects. It uses Peirce's pragmatic conception according to which experience is always situated, that is: embedded in lifeworlds in which the characteristics of the situation are related to subjective (intentional) and objective (extensional) elements [25]. As anticipations in technology projects are often based on (seemingly) general definitions, the deconstruction of the "natural attitude" against product anticipations within technology projects

aims to provide material for a re-construction of such product anticipations, this is: for more reflexive anticipations.

To do so, *Business Ethnography* uses ethnographic methods to analyze the connotations of the project participants about the anticipated product. Instead of attempting to derive such connotations from studies of the lifeworlds of the project participants, *Business Ethnography* applies a focused form of ethnography [26] by concentrating on the sense making within the technology project. It has to be stressed, that while *Business Ethnography* deploys ethnographic methods as a means to understand the different perspectives, anticipations and intentions of the project participants, it is not an ethnographic approach in the narrow sense. Instead, sense making processes are to be artificially deconstructed into the multiple individual contributions, which are collected by means of interviews. *Business Ethnography* then allows the researchers to elaborate a picture of the multi-perspective frame of the common anticipations and decisions, and confronts project participants with this picture of their intention, their factual "business" (this is the reason for the name, which could also be: reflectivity-oriented project ethnography.) Thus, project actors are enabled to reflect upon their own decisions from a wider perspective [7].

Business Ethnography has been developed to support technology projects which often involve several organizations. As such, *Business Ethnography* is not a GSE-specific method. Formally, *Business Ethnography* requires a shared project with project partners and a project anticipation. This requires a kind of work alliance between practitioners and researchers. For example, a shared project could be a technology development activity of a software company, whereas the project anticipation would be the software that is to be developed. In such an example, the working alliance would involve the members of the company, the researcher as well as related customers and users (as far as possible, depending on the nature of the project).

In practice, *Business Ethnography* follows a typical Action Research cycle, consisting of the following stages: research, analysis, and feedback workshops (see figure 1, section 4). The field to be studied, in this context, is the very project. During the research phase, the researchers use ethnographic methods to identify the different perspectives of actors in it. By conducting interviews with all the participants, the researcher attempts to capture and illustrate practical implications (i.e. expectations, fears, etc.) of the commonly shared intentional framing, which may impact on the anticipation of the product or its implementation. In order to get a complete picture, *Business Ethnography* relies on intensive, individual interviews with all related participants of the project. Other ethnographic methods like on-site observation can be used to complement the interviews. This allows for more context-aware interviews, which form the primary source of data, as they are useful for fostering participation and illustrating an established and transparent ethnographic process, at the same time. It has to be stressed that ethnographic methods should not be picked and combined arbitrarily, as it is important that the choice of methods allows the researcher to get a broad picture of the different perspectives, intentions and expectations of *all* relevant actors in the joint project.

In the analysis phase of *Business Ethnography*, the researcher actively looks for a plurality of views and analyzes their meanings and implications for the common project. The desired result of the analysis phase is a refined, multi-faceted description of the field, including the different perspectives (including hopes, concerns etc.) of the participants. Since intentions normally need to be respected as expressions of self-determination, *Business Ethnography* is not trying to evaluate intentions of others from some absolute perspective; instead, it studies the complex inter-relation between the intentions and expectations of the project participants in order to allow

for better informed decision making. In this regard, the Business Ethnographer also has to take into account his own role in the project, which needs to be constantly reflected during the research.

In the feedback phase, the results of the analysis are presented in a common workshop, confronting practitioners with "their" own perceptions (as well as related synergies and conflicts) from a distanced, *verfremdet* point of view [27]. Taking this exposure as basis for joint decision-making, the partners may re-appropriate their project as a more concrete and situated relation between intentions and extensions. This re-appropriation of project rationale and anticipations helps the participants to reflect on their own project by unveiling implicit contradictions and differing perspectives on the project procedures, as well as the interpretations and expectations of the participants.

By this, *Business Ethnography*, as an action research process [28], supports the ability for self-organization and enriches the expertise of the project participants. The results of the workshops, as well as the agreed actions can become the subject of another *Business Ethnography* cycle, in order to validate and to further improve the practical findings. However, *Business Ethnography* does not only support the development of a situated useful practice: it also has to analyze the findings in a more general manner.

Hence, the results of a *Business Ethnography* are two-fold: for the project members (project partners and the business ethnographer), the outcome is a practical solution; for the scientific community, a traceable solution of the situation in the field at stake has to be provided. This is to say that *Business Ethnography* involves two different activities. As a project member, the business ethnographer tries to operate like a local expert, that is: he ensures the operation of the joint project. As a scientist, on the other side, he is trying to understand the opportunities and problems of generalizing the situated findings, of discussing operational practice in projects with regard to their theoretical implications, in connection with prior theories and assumptions in the field. In this regard, the envisaged scientific contribution of *Business Ethnography* encompasses both practical success in one project and the elaboration and analysis of the general implications and multiple perspectives involved in the individual case.

3. Our Research Project: Articulation Work in Offshoring of small to medium-sized Software Companies

This section provides an overview of the different research design approaches used in the two studies we conducted for this research project. It also describes our methodology for comparing the two research approaches with each other (section 3.2), as well as the organization we focused on in our research project: company Alpha (section 3.3). A detailed discussion of how we conducted the *Business Ethnography* in practice will be presented in section 4.

3.1 Aims and Research Design

Our research project consisted of two studies following different research designs on different problems within the context of software offshoring in German SMEs. The first one was an exploratory ethnographically informed field-study in several German SMEs. The second study aimed at studying and supporting articulation work and organizational learning in distributed software development teams, and was conducted in the form of a *Business Ethnography* in the German software SME "Alpha" (see Table 1 for a brief overview). The focus of this paper will

be on the second study. However, we will briefly discuss the first study, which formed the basis of our *Business Ethnography*, in order to draw comparisons between our experiences with the two approaches.

In both studies, the first author of this paper, who has a background in Cultural Anthropology, did the field research (observations, interviews). All authors as well as the head of our department were involved in the analysis as well in the preparation and execution of the workshop. Furthermore, several students volunteered in all parts of the two projects.

	First Study	Second Study
Aims	Understanding coordination practices in the context of offshore software development in SME	Supporting coordination and organizational learning in distributed teams
Research design	Ethnographically-informed field studies	*Business Ethnography*
Methodology	- 15 semi-structured interviews in ten German SMEs - 5 weeks of on-site observations in 2 German SMEs, as well as one Russian partner company in Tomsk, Siberia. - Grounded Theory analysis	- 11 open interviews with almost all employees of company Alpha. - 2 weeks of on-site observations at the company - Grounded Theory-oriented analysis - 1-day workshop at the company

Table 1: Details on the two studies in our research project.

The initial aim of our research project was to understand coordination practices in SMEs belonging to the German software sector, in the context of offshore software development. As we wanted to learn how SMEs try to secure their agility in global software development, we decided to conduct an exploratory ethnographically-informed field study.

First, we conducted semi-structured interviews with fifteen managers and developers of ten different German SMEs. From the sample, two companies were chosen as sites for a deeper analysis of the work practices; in these, we conducted on-site observation. We spent two weeks in each of the two German SMEs. A third on-site observation period was conducted over one week at the Russian partner company of company Alpha in Tomsk, Siberia.

Our analysis showed that the SMEs of our sample used a broad variety of different coordination tools and artifacts in order to coordinate their distributed work. While formal tools (like bug-tracking applications and project plans) played an important role for the development work, it became clear that their use happened in the context of complex articulation work practices [29], which required time-consuming chat sessions and expensive personal visits. The related limitations (in combination with social and cultural issues) led to frequent misunderstandings and limited the ability of the companies to adjust their working arrangements in case of emerging problems [4].

Our first study was conducted in the context of a bigger research project funded by the Federal Ministry of Education and Research (BMBF), the VSEK project [30]. When VSEK reached its

conclusion in 2007, study 1 was still in an early stage. At that point, we had already gained some interesting insights into the practices and challenges of distributed development work in German SMEs. However, as a design oriented group we were interested in actually deriving practical recommendations and tangible ideas for support tools from our exploratory material. Hence, we needed to collect more fine-grained data in order to identify solutions grounded in practice, and thus we reconsidered our possibilities for further research. Being in contact with two SMEs which practiced offshoring was a natural point to start, especially since both companies had already granted us access before. However, as we contacted them again it became quickly clear that the gatekeepers, i.e. the managers of the companies, both regarded their role in the project as fulfilled. Even though they both agreed to grant us a couple more days of participant observations and interviews in their companies (an offer we gladly accepted), they made clear that their willingness to grant further access was limited. As we wanted to dig much deeper into their work practices, this hesitance to give us further access was problematic for us.

As we were without external funding, we began writing new project proposals which also included funding for the two companies as project partners. It became clear in this phase, that the manager of one of the companies ("Alpha") was especially interested in getting in contact with academic research projects. At the same time, the offshoring project of the other company was terminated, thus making further research on this topic impossible (although we managed to conduct interviews with several participants on the reasons and outcomes of this decision).

In 2008, we successfully acquired funding for our project ARTOS[2] by the German Research Foundation (DFG). Framed as an explorative study into the practices of coordinating distributed software development work in SMEs, ARTOS was also interested in supporting practitioners by identifying useful practices as well as means for tool support. Methodologically, we had decided to use a particular action research design that had already proven to work quite well in several of our research projects: *Business Ethnography* [31]. Following the *Business Ethnography* concept, we needed to establish a joint project together with a company practicing offshoring as a basis for our research activities, then analyze the multi-perspectivity of the field by means of ethnographic methods and mirror the related findings back to the participants.

As our DFG project did not include funding for enterprises, we had to convince possible project partners with other arguments. As we knew that the manager of Alpha was still interested in further cooperation with us, we contacted him again and told him about our new research project, asking if he was willing to participate again. In this discussion, we proposed the intention to support the company in organizing their inter-team cooperation and learning. This proposition was based on our experiences from study 1, which had revealed that the theme "learning in distributed organizations" was an important issue for the company (see above). For example, in study 1 some developers of company Alpha had reported to be not happy with parts of the company's working arrangements, finding it difficult to maintain an overview of what was going on in the company. At the same time, it was difficult for them to improve the situation, as the company lacked resources and procedures for systematically discussing and implementing changes [6]. Hence, we offered to support Alpha's capabilities of self-organization by giving them the opportunity to conjointly address specific practical problems of inter-team coordination and knowledge exchange in case they participated in our study. Deploying a *Business Ethnography* approach, we explained that what we were offering was not consultancy, but rather an attempt to initiate mutual learning processes between the company and us as researchers by

[2] See http://www.artos.uni-siegen.de

stipulating a tentative and exemplary implementation of organizational learning procedures. Gladly, the manager of Alpha agreed to our idea, although his interests in our study turned out to be a little bit different from ours in the course of the project (this will be discussed later).

Details on how we conducted our *Business Ethnography* will be presented in section 4.

3.2 Analysis of our Research Methodology

The material for this paper is based on our methodological reflections and notes from the field that we had accumulated. For the analysis, we followed a similar approach as outlined in section 4, using a Grounded Theory-oriented coding and analysis approach in order to identify issues and challenges documented in our research notes.

As we had constantly deliberated on our choice of methods, as well as on the appropriateness of their application, we had a rich basis for a systematic reflection on the two different phases of our study. While the notes concerning our research reflected the research rationale of our project, we complemented the analysis with a systematic reflection on our own role in the field (as required by *Business Ethnography*). For doing so, we scrutinized our documentation (field notes and interview transcripts) concentrating on how our application of methods and our research focus affected our perspective on the practices, as well as the conclusions we were able to draw. We also cross-searched the interview transcripts and field notes for related evidence.

3.3 Case Study: Company Alpha

Alphan, the company at the center of our *Business Ethnography*, provides data processing software and services for statistics and documentation. Most of the approximately 20 employees of the company are software developers who work in several teams on different projects (see table 2 for details). The products include databases, documentation and presentation systems used by cultural institutions, like archives or museums. The services that are offered are concerned with the use and adaptation of these products. Since the mid-1990s, the company has employed a project manager as well as three to seven software developers in Tomsk, Siberia. At the origin of this decision was an internship spent by a Russian developer at the German company. Due to the positive experiences they had working with him, the German manager decided to expand the cooperation.

The first offshoring project aimed at re-engineering an existing software product and was led independently by an offshore project leader, who directly reported to the German manager. The offshore project leader was also responsible for the communication with the German customers, providing support and investigating bug reports. Despite unexpected delays in the development of that first project, offshoring was expanded to several other projects, which involved a closer cooperation between German project leaders and offshore developers.

German Site: Bonn	Offshore Site: Tomsk (Siberia)
- 1 CEO - 3-4 project managers - ~8 developers	- 1 project manager - 3-7 developers

Table 2: Details of company Alpha (as our research spanned several years, the numbers of developers employed varied).

4. Conducting a Business Ethnography in our Project

After our idea of conducting a *Business Ethnography* in company Alpha had been approved by the German manager, our research started with a one-hour kick-off workshop at the German company where we presented our ideas and our approach to the employees in order to facilitate the emergence of a common project anticipation. After the manager of Alpha had introduced us to his employees (most of which already knew us from study 1) and had stated his support of our project, we held a talk in which we explained the research topic and our expectations as well as the possible benefits for the company. In doing so, we briefly presented some findings regarding possible problems and challenges from study 1, and explained how we hoped the company could benefit from participating in our study. We also offered that everything would be organized from the researchers, and that the employees of the company would only be expected to grant us some time for conducting interviews as well as allow us to engage in participant observations. The main aim of the shared endeavor was described as the initiation of an organizational development process during which the company would have the opportunity to address problems and improve their organizational practices if they decided our findings would be valuable for them. In order to inspire confidence, we were very open about the limitations of our study, and stressed that we were not doing an evaluation of individual work and that all results of our research would be made anonymous and kept in strict confidence, even from the manager of the company. The Russian team was also informed of our endeavor through the Russian team manager. We sent him a set of slides translated into English and we had a phone conversation with him to explain our intentions for the study.

In order to understand the perspectives of all involved actors, we conducted semi-structured interviews with the majority of employees (developers, testers, secretaries, project leaders) of both the German and the Russian team. Each interview lasted between 45 and 120 minutes, depending on the role and involvement of the interviewee in the cooperation between Bonn and Tomsk. During the interviews, we focused on discussing issues we had unveiled during our previous study with the company, and on aspects that were related to our research question: how to support the inter-team coordination and knowledge exchange practices. During a second round, we conducted telephone interviews with the Russian team manager as well as with his developers in Tomsk.

In addition to the interviews, we conducted additional on-site observation at the German company. Over a period of three months, we visited the company on a regular basis (1-2 days / week). We did not actively take part in the work, but we were allowed to accompany the developers during their working days. In this phase, we also got access to some internal documents which were relevant at that point of time, for example to project plans, agreements with the customer, and requirements documents, as well as to chat-logs as far as they were relevant for our research topic. Thus, we had many opportunities to observe local and distributed articulation work practices in the context of meetings, individual work situations and cooperative tasks. Again, our fieldwork was documented by taking field notes and pictures, as well as by collecting artifacts.

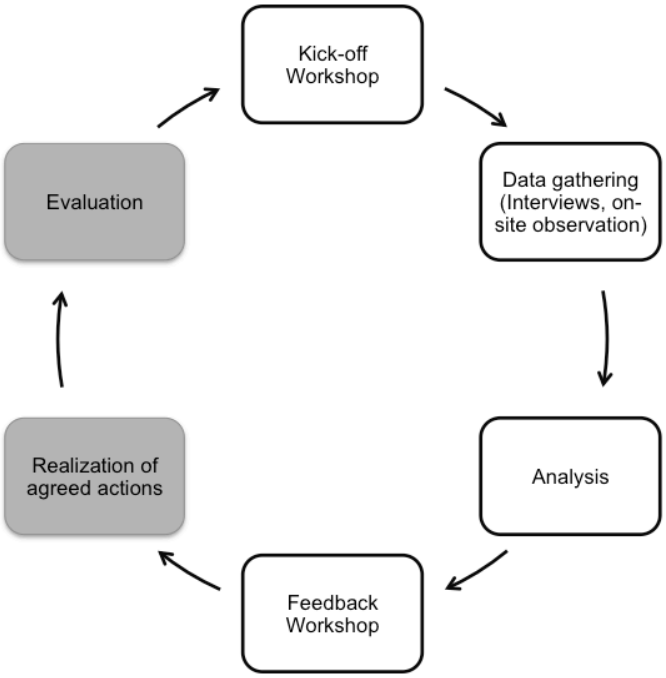

Figure 1: *Business Ethnography* circle (future steps are grey)

For the analysis part, we chose a Grounded Theory-oriented approach for investigating the different perspectives, perceptions, and views of the participants on the cooperation with the other team [32]. After each research step (e.g. after each interview or period of on-site observation), the transcripts of the material (field notes, chat-logs, specification documents or interview data) were coded in an open process using the Qualitative Data Analysis (QDA) software Atlas.ti. In doing so, we analyzed the coordination and knowledge exchange practices we had documented with regard to the problems (and ideas for improvements) that the interviewees reported during the interviews. Three main categories emerged which were focused during the subsequent analysis: social, organizational, and technical aspects of the onshore-offshore cooperation. On this basis, we prepared a workshop for company Alpha, in which we presented the results of our research to the participants in Bonn for discussion. The aim was to develop a set of specific measures, in order to improve inter-team coordination and knowledge exchange within the company. The workshop was organized as a half-day event and consisted of two parts.

The first part began with a presentation of our findings. It ended with some explicit suggestions for improvement, divided into three main areas that were meant to be improved: technology, organization, and social aspects. While we drew on scientific concepts like

articulation work [29] to explain our findings on a theoretical level, we attempted to be as specific and comprehensible as possible in describing the practices in the context of different perceptions, needs and concerns of the participants. In doing so, we took care to anonymize the presentation as much as possible. Subsequent to the presentation, we discussed our findings with the practitioners, asking for feedback and clarifications. Our aim was to come to an agreement with regard to possible improvements of the cooperation. During this part, the German manager volunteered to leave the room at some point, giving us some time to get feedback from the employees only. This unplanned opportunity led to a critical and interesting discussion, which continued even after the manager had returned to the room after about 20 minutes.

The second part of the workshop aimed at a specific topic the company had a particular interest in: possibilities for expanding on the Russian market. As this issue had not been targeted by our research, the German manager moderated this part, explaining his interest and aims as well as comparing and assessing possible strategies and dangers. The practitioners and researchers in the room then discussed this topic. The workshop ended with a final round of feedback, where every participant was asked to summarize the key points from his perspective.

The researchers summarized the results of the workshop in minutes including action items, which were sent to all the participants. For example, at the organizational level, the results were centered on changing the form of the weekly meetings the company held in order to support better the knowledge exchange between employees. During the interviews, these meetings had been described as often being too time consuming and unfocused. At the same time, many developers found the occasion useful to get hooks for later discussions, for example in the kitchen during coffee breaks. After discussing these aspects at the workshop, the participants agreed to limit the time allocated to each speaker and shift the focus towards brief overviews about current projects and problems, while deferring the details for later project team discussions. On the technical level, one of the action items stipulated the use of instant messaging (which was not used by all members of the German team despite the many benefits its users reported), and another was the installation of a digital blackboard to serve as an extension for the minutes of the weekly meetings. Last, but not least, the social level action items were centered on the role of „bridges", i.e. the capacity of human mediators to support mutual understanding and communication between the teams, to be realized by exchanging knowledgeable team members over longer periods of time.

5. Challenges of GSD Research

This section describes several challenges we had to deal with as we conducted our research project. While we focus on both our experiences with the second study and the adopted *Business Ethnography* approach, we also look at general issues we have found while conducting our first study.

5.1 Studying Global Work Practices through a Local Lens

A general challenge we had to deal with during both studies was that our observation of inter-organizational work practices was only possible through a local lens. Since it was not possible in our project to deploy several researchers to observe the work practices synchronously at the two different sites, cooperation processes could only be observed from the perspective of one team at a time. This sometimes resulted in lacking awareness of what was going on at the remote site,

which was hard to maintain during our on-site observations in Bonn. Since we were dependent on the same media and tools for communication as the software developers and the managers in Bonn were, our research was subject to the same difficulties the software developers located in Bonn had to face for conducting distributed development work. The limitations of the communication technology also made it hard for us to conduct interviews with the remote team members, as the VoIP connection to Russia was slow and not always stable. The following excerpt from our field notes gives an idea about how this could lead to problems:

> *„[During the interview] there was some sort of misunderstanding, as suddenly [the interview partner] went offline and did not sign in again over the rest of the day. I wrote several emails to him and hoped that he would soon return. [...]*
>
> *[After the weekend] it turned out that [the interview partner] had left the office at 4 pm to pick up his kids from the kindergarden [...]. Apparently, he had told me so but I did not understand it due to the bad connection.“*

Despite such technical problems (which also made the transcription of the recorded interviews more cumbersome in some cases), it was also very difficult to even get an idea of the physical layout, not to mention the local unwritten rules, local practices and cultural differences of the remote site (Tomsk) we were interested in. Even though it helped that we were able to refer to our experiences from the first study, during which we had visited the remote site, it was hard to obtain clear information concerning some hard facts such as the actual size of the remote team during the interviews. Since no one from the local team had regular contact with every team member abroad and since the size and structure of the offshore team had changed several times during the year prior to the study, the local perception of the remote team differed. As one of the German developers explained:

> *“Well, I am not quite sure about the exact number of colleagues (in Tomsk). That’s a clear sign that I probably don’t know everyone yet. And, yes, so far I know the three who have been here in Germany (…). But the others, I don’t know them.”*

Also, there was no clear evidence available of the exact reasons and dates of changes in the cooperation. Even here, the explanations of team members differed considerably. For example, our inquiry ignited a dispute at the company between a senior developer and the manager on the question of when the whole cooperation had started.

Another challenge was related to the high complexity of the articulation work practices in the GSD projects. This involved the simultaneous use of several interrelated synchronous and asynchronous media (Skype, email, ICQ, etc.), tools (bug-tracking-systems, etc.), and artifacts (specification-documents). This turned out to be a problem for the developers, too: *“(...) one notices again and again that information is there, but is distributed in a way that makes collating it cumbersome…“*. As it was hardly possible to understand the complex interrelationships by referring solely to interviews, our research required monitoring a broad set of media and artifacts, as well as their complex interrelations. This turned out to be quite difficult, as the time frames for observing the inter-site cooperation were limited. Even when trans-local work had to be done, the actors often omitted to involve us when they contacted the remote team, as they did not always plan for such incidents, and as these occasions were usually related to emerging problems that required their attention more than paying attention to the interests of the researcher. As a result, we were sometimes involved too late or not at all, so that we had to

conduct interviews in order to reconstruct the missing events. In addition, documenting the context of the collected data and linking different kinds of information (artifacts, field notes, pictures etc.) with each other required great efforts from us, especially since we were usually not granted full access to log-files and databases.

In particular, documenting complex work practices was challenging, requiring extensive and accurate field notes on the role of several interrelated media and artifacts. As the observed work trajectories were complex and hard to predict, it turned out to be difficult to relate the various sources of data to each other during the analysis. Basically, the problems were related to the high granularity of data that was needed to reconstruct the complex interactions of the developers and teams, and our limited resources in terms of research time and the limited access to data posed complex obstacles that we had to deal with.

5.2 Adapting to Changing Interests of the Company

Despite the initial presentation of our research interests at the beginning of our study, the aims and even the schedule of the shared project we agreed with the company on turned out to be not considered important by several of the participants. For example, developers who were not involved in the management of software projects were willing to give interviews, but during the negotiation of possible dates for interviews they often said they would not redeem themselves as being important and stated they did not or only hardly remember the aims of the research project. For example, during the interviews we often got answers like *"I will be happy to help you with this"*, indicating that they ignored the intention of the joint *Business Ethnography project*. An excerpt from our field notes, taken after an interview with a Russian developer in Germany, further illustrates this issue:

> *„Again I had the impression that the Business Ethnography aspect of my research was not really appreciated by the company. [The Russian developer] told me much about his attempts to improve the cooperation between Tomsk and Germany, without referring to the planned workshop. He didn't seem to regard the interview as an opportunity for him to impact the cooperation."*

This became even more apparent when the interview phase finished, since it was hard for us to remain in constant contact with the field site during the analysis phase.

As the company struggled to deal with the consequences of the financial crisis during this period, and as our own scientific work life imposed other engagements to be prioritized (like writing papers or attending conferences), the shared commitment deteriorated more or less and we had to make additional efforts to get back in touch with everyone again, and even to negotiate the aims and scope of the shared workshop again. It took us two months to transcribe all the interviews and to analyze the transcripts with regard to the focus of our research project. Then, finding a possible date for the workshop turned out to be difficult due to conflicting commitments, for instance the company had to finish a product and the researchers were writing papers. As a result, we had to postpone the workshop for another month.

During this three-month period, we visited the company on a regular basis in order to keep in touch. However, our involvement in the company declined during this phase, fact that became apparent when we finally came to plan and prepare the workshop. As we approached the German manager in order to set the date, he suggested to change the topic of the workshop into "Expansion to the Russian market", which had not been at the focus of our work. In order to

satisfy his interests, we decided to divide the workshop into two parts, as described in section 3.1.2. However, we found it quite hard to deal with this question not having much interview material on this aspect, as we had focused on a totally different topic.

But even with regard to our core topic, improving the cooperation between the sites, the workshop revealed that the company had already begun to change several aspects of the cooperation. The following excerpt of our field notes from the workshop illustrates this issue:

> *„Interestingly, [Alpha] has already begun to implement some of the changes we have suggested during the workshop [...]. Hence, there are change and learning processes in place which might have been triggered by the interviews. On the one hand, this is an encouraging result, but it implies that we might have been too slow with our analysis or that we did not succeed to communicate our own role in the learning processes well enough (or both).“*

As described above, the weekly meetings of the company had often been described as being not very useful, as many employees considered them too long and too formal. When we suggested changing the organization of the meetings to a more focused and efficient modus operandi, it turned out that the company had already decided to abolish the unpopular meetings. Even if our suggestions suggested a discussion about reintroducing the meetings in a different form, we had not been aware of these changes (which also affected other aspects of the cooperation we wanted to discuss).

5.3 Dealing with Micro-Political Conflicts between the Sites

Another important challenge we had to deal with while conducting our *Business Ethnography* was getting access to the field. As we were already in contact with company Alpha, due to our first study, this turned out to be less difficult for the German site. However, it turned out to be very challenging for us to get involved in the Russian team. As it turned out, the relationship between the sites was constrained by ongoing conflicts regarding duties and responsibilities, as well as by social aspects of the cooperation. Russian and German developers reported different estimations concerning reasons for the failure of a shared project. As teams blamed each other it was very interesting to analyze the different views that revealed different perceptions of what constitutes “good software development”, influencing the cooperation practices.

However, the different perspectives also led to problems. In this regard, a Russian developer who lived in Germany at the time of our research and who was acting as some kind of a bridge between the teams told us that most of the communication of his German colleagues with the Russian team would consist of criticism, and positive developments were not acknowledged properly. As the Russians usually were in a sort of inferior position when it came to conflicts, they were sometimes very sensitive to criticism. He pointed this out with an example:

> *“I think it was the day before yesterday, when we (...) requested to our Tomsk colleagues to temporarily take down the Tomsk website. We explained that the website content should be more strictly controlled (...). Our colleagues in Tomsk interpreted it as an authoritarian command, and found it very rude. They asked us in a quite emotional way: why you are starting war on this?”*

Due to the asymmetric power relationship, developers from both sides took care to avoid discussing problems too directly. As a German employee explained: *“When dealing with Tomsk,*

you have to take care to find the right words (...)". This also had consequences for our research, as the Russians were rather reluctant to talk openly about the problems with the homepage in their interviews. Asked about general problems of the cooperation, they avoided talking about problems and stated that everything was running quite well (in contrast to the German developers who openly reported problems between the teams [3]), for example: *"So for me, everything is ok."* When explicitly asking the Russians about some of the problems with the homepage, the answers were usually elusive, like "*there had been a set of bad steps"* that had led to some *„minor problems and misunderstandings"*. The following statement describes an experience we described in our field notes:

> *„[When interviewing Russian team members,] one has to act very carefully. It happens that the interviewee seems to feel cornered if one interprets vague suggestions about changes as an indication for lower-level problems."*

It was challenging for us to convince the Russians that like in our first study we still had a more or less neutral role, and that they could use the intended workshop to influence the offshore-onshore cooperation arrangement and to address problems that were relevant for them (and not necessarily for the German team). This problem was probably aggravated by the geographical distribution between the researchers and the offshore site, as well as by cultural and language related issues. For example, some of the new developers from Russia had problems to answer our questions in English during the interview, which prevented us having an open discussion on change opportunities.

Visiting the remote team before the workshop might have helped in this regard, but organizational issues and funding limitations prevented us from organizing more than one visit to Tomsk. Similarly, these issues prevented the Russians from participating in the workshop, somewhat limiting its scope to the perspective of the German team.

6. Discussion

The presentation of the challenges illustrates the complexity of doing research on work practices in the context of GSD projects. The following discussion aims at analyzing our experiences in order to develop a strategy for dealing with these challenges. As pointed out in section 5, we encountered several challenges while conducting our *Business Ethnography*. These were related to the local view on global work practices (5.1), the changing interests of the participants (5.2) as well as possible frictions in the field (5.3).

Dealing with challenges, such as observing the global through a local lens or tackling the high complexity of practices involving the simultaneous use of several media are a very basic and should be inherent for most studies looking at Global Software Development practices. Methodologically, these challenges hold a clear danger to acquire a biased view on the cooperative work arrangement. The many obstacles in such fields makes it desirable to spend as much time as necessary at the field site in order to observe the given situation long enough to understand it (even though such observations are necessarily biased towards the local perspective). In order to deal with the complexity of distributed development work, we expected that referring to a single source of information (like observations or interviews only) would not be sufficient [9]. Hence, apart of conducting interviews and observations, we also wanted to access artifacts and media, including server and communication log-files, email repositories and bug-databases (just to name a few). In practice, observations and interviews turned out to be our

main source of information in practice, while artifacts and media played a subordinate role and were only accessed when the actors themselves reported their importance. This might be related to the background of our first author in cultural anthropology, whose account of ethnography is usually centered in understanding the perspectives and interpretations of the practitioners (and not so much focuses on revealing the underlying social patterns or ethno-methods as a means and end of ethnography) [33]. However, this ethnographic view provided a valuable basis for the analysis of the multi-perspectivity of the field, which nonetheless required the interpretation of field material with a great deal of sensitivity to the context in which it was created. This was especially related to the intricate interrelations of practices before the backgrounds of a dynamic development approach as well as cultural and language-related barriers in international teams. This is especially the case for dealing with the virtuality of the inter-team cooperation, where the displacement between researcher and the field may result in a lack of common and mutual perception, as voice connections can be bad and communication is subjected to language problems and a general lack of common ground. Sometimes, researchers even have to fall back to text-based communication, which has implications for the perceived authenticity as well as for the underlying textuality, narrowing down the form of interaction to words and a couple of emoticons [34].

In practice, the degree of access is very much dependent on the good-will and cooperation of the participating companies, which often limits the possibilities for research to be undertaken in terms of research time and levels of access. This became apparent in our first study at the two German SMEs. Because our partners saw no benefit from participating in our study, they limited our access to artifacts, which they considered as confidential, even when the artifacts were relevant for our research. Furthermore, after allowing us to interview their employees and granting us access for a number of days of on-site observation, companies usually signaled that they regarded their role as having come to an end. In this regard, following an action research approach helped us to (re-)negotiate access, as it allowed us to offer something to the companies. Since the related research questions were recognized by the participants as being important and relevant for themselves, we were able to raise awareness about the scope of our study at the company by offering some feedback with regard to possible improvements and joint learning processes (even though the motivation of Alpha's manager to participate in our study might also been affected by his abovementioned interest in cooperating with academic research projects). At the same time, the workshop turned out to be an interesting instrument for us in order to discuss the validity of our findings with the participants in the study. As Dittrich [8] pointed out, simply spending time on-site is often not sufficient for understanding the implicit aspects of the daily communication and cooperation of software development teams. In distributed settings, this seems to be even more the case due to the particular conditions of globalized software projects [12]. In this regard, it turned out to be very valuable for us that we had already spent time at the company during study 1, and also visited the remote team in Tomsk. Being able to refer to these experiences during our *Business Ethnography* was very valuable for us in conducting the interviews, especially since we already knew many of the employees and also had some insights into the situation at the cooperating site in Tomsk right from the beginning of our second study.

Compared to our first study, becoming immersed deeper into the field by contributing to a shared intention as business ethnographers certainly helped us to get a more profound understanding of what was going on in the second study. However, adjusting to the second issue, the shifting interests of the participants, turned out to be still very difficult. From our perspective,

the problem we had managing our role in the joint project was related to the conditions of our research. As it had been us who suggested a shared project with the company in order to improve our collaboration, it was our duty to keep the participants from company Alpha motivated and interested in our project ancitipation. Even though the practitioners were aware of the existing general problems in their cooperation arrangement, solving them was not a priority because of the daily problems they had to deal with in their development work. As we participated in the project as business ethnographers, and not as software developers, it turned out that the rationale of our research focus collided with the company's rationale for software development. As a result, we had to adapt to this shift in interest when the German manager suggested a new topic for the joint workshop. In this regard, it would probably have been beneficial to at least follow a much more iterative research approach, in order to allow us adapting more quickly to this change of focus.

The third issue we had to deal with was perhaps the most challenging, as it was connected to the particular conditions of the company where we did our field study: the micro-political conflicts between the sites. Since we were regarded as colleagues to some extent (at least by the German developers), and not so much as outside observers, we lost our neutral status and we had to take a position with regard to operational and strategic questions of the offshore-onshore cooperation. While our role as scientists, as well as the perspective of the joint workshop helped us to channel the expectations toward the time after the analysis, we were no longer in the position of outside observers. While we claimed not to become yet another member of the team in Bonn, but rather act as a learning mediator, it turned out to be difficult for us to make this role obvious to other project members, and especially to the Russian team. As Russian project participants were hesitant to talk plainly about problems, and as we had problems to negotiate our project anticipation with them, our access to their views and anticipations clearly was limited. A possibility would have been to establish a steering committee, as Rönkkö [12] suggests, for making our role more transparent as well as to include Russian team members in the related decision processes. However, the described conditions made this approach very difficult and limited our access to the Russian team.

In general, it has been very advantageous for us to employ *Business Ethnography* as a research concept, especially for making our role explicit in the context of the research activities and for negotiating access, by having something to offer to the participating companies [19]. This is a benefit most action research approaches have in common. Although applying our approach to a distributed software team went along with additional challenges, the relatively deeper immersion helped us obtain a much more detailed understanding of the articulation work practices we were interested in. Hence, *Business Ethnography* allowed us to leverage many of the known challenges of conducting research into distributed teams [18]. Even though *Business Ethnography* as a method is not very specific in how research methods actually have to be applied, the theoretic lens it offers helped us in dealing with the conflicts we found in the field, as it does not only require the researcher to remain aware of his political role in the field, but actively and explicitly considers this role as a subject matter for the research itself. Hence, even though we were forced to concentrate on the perspective of the German side of the cooperation, we think that the awareness and transparency implied enabled us to understand the related conflicts between the sites in a much more detailed way, compared to our first study. On the other hand, it has to be stressed that we also benefited substantially from being able to refer to

our experiences as well as to the trust we had gained by conducting our first study; benefits, which can not be attributed to the *Business Ethnography* approach.

7. Conclusion

The geographical distribution of distributed software development projects imposes new challenges to researchers in the field of GSD. In this paper, we have introduced *Business Ethnography* as an action research approach and discussed our experiences with practically applying this method in the context of software offshoring in a German SME. In doing so, we have described several challenges we had to deal with during our research. A possible solution that we identified is based on addressing the role of the researcher in the field, in relation to the experiences of the actors that take part in the research. While this kind of studies may not be well suited for measuring success (an aspect which is most interesting for many companies from our experience), the broad picture they provide can offer opportunities for unveiling possible improvements and chances for inter-organizational learning. Thus engaging in a shared process with the practitioners may offer several advantages for both parties and allows to leverage many of the known challenges of conducting research in distributed software teams. The additional chances of such approaches include being able to learn about strategies for fostering flexibility in offshoring projects, as well using the findings for technology development. We also found interesting ideas about situated learning processes coming from the practitioners that may have been triggered by our research.

Acting as a learning mediator resulted in both benefits and challenges for our research. On one hand, defining organizational learning as a meta-project it was a challenge, and determined the practitioners to remain interested in the long term. As our feedback cycle apparently was too time consuming for the practitioners, it could be worth considering approaches that offer smaller and more rapid feedback loops in order to keep the practitioners interested, exploiting informal and situated learning processes for the purpose of the research as well. On the other hand, keeping a research stand allowed us to leverage expectations and keep a more or less neutral status in the micro-political struggles between the teams, even though this required ongoing negotiation of our role especially with the Russian team.

Institutionalizing results still remains an important challenge for action research in distributed teams. As Dittrich pointed out, successful process and practice improvements are not only dependent on valid findings, but also on social relationships in the field [20]. When the researcher gets involved in conflicts on-site and between the sites, transparent and legitimate forms of involvement of the researcher in conflicting issues have to be found. While we have no final answer on how this can be achieved, we believe that one advantage *of Business Ethnography* is that it actively conceptualizes these struggles and attempts, in order to make them transparent for the scientific community, as well as for the participants.

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