Customer Knowledge and Requirements Engineering in Customization Projects: A Multi-Method Case Study

Abstract

Increasingly heterogeneous customer demands in software development have led to growing research into the effectiveness of customization projects. Despite the widespread assumption of a positive relationship between customer involvement and project success, there is limited empirical research on the mechanism that translates customer knowledge into project success and other positive customer outcomes. This research explores how customer-enabled market knowledge, clarity of requirements and frequency of requirements changes affect the success of software customization projects as well as customer satisfaction and loyalty. The authors employ a multi-method case study design that consists of qualitative and quantitative elements. The results indicate that customer knowledge differently affects the clarity of requirements and the frequency of requirements change. In addition, the authors found support for a positive association between the clarity of requirements and customer loyalty. The authors end with delineating the next steps of this research and possible general future research directions.

Keywords: Customer satisfaction, Requirements engineering, Service management, Case study/studies, Capabilities, Dyadic Survey
Introduction

In business-to-business markets, large software products are often subject to customization (e.g., Bertram et al. 2012, Subramanyam et al. 2012). Customization refers to the ongoing process of adapting the software’s core functionalities to customer requirements and is an important means to increase customers’ perceived value. In particular, customers often are not capable of adapting complex software to their own needs due to a lack of technical knowledge (Schaarschmidt et al. 2015). As software vendors naturally possess a knowledge surplus concerning their own software, they are capable of complementing their products with specific customization services, ranging from frugal (e.g., adapting colors or images) to more complex (e.g., aligning software with organizational structures) services (Sarker et al. 2012). Thus, services that may span from small-scale software changes to long-term projects with hundreds of workers may all be considered customization services. As such, customization services bridge the continuum between standardized packaged product software and fully individualized offerings (Xu and Brinkkemper 2007). Product software is based on the concept of “make one – sell many” (Sawyer 2001) and is usually designed for an anonymous mass market. In contrast, individualized, tailor-made software is designed for just a single customer. Customized software solutions thus may be viewed as a hybrid of standardized and individualized software as they allow for offering individualized software functionalities based on a core software product.

Surprisingly, although the role of customization services for generating stable revenues is gaining importance (PWC 2010), little research attention has been devoted to the antecedents and the consequences of offering such services. The role of customer knowledge in requirements engineering (i.e., structured elicitation, analysis, and specification of customer requirements) for customization of information systems (IS) in particular has been largely neglected. For example, the literature that is concerned with software requirements engineering highlights the importance of transforming customer needs into formal specifications (e.g., Alves et al. 2010, Castro et al. 2002, Saiedian and Dale 2000). Similarly, literature on the rollout of product software (e.g., enterprise resource planning software) emphasizes the need of a structured process of requirements engineering (e.g., Daneva 2004, Light 2005). However, neither of these literature streams has systematically addressed the effects of customer knowledge on different facets of requirements such as their quality and the frequency of their change. Relatedly, the role of customer knowledge for successful co-creation of value has been emphasized by multiple streams of research, such as research on marketing (e.g., Payne et al. 2008), innovation management (e.g., Perks et al. 2012), and information systems (e.g., Ko et al. 2005), but these literatures have not focused on how customer knowledge influences requirements engineering.

Thus, it is far from understood in the IS field how customer knowledge affects different aspects of requirements engineering and how customers react to clear (unclear) or changing (stable) requirements definitions. We respond to this lack of research by conducting a multi-method case study that aims to (1) investigate how customer knowledge influences the clarity of requirements, the frequency of requirements change, and customer-enabled market knowledge and (2) explore how these aspects subsequently affect project success and customer evaluations, such as satisfaction and loyalty. Thus, this research complements existing knowledge in the field of requirements engineering for tailor-made software and packaged product software (e.g., Light and Sawyer 2007, Regnell and Brinkkemper 2005), and is among the first to examine requirements engineering in customization scenarios. The case study method is appropriate because software customization projects are complex, context-dependent, and involve people from the buyer and the vendor organization (Yin 2013). As such, a case study allows for an exploration of and to generate fresh and deeper insights into an under-researched area of IS.

Such insights are important for both theory and practice. From a theoretical perspective, detailing how customer knowledge affects the quality of requirements and the subsequent customer evaluations of a customization project addresses a gap in the pertinent literature. For customization practice it is important to understand how customer knowledge transforms into requirements and how customer satisfaction and loyalty may be stimulated through the prudent use of requirements. The rest of this research-in-progress is organized as follows. We first review related literature concerning customization, requirements engineering, and customer knowledge. We then describe the research process as well as results. We close by discussing our findings and our intended future research directions.
Background: Software Customization and Requirements Engineering

The pertinent literature distinguishes three types of software: Tailor-made, customized, and packaged product software, sometime referred to as standard software (e.g., Guvendiren et al. 2014, Xu and Brinkkemper 2007). While standard software is market-driven, tailor-made software is customer-oriented. As described earlier, customized software may be viewed as a hybrid between tailor-made and standard software. As with tailor-made software (cf. Daneva 2004, Light 2005, Potts 1995), customer needs are captured through the assessment of requirements at the beginning of customization projects. However, for tailor-made software, Holmström and Sawyer (2011) emphasized that requirements engineering – although established in this field – typically rests on at least three questionable assumptions: (1) organizations remain unchanged during the time the software is developed, (2) users are expected to understand and communicate their needs in ordered ways, and (3) main actors within an organization have congruent ideas of what a solution should look like. The first two assumptions are particularly crucial for customized software. First, during a customization project, customer requirements might evolve from early user evaluations, thus, they are not stable and subject to change. Second, software vendors might serve different types of customers, some of which may be particularly knowledgeable in terms of technologies used whereas others may have no technical knowledge at all (e.g., firms that do not have their own IT departments), which leads to differentially specified requirements across projects.

As such, offering customization services effectively involves managing the clarity of requirements and the frequency of requirements change, which both may be dependent on customers’ (technical) knowledge (Castro et al. 2002, Ricca et al. 2009). Such knowledge is commonly assumed to have positive effects on the requirements engineering processes, in that it fosters communication, and a mutual understanding of customer needs. However, to a minor extent, some negative effects, such as time-consuming project meetings, have also been reported (Hadar et al. 2014). We define clarity of requirements as the extent to which a vendor firm has (documented) knowledge of customer needs. In turn, we define frequency of requirements change as the frequency with which a customer demands functionalities that were not covered by the initial requirements definition. Having clear requirements upfront is a benefit for vendor firms as it is possible to allocate resources effectively. In contrast, the frequent changes of requirements might harm the firm as either already developed code has become useless or new requests demand additional development power that may stretch budgets. Customers, in turn, appreciate the possibility of changing requirements during a customization project as it provides them greater flexibility. In sum, customer and vendor interests concerning requirements need to be reconciled (Langer et al. 2013). Although a clear set of requirements at the beginning of a customization project is favored by software vendors, customers tend to reserve the right to change requirements. However, how customer knowledge and requirements interact with each other and how they affect the customization project success and customer evaluations is far from understood.

Method

Research Methodology

We employed a multi-method case study. Case study research is most suitable when the underlying research question is of an exploratory nature (Yin 2013). It is best described as a set of techniques that helps answer “how” questions. The majority of case studies rely on qualitative data, such as interviews and company documents (Benbasat et al. 1987, Eisenhardt and Graeber 2007). Typically, conclusions then may be specific to the case organization under investigation and not generalizable to a population of organizations. In contrast, research that is driven by quantitative data allows for testing assumptions against populations, which results in robust, often representative and generalizable, evidence.

Thus, while case study research helps to unravel unknown knowledge territories, it lacks generalizability. On the other hand, while quantitative data might achieve generalizability with a greater degree of assurance it is limited in that it does not enable knowledge generation at a detailed level. This trade-off between qualitative and quantitative approaches, that is, a trade-off between breadth and depth prompted researchers to suggest combining qualitative and quantitative research methods to better address research questions (e.g., Kaplan and Duchon 1988, Ridenour and Newman 2008, Venkatesh et al. 2013).

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Although combining qualitative and quantitative data might imply combining different underlying research philosophies – a legitimate philosophical concern (Ågerfalk 2013, Halaweh et al. 2008) – we side with research that suggests that it is feasible to combine multiple methodologies and paradigms (e.g., Gable 1994, Kaplan and Duchon 1988, Ridenour and Newman 2008). We thus heed the call of Klein and colleagues (1991) for the tolerance of methodological pluralism within case studies and combine qualitative and quantitative data within one case study. That is, although we collect quantitative data, our overall research approach is still in line with case study research and our results are not generalized against a population (Lee and Baskerville 2003). We simply use quantitative data to complement qualitative insights within our case study approach.

Our research steps are illustrated in Figure 1. In phase 1 we started our research with a literature review concerning software customization and requirements engineering, which was followed by five preliminary interviews with software vendors that offer customization services. For the literature review, we performed a search on portals such as Web of Science using the search terms “customization”, “customizing” (both in American and British English), and “requirements engineering.” The five preliminary interviews were conducted with experienced software engineers and consultants with more than ten years of experience in national and international customization of software. Based on the knowledge we gained from this procedure, we preselected possible case companies according to their customization intensity and conceptualized knowledge-related antecedents and consequences of requirements. Phase 1 ended with a research workshop at a company that was judged suitable to act as a case company. In phase 2, we first refined our workshop findings and selected two other case companies. We followed the suggestion for case selection by Seawright and Gerring (2008) and searched for “most similar” cases. In our cases, similarity refers to a comparable size (i.e., small or medium sized companies), focus (i.e., not limited to domestic markets), and degree of software customization. In particular, all of the case firms are small or medium sized enterprises (SME) with no more than 100 employees and located in the western part of Germany. Two of these firms offer only software; the third firm customizes software for their own manufactured special-purpose machinery.

Within each case we first focused on qualitative data gathered via semi-structured interviews with consultants, project managers, and CEOs (Schultze and Avital 2011). In each of the three cases, we conducted seven interviews, which lasted at least 50 minutes (up to 2 hours) and were transcribed for further analysis. Parts of the interviews were used to draw service blueprints to compare customization processes within the firms (Bitner et al. 2008). These data were complemented by company documents, such as presentations and written strategies. We also participated in at least one project meeting per case company. Phase 2 ended with a first version of a knowledge-related requirements engineering framework, which was also subsequently used as a research model (cf. Gebauer et al. 2012, Schaarschmidt and Kilian 2014). In phase 3 we conducted a dyadic survey to further support this framework. In particular, we started to search for multi-item measures to capture relevant constructs. We then 1) surveyed project managers at each of the three case companies who had not previously served as interviewees, and 2) additionally asked them to provide a questionnaire to the project manager on the customer’s side. Thus, the unit of analysis here was the customization project. Customer answers were directly sent to us to ensure anonymity. This procedure resulted in 21 complete vendor-customer dyads on the project level that helped corroborate qualitative results (Zainuddin et al. 2012). Lastly, we combined qualitative and quantitative insights to arrive at testable propositions.
Qualitative Insights

We analyzed the qualitative data using the software tool MaxQDA. The analysis followed the steps suggested by Saldaña (2009) and involved two coding cycles. In the first coding cycle, two researchers captured the essence of customization projects by marking respective text passages (i.e., defining codes). In a second coding phase, the same two researchers and two research assistants grouped different codes according to superior meanings. Among the most often stated customization-related aspects of project success on the vendor side were customer knowledge, the clarity of requirements and the frequency of requirements change. In addition, the role of customer-enabled market knowledge was emphasized by the majority of interviewees. We also found evidence for often-used performance indicators. Among these indicators of successful customization projects were project success (in terms of monetary gains, finishing a project on budget and time, and even gaining new customers through that project), and customer satisfaction and loyalty. Interviewees also quite regularly mentioned the important role of interaction quality in customization projects. Other aspects, such as the software structure in terms of modularity, were mentioned to a lesser degree, which is why we did not include them in this study.

We took the list of codes and mapped it with 1) what we observed in company meetings and several workshops, and 2) what is known from the pertinent literature. We then built a first conceptual framework of requirements engineering and customer knowledge in customization services. We showed this framework to representatives of each case company and adapted it slightly based upon their suggestions. The preliminary framework is depicted in Figure 2. According to this framework, customer knowledge has a positive effect on customer-enabled market knowledge and the clarity of requirements. In turn, customer knowledge is negatively associated with the frequency of requirements change. This reasoning is backed by the fact that if customers find ways to formulate their needs in an appropriate way, the company benefits in terms of access to market knowledge, well-formulated requirements and less inducement to change requirements.

Subsequently, customer-enabled market knowledge positively affects project success (e.g., monetary gains, finishing a project on time and budget), which is in line with research that highlights the positive effect customer knowledge has in generating superior performance (e.g., Ngo and O’Cass 2013, Schaarschmidt et al. 2015). Concordantly, both a high degree of clarity in requirements and a limited...

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1 We do not provide interview excerpts here because of the limited space available. We can provide interview excerpts and code frequencies upon request.
frequency of requirements change will increase vendors’ productivity, which also results in various forms of project success.

The framework also predicts the effects of the clarity of requirements and the frequency of requirements change on important customer evaluations, such as satisfaction and loyalty. Generally, customization leads to a real match between customer and product (Ostrom and Iacobucci 1995). Consequently, researchers such as Bettencourt and Gwinner (1996) concluded that customers who experienced customized treatments would be more satisfied than customers who received a standard treatment. Clearly formulated requirements in customization projects thus should contribute to a perfect match between customer and product and result in customer satisfaction. In turn, frequent changes of requirements might be a reflection of either misspecified requirements or rapidly changing customer needs. Both aspects potentially harm the customer’s satisfaction. A similar reasoning might be used for customer loyalty. Research that is informed by social exchange theory (e.g., Coelho and Henseler 2012) emphasizes that customers maintain relationships with the vendor as long as the attractiveness of the current interaction plus potential switching costs exceed the attractiveness of alternative interactions. To that end, customization based on clear requirements potentially creates switching costs and increases the current interaction’s attractiveness (Coelho and Henseler 2012). In turn, the attractiveness of alternatives decreases, which results in customers that are willing to maintain the interaction with the focal firm and, thus, display loyalty. Frequent changes of requirements might dissatisfy customers and make them seek alternative interactions, thus, potentially leading to decreases in loyalty.

Finally, both customer satisfaction and loyalty are likely to benefit from interaction quality. Interaction quality was among the most-often mentioned topics according to the interview study and refers to interactions that are characterized by a high degree of knowledge exchange and reciprocal responsiveness. Vendors’ responsiveness to customer complaints and suggestions especially will be valued by customers and lead to increased satisfaction and loyalty.

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**Figure 2. Conceptual Framework**

**Quantitative Insights**

To further substantiate the conceptual framework depicted in Figure 2, we conducted a dyadic small-scale survey of project managers of the three case companies and respective project managers on the customer side. Each case company identified seven projects 1) that should reflect a wide range of what the company would consider successful and unsuccessful projects, 2) that were recently completed, and 3) that were managed by someone who had not participated in the qualitative study. Vendor firm project managers were asked about customer knowledge, customer-enabled market knowledge, the clarity of requirements,
the frequency of requirements change, and project success using a standardized questionnaire. In addition, they were asked about project characteristics that we could use as control variables (i.e., project size, duration, and budget). Project managers on the customer side were identified with the help of the case company. To not impair this research’s results, we ensured and communicated that customer answers would not be shared with vendor companies. We asked project managers on the customer side about their satisfaction with the final product, customer loyalty, and interaction quality. Several reminders and phone calls ensured that we received 21 filled out questionnaires from both vendors and respective customers.

For the majority of constructs we used established multi-item measures, which were anchored at 1="strongly disagree" and 7="strongly agree." For customer knowledge, we relied on a three-item measure used by Ghosh et al. (2006), which captures the degree to which the vendor sees the customer as knowledgeable in the field of the customization project. Project success was measured using a conceptualization that pertains to project success on the comparison level, that is, we used items that center on comparison with other projects and their own expectations rather than absolute values of success, such as turnover or profit. An example item reads: “What we have achieved in our relationship with this customer has been beyond our predictions” (Anderson et al. 1994). The items for customer-enabled market knowledge were taken from Malhotra et al. (2005). Sample items involve “Working with <customer> in this project has helped us better understand the needs of customers in general." The clarity of requirements and the frequency of requirements change were measured by one item each. The item “This product/solution’s requirements were formulated clearly by the customer at the beginning of the customization project” was designed to capture the clarity of requirements. The frequency of requirements change was measured by the item “During the customization project, how often were requirements changes requested by the customer,” which was anchored at 1="never” and 7="very often.”

Table 1. Construct Reliabilities

<table>
<thead>
<tr>
<th>Construct</th>
<th># of items</th>
<th>CA</th>
<th>Source</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer knowledge</td>
<td>3</td>
<td>.93</td>
<td>Ghosh et al. (2006)</td>
<td>Vendor</td>
</tr>
<tr>
<td>Project success</td>
<td>3</td>
<td>.72</td>
<td>Anderson et al. (1994)</td>
<td>Vendor</td>
</tr>
<tr>
<td>Customer-enabled market knowledge</td>
<td>5</td>
<td>.85</td>
<td>Malhotra et al. (2005)</td>
<td>Vendor</td>
</tr>
<tr>
<td>Clarity of requirements</td>
<td>1</td>
<td>--</td>
<td>Own</td>
<td>Vendor</td>
</tr>
<tr>
<td>Frequency of requirements change</td>
<td>1</td>
<td>--</td>
<td>Own</td>
<td>Vendor</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>2</td>
<td>.73</td>
<td>Coelho and Henseler (2012)</td>
<td>Customer</td>
</tr>
<tr>
<td>Customer loyalty</td>
<td>2</td>
<td>.86</td>
<td>Coelho and Henseler (2012)</td>
<td>Customer</td>
</tr>
<tr>
<td>Interaction quality</td>
<td>4</td>
<td>.76</td>
<td>Own</td>
<td>Customer</td>
</tr>
</tbody>
</table>

Note: CA=Cronbach’s Alpha

Customer measures involved customer satisfaction with the product and customer loyalty. Items were taken from Coelho and Henseler (2012). In addition, based on the qualitative interviews we developed a measure for interaction quality. The scale involves items such as “Compared to other companies, how would you rate the interaction with this vendor with respect to their employees’ flexibility in dealing with customers?” All multi-item measures exhibit good reliability as indicated by values for Cronbach’s Alpha that ranges from .72 to .93. Table 1 gives an overview of different constructs as well as their source.
Table 2. Regression Results

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CLOR</td>
<td>FORC</td>
<td>CEMK</td>
<td>Project success</td>
<td>Customer satisfaction</td>
<td>Customer loyalty</td>
</tr>
<tr>
<td>Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Size</td>
<td>-.48</td>
<td>.39</td>
<td>.52</td>
<td>.41</td>
<td>.64</td>
<td>-.05</td>
</tr>
<tr>
<td>Project Duration</td>
<td>.26</td>
<td>.07</td>
<td>.06</td>
<td>-.78**</td>
<td>-.48</td>
<td>.07</td>
</tr>
<tr>
<td>Project Budget</td>
<td>-.03</td>
<td>-.16</td>
<td>-.47</td>
<td>-.07</td>
<td>-.23</td>
<td>.16</td>
</tr>
<tr>
<td>Independent variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer Knowledge</td>
<td>.69**</td>
<td>-.53**</td>
<td>-.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEMK</td>
<td></td>
<td></td>
<td></td>
<td>.70***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLOR</td>
<td>-.19</td>
<td>-.25</td>
<td>.56*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FORC</td>
<td>.14</td>
<td>-.52*</td>
<td>.03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction quality</td>
<td></td>
<td></td>
<td></td>
<td>.04</td>
<td>.48</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>R²</td>
<td>.50</td>
<td>.39</td>
<td>.08</td>
<td>.73</td>
<td>.48</td>
<td>.26</td>
</tr>
</tbody>
</table>

Note: CEMK=Customer-enabled market knowledge, CLOR=Clarity of requirements, FORC=Frequency of requirements change; ***p < .001, **p < .01, *p < .05, +p < .1

Although the structure of our conceptual model would call for structural equation modeling, we are aware of the fact that 21 observations are too few to calculate meaningful saturated models (Fritz and MacKinnon 2007). Again, we position the quantitative study as an additional source of data within the case study approach. Thus, we do not claim to fulfill representativeness. To get an idea of how the model constructs interrelate statistically (in addition to the qualitative insights), we conducted ordinary least square regressions, which are robust against potential violations of normal distributions in small sample sizes (n < 50) (Yazici and Yolacan 2007).

In total, we ran six separate regression models that reflect the main paths of the conceptual framework (Table 2). In Model 1, the clarity of requirements is regressed on customer knowledge and the controls. We find that the control variables (project size, project duration, project budget) have no influence on the dependent variable. However, in line with the conceptual model, customer knowledge is positively associated with the clarity of requirements ($\beta = .69; p < .01$). Furthermore, customer knowledge is negatively associated with the frequency of requirements change as indicated by $\beta = -.53$, p < .01 in Model 2. Surprisingly, customer knowledge is not related to customer-enabled market knowledge (Model 3; $\beta = -.02$; ns). Next, we regressed project success as well as customer satisfaction and loyalty on the clarity of requirements and the frequency of requirements change. As seen in Model 4, both the clarity of requirements and the frequency of requirements change are not related to project success. However, in line with the pertinent literature, customer-enabled market knowledge is positively associated with project success ($\beta = .70; p < .01$). Finally, we find in Models 5 and 6 that the frequency of requirements change is negatively associated with customer satisfaction (Model 5; $\beta = -.52$; p < .05) and the clarity of requirements with customer loyalty (Model 6; $\beta = .56$; p < .1). Surprisingly, neither customer satisfaction nor customer loyalty is caused by interaction quality.
Conclusion, Limitations, and Future Research Steps

This research in progress aims at investigating how customer knowledge affects different aspects of requirements management (i.e., customer-enabled market knowledge, clarity of requirements, and frequency of requirements change), and subsequently influences project success and customer satisfaction and loyalty in software customization projects. We employed a multi-method case study design that involves qualitative data analysis as well as (non-representative) quantitative data analysis. Our qualitative analysis yielded a conceptual model that uncovers dependencies between customer knowledge, the clarity of requirements, the frequency of requirements change and customer-enabled market knowledge. It also addresses subsequent effects on project success, and customer satisfaction and loyalty. All of these paths may be viewed as testable propositions in the sense of “The more knowledgeable the customer, the more customer-enabled market knowledge will be obtained.” Our small-scale dyadic survey yielded results that support the majority of these propositions. For example, the most salient results are that customer knowledge potentially increases clarity of requirements and reduces frequency of requirements changes. This implies that vendors should either assess customers’ levels of knowledge upfront or invest in training their customers to benefit from their knowledge in terms of prudent requirements formulation. Our findings also suggest that frequent changes of requirements potentially harm customer satisfaction.

However, some of our predictions were not supported by the data. Given that the number of observations is very small we would not interpret a non-significant path as meaning that the proposition is rejected. Rather, the quantitative results caused us to reconsider the links within the framework. In particular, although no link between customer knowledge and customer-enabled market knowledge could be established quantitatively, we still would argue that such a relationship exists in light of the pertinent literature (e.g., Malhotra et al. 2005). The fact that such a link was not confirmed in our quantitative data may be due to the small sample size. In contrast, the missing link for interaction quality and customer evaluations calls for further research. Either our self-developed measure for interaction quality does not effectively capture what it should or the role of interaction quality is not quite as prevalent as suggested by the interviewees.

As any research, this research is not free of limitations. Apart from methodological limitations that stem from the case study methodology (e.g., limited opportunities of generalization), a few other limitations are worth mentioning. First, clarity of requirements and frequency of requirements were measured with one item only. While single-item measures have been shown to possess adequate predictive validity (Bergkvist and Rossiter 2007), future research could replicate these findings with multi-item measures. Second, customer loyalty is often treated as a consequence of customer satisfaction (e.g., Coelho and Henseler 2012). Future research thus could investigate if the path from clarity of requirements to customer loyalty is mediated by customer satisfaction. In summary, we contribute to a better understanding of the effects of requirements management in software customization services and add to methodological pluralism within case study research (Yin 2013), thus showing how quantitative data might be used to stress qualitative findings. Our next research steps in this research in progress involve actions pertaining to both the qualitative and the quantitative part. First, we are planning additional interviews within the case companies to further unravel the role of interaction quality. Second, outside of this case study, we plan a large-scale survey based on the conceptual framework. Here, the next steps involve designing, pre-testing, and validating multi-item scales to measure the clarity of requirements and the frequency of requirements change. In addition, we have to further validate our measure for interaction quality. Finally, we will map this case study’s results with results derived from the upcoming large-scale survey. In our future research, we also aim to generalize our proposed framework to a wider range of IS projects. For example, Mirani and Lederer (1998) distinguish IS projects in terms of the benefits firms associate with them. Specifically, they distinguish strategic, informational, and transactional benefits. Such a distinction could add to the external validity of our results.

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