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RESEARCH PAPER

Investigating the co-creation of IT consulting service value: empirical findings of a matched pair analysis

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Abstract

Digitalization is increasingly and broadly impacting on companies throughout all industries. To cope with digital transformation, organizations need specific IT skills and often face a bottleneck between required and existing capabilities. Thus, organizations revert to support from IT consultants. However, such collaborations need to create value so as to make client organizations future-proof in the long term. We therefore need a better understanding of how value is created in IT consulting projects. We build on service-dominant (S-D) logic as the theory base and evaluate our structural model, which explains IT consulting service value based on 77 matched pairs of IT consulting projects using structural equation modeling. We provide empirical support for the assumptions of S-D logic in the IT consulting industry and reveal determinants that significantly contribute to the overall IT consulting service value. Our results contribute to the ongoing discourse in the S-D logic literature and provide meaningful insights for practice.

Keywords Value co-creation · Service-dominant logic · Matched pair approach · IT consulting services

JEL classification L84

Introduction

In the digital age, the rapid developments in information technology (IT) and information systems (IS) challenge incumbent organizations in particular, but also offer them new opportunities (Colbert et al. 2016; Legner et al. 2017). Emerging technologies such as SMAC (i.e., social media, mobile computing, analytics, cloud computing) (Ackx 2014; Ross et al. 2016; Sebastian et al. 2017) and DARQ (i.e., distributed ledger, artificial intelligence, extended reality, quantum computing) (Daugherty and Carrel-Billiard 2019), provide among others deeper customer insights and enable an organization to prepare more customer-centric offerings. However, levering the opportunities of these emerging technologies require that organizations change in fundamental ways (Hess et al. 2016). The implementation of the emerging technologies as part of an organization's digital transformation often requires not only an entirely new or a redesign of its business model and the alignment of strategies, but also of the value creation process (Legner et al. 2017; Nambisan et al. 2017; Vial 2019).

Such digital transformation endeavors, which are most often carried out in projects, call for new skills and know-how on the part of both business and IT employees. Further, such

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projects require more analytical skills from employees to successfully complete their tasks than before (Dremel et al. 2017). However, organizations often lack one required skill type or another (Colbert et al. 2016; Vial 2019; Watson 2017), which is why many organizations (sometimes even continuously) revert to support from external service providers (Lessard and Okakwu 2016). Such collaborations between clients and consultants working jointly on IT projects are becoming increasingly commonplace, changing the perception of IT consulting firms from a pure service provider toward an integrative component of an organization's daily business (González-Benito et al. 2016). In this context, a thorough understanding of how value is co-created in IT consulting projects is essential to organizations; this is our study aim. We investigate determinants of IT consulting value.

Previous research, specifically in the consulting domain, has investigated for instance trust and reputation (e.g., Glückler and Armbrüster 2003; Green 2017), skills and roles (e.g., Alt et al. 2019; Henningsson and Øhrgaard 2016), knowledge transfer (e.g., Argote and Fahrenkopf 2016; Ko et al. 2005), and consulting service quality (Momparler et al. 2015; Yoon and Suh 2004). However, we know very little about how value emerges in and is co-created in consulting projects. Thus, we revert to more general theories in related research domains. The research stream on the measurement of service quality and customer satisfaction (e.g., Das et al. 1999; Grönroos 1984) put forth the SERVQUAL instrument (Parasuraman et al. 1985), which was also adapted and has been used in the IS literature (e.g., Yoon and Suh 2004). However, the empirical studies that applied SERVQUAL took an outdated firm-centric and goods-centric approach, and focused on customer satisfaction instead of on value. This was resolved by the advent of service-dominant (S-D) logic, which is considered the most impacting shift in the marketing literature from a firm-centric and goods-centric perspective to a customer-centric one (Vargo and Lusch 2004, 2008, 2016). S-D logic has been picked up by many researchers and has been applied in various disciplines, including IS (Barrutia and Gilsanz 2013; Brust et al. 2017; Haki et al. 2018).

The literature on S-D logic provides a valuable starting point for our research. Breidbach et al. (2013b) drew on S-D logic, investigating innovations in professional service firms, acknowledging a customer-centric perspective. Further, Tallon (2010) examined business and IT strategy's impacts on firm performance. While both contributions provide significant insights into value co-creation, their underlying objective differs from ours. Barrutia and Gilsanz (2013) examined electronic service quality and value in a business-to-consumer (B2C) e-commerce context by considering consumer and firm resources in their model. While their model and their incorporation of consumer and firm resources are promising, the investigated B2C service cannot be compared to the more complex area of IT consulting services. In business to business (B2B) relationships in the SDL paradigm, recent publications have been put forth: Digital platforms and the underlying value co-creation processes (Blaschke et al. 2018), value co-creation in B2B platform ecosystems on how platforms lever boundary resources (Hein et al. 2019), and digital value co-creation in B2B networks (Blaschke et al. 2019). In contrast to digital B2B platforms, IT consulting projects have more face-to-face interpersonal interactions. Thus, the findings of these three studies are not directly transferable to the IT consulting industry, but serve as valuable starting points to understand the value co-creation processes in B2B relationships. We set out to explain and measure the emergence of co-created value in IT consulting projects and to operationalize S-D logic in a B2B context using a quantitative-empirical design. Our research question is:

How is IT consulting value co-created in IT projects, considering both IT consulting and client capabilities?

To answer this, we developed a conceptual model that explains the emergence of co-created IT consulting service value and a suitable measurement model. To account for the distinction between IT consultant and client capabilities, we used a matched pair approach and gathered 77 matched pairs from IT consulting projects. Each dyad comprises the questionnaire responses of an IT consultant and the corresponding project partner. To validate our conceptual model, we applied structural equation modeling.

Our primary research objective was to investigate the value co-creation mechanisms in the IT consulting industry. By including client and consultant capabilities, we seek to offer holistic insights into the IT consulting industry's value creation mechanisms, enabling IT consulting firms to strengthen their value propositions and enabling clients to allocate their existing resources in the best possible ways, thereby adding the highest value to an IT project. Our secondary objective is to enhance the existing S-D logic literature with our empirically tested matched pair measurement instrument. Thus, we seek to capture the inner mechanisms in S-D logic and value co-creation settings that can potentially be transferred to other B2B contexts.

The remainder of this paper is structured as follows: Section 2 contains the underlying conceptual and theoretical foundations, while in Section 3 we explain the development of our hypotheses. The method section (Section 4) outlines the development of our measurement model and the data collection process. We then present our data analysis and results in Section 5. In the discussion section (Section 6), we summarize our results, outline the study's limitations, and suggest future research directions. We end with our conclusion and contributions to theory and practice in Section 7.

Foundations

IT consulting

Consulting firms generally belong to the group of professional service firms in which knowledge is a core resource (Jensen et al. 2010). Consulting services "refer to expert services that are rendered to help companies survive, develop, and improve their performance, that is, to produce value" (Becker et al. 2015, p. 41), and the service provision is time-limited and interactive. Clients often attribute impartiality, information exchange, knowledge sharing, efficiency, and legitimization to consulting firms and their services (Mauerer and Nissen 2014; Momparler et al. 2015). In the digital age, more and more organizations are seeking to gain competitive advantages by coming up with IT-enabled new digital business models (Iyer et al. 2006; Matt et al. 2015). Thus, firms need more and more IT-related knowledge, skills, and capabilities, resulting in a gap between available resources with the required skills and needed resources. To close this gap, organizations often rely on the services of IT consulting firms to eliminate their internal deficits in IT capabilities and to procure services with the expectation of performance and value advantages (DeLeon and Chatterjee 2017; Henningsson and Øhrgaard 2016). We see that organizations demand more consulting services in IT and related areas (Yoon and Suh 2004), which not only increases the prosperity of IT consulting firms (Mazareanu 2018), but also leads to traditional strategy and management consulting firms founding specialized IT or digital consulting subdivisions. Vice versa, traditional technology companies such as IBM no longer focus purely on IT, but also offer IT consulting services (O'Mahoney and Markham 2013).

In the IT consulting industry, four segments can be differentiated (O'Mahoney and Markham 2013): large system integrators (e.g., Accenture, IBM), audit houses (e.g., Deloitte, PWC), niche strategists (e.g., Sapient, IT-economics), and individuals (e.g., Comatch). IT consulting projects are conducted over all hierarchy levels, from IT strategy on the board level, to program management at the middle management level, to systems integration and IT audits at the operational level (O'Mahoney and Markham 2013). Thus, IT strategy projects tend to have high-touch collaboration owing to their impacts on and priority for the client organization, and clients and IT consulting firms interact very intensely. IT consulting on a strategic level advises client organizations where they should position themselves in the future and how they can achieve this position. In practice, such topics are discussed with top management, because the decided directions have far-reaching effects on the entire client organization. In contrast, for instance IT audits – as an example of fairly low-touch collaborations – need to be conducted owing to regulatory requirements at a more operational level. They tend to have high volumes but fairly low impact on the client organization compared to IT strategy consulting (O'Mahoney and Markham 2013). This goes back to the nature of IT audit projects in which IT consultants examine and evaluate a client's infrastructure, operations, and policies based on industry-specific regulatory requirements and propose changes to comply with regulatory affordances. Having elaborated on research into IT consulting, we will now explain our study's theoretical foundations.

Theoretical foundation of service-dominant logic and value co-creation

We drew on the research stream on S-D logic and its value co-creating processes (Vargo and Lusch 2004, 2008, 2016, 2017). S-D logic is a mindset for the unified understanding of the purposes and natures of organizations, markets, and society. Based on its underlying propositions, S-D logic has blurred the dichotomy of goods. In their seminal work, Vargo and Lusch (2004, p. 2) defined *service* "as the application of specialized competences […] through deeds, processes, and performances for the benefit of another entity or the entity itself." Thus, S-D logic focuses on interactions between at least two entities with inherently different roles (e.g., IT consulting firms and their clients) in which specialized competencies such as knowledge and skills are exchanged (Bruns and Jacob 2014). Considering this, a service-providing entity (e.g., an IT consulting firm) cannot provide value directly to the beneficiary entity (e.g., an IT consulting firm's client), but can only offer value propositions, leading to value co-creation in networks (Blaschke et al. 2019; Hein et al. 2019; Vargo and Lusch 2008, 2016). The participation of all involved actors in the value creation process leads to an enhanced role of beneficiaries, enabling beneficiary-specific solutions. Our unit of analysis is IT consulting projects in which IT consultants and client employees interact.

Value propositions, value co-creation, value, and operant resources

While the term *value proposition* is widespread in science as well as in practice, it has been poorly defined (Skålén, Gummerus, Koskull, & Magnusson, 2015), which also holds true for the initial work and later revised works on S-D logic (Vargo and Lusch 2016). Lusch et al. (2007) defined value propositions as the commitments a service provider makes. We adopted the definition by Payne, Frow, and Eggert (2017, p. 472), who defined a value proposition as a "strategic tool facilitating communication of an organization's ability to share resources and offer a superior value package to targeted customers."

S-D logic is based on the concept of value co-creation between customers as active contributors and service

providers (Vargo and Lusch 2004, 2008). The value co-creation literature dates back to the 1970s (e.g., Eiglier and Langeard 1975; Grönroos 1978; Hill 1977; Holbrook and Hirschman 1982; Morgan and Hunt 1994) and has seen increased attention since the early days, which has resulted in an ambiguous understanding of the term (Cova et al. 2011; Ford 2011; Grönroos 2012; Leroy et al. 2013). Ranjan and Read (2016) provided a thorough overview of different understandings and concepts of value co-creation. Nonetheless, value co-creation is a pivotal element of S-D logic and offers a refined perspective to understand how value co-creation processes occur (Blaschke et al. 2019), although this differs in the literature. Grönroos (2006) proposed that only clients are value creators and that service providers are considered value co-creators only in cases when the two parties interact. In contrast, according to Vargo and Lusch (2016), service providers and clients are always co-creating value. We follow the more precise definition by Lusch and Nambisan (2015, p. 162), who defined value co-creation as "the processes and activities that underlie resource integration and incorporate different actors in the service ecosystem." Thus, every involved entity integrates resources *and* plays an active role in the co-creating process.

Since S-D logic has a "value-centric focus" (Blaschke et al. 2019, p. 444), it is crucial to examine value. However, the word *value* is often understood differently in the literature. Looking closely at the literature on value, the understandings range from a more monetary understanding, in which the cost-benefit ratio is evaluated (e.g., Ulaga 2003; Ulaga and Eggert 2006; Walter et al. 2001), to a more nonmonetary understanding (e.g., Aarikka-Stenroos and Jaakkola 2012; Macdonald et al. 2016). When considering the S-D logic literature, there are also various perceptions of value, such as value-in-context (Vargo and Lusch 2016), value-in-social-context (Edvardsson et al. 2011), value-in-exchange (Vargo and Lusch 2004), experiential value (Mathwick et al. 2001), and value-in-use (Macdonald et al. 2016; Vargo and Lusch 2004). In IT consulting, the IT consulting firm as the service provider offers its specialized knowledge and skills to a client on a specific IT consulting project in order to solve the client's individual problem. To overcome the de facto problem, the client needs to use the individually compiled solution, with all its monetary and nonmonetary consequences, to achieve value; thus, we follow Macdonald et al. (2016) and consider the emerging value in IT consulting projects to be value-in-use.

Further, S-D logic distinguishes between *operand* resources (tangible, static, for instance, raw materials) and *operant* resources (intangible, continuous, dynamic, for instance, knowledge and skills). Madhavaram and Hunt (2008, p. 67) defined *operand* resources simply as "those on which an act or operation is performed" and *operant* resources as "those that act on other [operand] resources." S-D logic focuses on service and therefore emphasizes operant resources as the focal unit of exchange (Bolton 2004; Chandler and Vargo 2011). Liu and Song (2014) attributed operand resources with a more transactional relationship and operant resources with partnership. Drawing on resource advantage theory, Madhavaram and Hunt (2008) developed a hierarchical model of operant resources in which interconnected, operant resources provide the highest competitive advantages. They define interconnected, operant resources as "a combination of two or more distinct basic/higher-order operant resources wherein the lower-order resources interact and reinforce each other in enabling the firm to produce efficiently and/or effectively valued market offerings" (Madhavaram and Hunt 2008, p. 71).

Applying service-dominant logic and value co-creation to the IT consulting domain

The consulting domain generally an interesting field for empirically investigating S-D logic (Payne et al. 2008), because the consulting service is accomplished mutually and mostly in face-to-face relationships (Hertog 2000; Xue and Field 2008). In IT consulting projects, there are at least two distinct actors, i.e., at least one IT consultant and one client employee. IT consulting projects often have more than two distinct resource integrators, leading to a network of actors (Vargo and Lusch 2016). However, to explicitly understand the co-creation processes and needed operant resources, we concentrate on the dyadic relationship between IT consultants and clients. When focusing on the dedicated dyadic relationship of an IT consulting firm and its client, the underlying assumptions of S-D logic and value co-creation seem to remain valid. In knowledge-intense industries such as IT consulting (Bettencourt et al. 2002; Jensen et al. 2010), both parties integrate core resources in terms of operant capabilities into an IT project to accomplish the given tasks, which implies that the IT consulting firm allocates consultants with the required expert knowledge, consulting skills, experience, and relational capital to this IT consulting project; vice versa, the client firm contributes the required information about requirements and context as well as the workforce with the right knowledge and skills to successfully complement the project (Aarikka-Stenroos and Jaakkola 2012; DeLeon and Chatterjee 2017). Through the interaction between and the resource integration of both actors (Mauerer and Nissen 2014), IT consulting projects tend to be mostly co-created. Value emerges during the use of the provided solution and thus represents value-in-use. Thus, it is crucial that both parties combine their individual operant capabilities during the service provision so as to achieve the best possible result.

Operant resources of IT consultants and their clients

IT consulting projects mostly comprise interconnected, operant resources, and capabilities of both parties that then act on

other operand resources. Thus, it is crucial to consider both IT consulting firm and client capabilities in the value co-creation process (Foglieni and Holmlid 2017; Grönroos and Ojasalo 2004; Løwendahl et al. 2001). In IT consulting projects, consultants make their capabilities available in the form of knowledge and skills in a project area in a partnership and offer mainly operant resources in which lower-order resources interact and reinforce one another and the service provision takes place in a partnership relationship. Thus, clients also need to provide a sound knowledge base of interconnected, operant resources in IT consulting projects so as to absorb the externally provided knowledge, transform and apply it, increasing the IT consulting service's value. Based on these specific partnership interactions in IT consulting projects, we focus solely on both parties' operant resources (Liu and Song 2014), and consider operand resources as preconditions that both must provide during the entire service provision. Further, we focus on operant resources because these are not obvious and therefore cannot be directly evaluated by both parties in our matched pair approach, i.e., clients evaluate the capabilities of their consultants and vice versa. An evaluation of operand capabilities would require in-depth insights into the underlying mechanisms of the other party, which falls outside our research project's scope.

A prerequisite for successful IT consulting services is the exchange of knowledge and information between consultants and clients as well as a trustworthy and courteous way of collaborating and interacting (Wurst et al. 2001). Collaboration between an IT consulting firm and its client is also a key determinant of information sharing, which is very relevant in IT consulting projects and contributes to the overall consulting service's value (Adams et al. 2014; Billing 2009; Smith 2009). These social resources include interpersonal trust, know-how exchange, relationship proneness, and social skills. We suggest that each of the parties' social expertise determines the collaboration quality, which directly influences the overall consulting service's value.

Conceptual development

Having described the theoretical foundations and identified work related to consulting research, we will now derive our hypotheses to explain the value co-creation between IT consultancies and their clients.

To investigate value co-creation in IT consulting, we investigate the value that emerges from the mutual work of an IT consulting firm and its client on a project level and their operant resources. As introduced in our theoretical foundation, we follow Barrutia and Gilsanz's (2013) distinction and integrate both client and IT consultant operant capabilities so as to capture the co-creation process in the IT consulting industry.

Our dependent variable is IT consulting service value, which is the overall assessment of multiple monetary and nonmonetary factors (Bolton and Drew 1991), and which emerges during the use of the provided service. We follow the definition of value of Barrutia and Gilsanz (2013, p. 234), who defined value as "an assessment of the tradeoff between benefits and sacrifices." Although S-D logic places the value understanding in a broader context perspective, the presented definition is still in line with the S-D logic notion of value (Barrutia and Gilsanz 2013). During the co-creation and the use of the provided IT consulting service, the client constantly assesses the provided benefits against its sacrifices, which mainly consist of its costs for the IT consulting service. Besides consultant and client capabilities, which explain our dependent variable, collaboration quality is another decisive factor that influences IT consulting service value and can neither be assigned to client capabilities nor consultant capabilities. In Fig. 1, we provide an overview of capabilities that influence IT consulting service value. We will now enlarge on the different capabilities and will derive our hypotheses.

Collaboration quality

Based on the theoretical foundation of S-D logic and value co-creation, the customer is always a co-creator of value (Lusch et al. 2007); thus, the service provision is a joint undertaking that requires collaboration mechanisms between IT consultants and clients (Ordanini and Parasuraman 2010). Collaboration quality refers to the extent to which at least two entities have the "ability to work across organizational boundaries to build and manage unique value-added processes to better meet customer needs" (Fawcett et al. 2008, p. 93). Collaboration includes both personal interactions and relationships between IT consultants and client employees for cooperative problem-solving as well as interactional aspects such as courtesy, respect, friendliness, and information exchange (Kelley et al. 1990; Sanders and Premus 2005). The

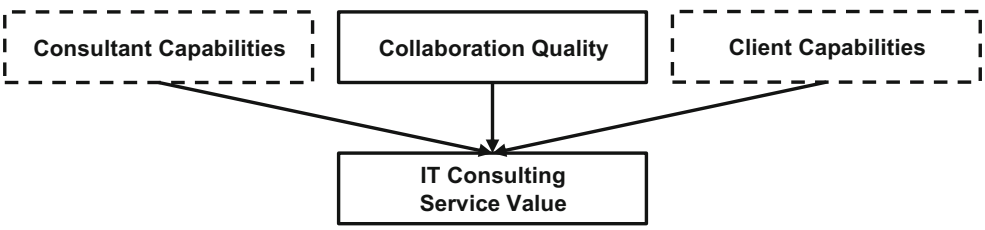

Fig. 1 Determinants of consulting service value

collaboration requires individual skills of employees in different areas, which is why we consider collaboration as composite operant resources (Adams et al. 2014; Madhavaram and Hunt 2008). The better these skills are, the stronger the ties between a consultant and its client and, thus, the higher the value that emerges (Boughzala and de Vreede 2015; González-Benito et al. 2016). Thus, IT consultants and their clients must collaborate so as to increase the value of the provided service. We therefore hypothesize:

- *H1: Collaboration quality positively impacts on IT consulting service value.*

Consultant capabilities

S-D logic concentrates on the emergence of value and its co-creation. We consider service quality as an antecedent of value because, as noted, value is defined as the tradeoff between benefits and sacrifices. We follow Barrutia and Gilsanz's (2013) argumentation and consider the service quality of IT consulting projects as a benefit the client gets and thus regard service quality as an antecedent of value. Consultants should therefore provide high overall consulting skills to address all relevant tasks in structured and comprehensible ways, as well as useful research techniques that are applicable to the project. We consider IT consulting quality as the extent to which an IT consultant has expert knowledge in required project skills, such as systematic approach, statistical analysis, project and change management, or development of surveys (Boh et al. 2002). The required overall IT consulting skills can vary in each project, and it is the IT consultant's task to decide which overall skills set is best to apply in order to achieve a high IT consulting service value (Sonne 1999). Thus, we state:

- *H2: IT consulting quality positively impacts on IT consulting service value.*

The IT consulting quality depends on the consultant's skills set, which we will now present. Industry expertise is becoming increasingly vital for IT consulting firms, not only in the consulting project but also as a criterion in the selection process. Further, IT consulting quality depends on the consultants' industry knowledge. Consultants with high industry expertise better understand a client's specific needs and have a thorough understanding of how business is conducted in the client industry (Goles 2003). We define industry expertise as the extent to which a consultant possesses expert knowledge in the client's domain. We hypothesize:

- *H3: Industry expertise of the consultant positively impacts on IT consulting quality.*

Clients often have neither the access nor the capabilities to implement new technologies, and therefore increasingly rely on IT consultancies to overcome their shortcomings. Especially in light of the ongoing digitalization and IT consulting projects, consultants need high technological expertise to satisfactorily solve specific client requirements. This underlines the importance of technological expertise and skills for IT consultants. Technological expertise is defined as the extent to which an IT consultant possesses expert knowledge in a required technology domain and emerging technologies (Kirby and Dylan 1997), which facilitates overall IT consulting quality. We hypothesize:

- *H4: Technological expertise of the consultant positively impacts on IT consulting quality.*

Consultants also need functional expertise if they are to successfully complete consulting projects. IT consulting projects require a heterogeneous set of functional expert knowledge to deliver high IT consulting quality. Consultants must therefore be experts in more than one functional area. Hoffman (1998, p. 85) defined a functional expert as "one who has special skills or knowledge derived from extensive experience with subdomains." From this definition, we deduce our definition of functional expertise, as the extent to which an IT consultant has expert knowledge in specific domains. We hypothesize:

- *H5: Functional expertise of the consultant positively impacts on IT consulting quality.*

Within the IT consulting industry, clients rely on consultants to figure out new ways to deal with a specific issue, and expect novel and innovative solutions from consultants. Especially if clients hire IT consultancies to support their digital transformation, a certain level of innovative approaches is necessary. Innovativeness is defined as the extent to which consultants provide an original and novel service and can positively influence a client organization (Garcia and Calantone 2002). Thus, we hypothesize:

- *H6: Innovativeness of the consultant positively impacts on IT consulting quality.*

Finally, we define a consultant's social expertise as "interpersonal perceptiveness and the capacity to adjust one's behavior to different situational demands and to effectively influence and control the responses of others" (Ferris et al. 2001, p. 1076).

This conclusion also remains valid in a B2B service context (Garavan 1997). In a consulting project, there are various actor types with different expertise, attitudes, and opinions. Therefore, a consultant must deal and work with them all in order to successfully complete a project. In this way, social expertise will facilitate the IT consulting quality. We therefore propose:

- *H7: Social expertise of the consultant positively impacts on IT consulting quality.*

Further, social skills will help consultants to be more empathic and collaborative (Mauerer and Nissen 2014). According to King (2011), social expertise is the foundation of effective communication and problem-solving collaboration. The better consultants can put themselves in a client's shoes, the better their understanding of the client's situation and the higher the collaboration quality (Mauerer 2019). Thus, we hypothesize:

- *H8: Social expertise of the consultant positively impacts on collaboration quality.*

In sum, we focus on an IT consultant's operant resources and hypothesize that the abovementioned determinants positively influence a client's perception of the overall IT consulting quality. In Fig. 2, we provide an overview of IT consultant capabilities.

Client capabilities

We will now introduce the operant client capabilities through which IT consulting service value emerges. Some determinants of client capabilities are similar to the consultant capabilities, but emerge in the client's sphere (social, technological, and functional expertise). Further, we included the determinants experience with consultants and the client's absorptive capacity.

As introduced above, S-D logic assumes that value is jointly created by all actors in a service provision (in our case, IT consultants and client employees), and the provided value unfolds its power during the use of the service. Thus, we follow Tokman and Beitelspacher (2011, p. 721), who regard absorptive capacity – besides service-related operant resources – as a potential client-specific resource "that allow a firm to become more co-creative." Absorptive capacity is a collective's ability to identify externally provided knowledge, and to assimilate or transform and apply it (Cohen and Levinthal 1990). Especially in consulting projects, consultants impart knowledge about a project domain to their clients. From a client project team's perspective, the provided knowledge is to be regarded as external knowledge and is integrated into their future work routines. In line with Mennens et al.'s (2018) suggestion, we conceive absorptive capacity as a dynamic capability that contributes to the client's value. Therefore, we hypothesize:

- *H9: Absorptive capacity of the client positively impacts on the IT consulting service value.*

IT consultants are experienced at adjusting their behavior to their clients, and are trained to cater to them. However, the client's social expertise also determines the collaboration quality. Ferris et al. (2001, p. 1076) defined social expertise as the "interpersonal perceptiveness and the capacity to adjust one's behavior to different situational demands and to effectively influence and control the responses of others." In IT consulting projects, client employees must work with consultants. Owing to the different attitudes, mindsets, and personalities in a consulting team, client employees should also be able to adjust their behavior toward the consultants so as to remove barriers and biased opinions. With an openness toward consultants and the ability to adjust their behavior, clients also contribute to the overall work atmosphere. Thus, social skills help clients to be more empathic and to do business with consultants. We hypothesize:

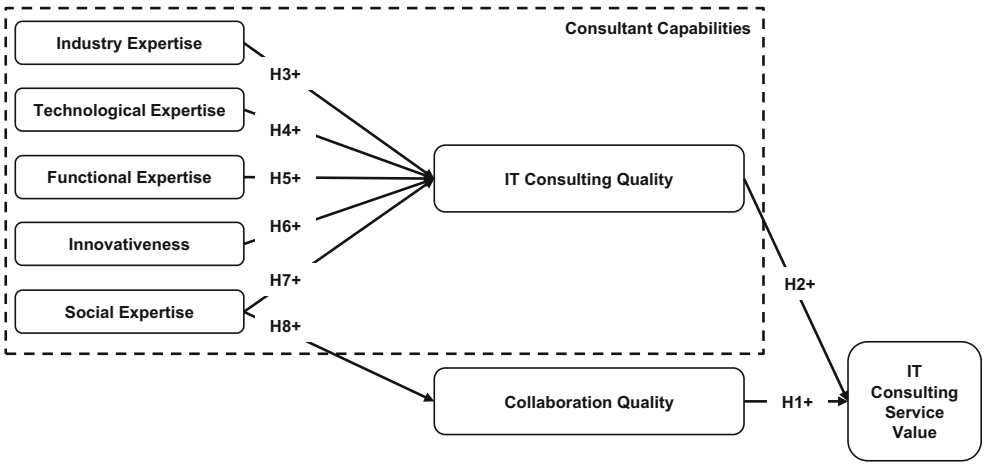

Fig. 2 Consultant capabilities

- *H10: Social expertise of the client positively impacts on the collaboration quality.*

Besides the positive impact on collaboration quality, social abilities will help clients to better understand consultants. Further, high client social skills lead to more formal and informal interactions with consultants, resulting in a better shared understanding of the entire IT project (Jensen et al. 2004). Thus, clients have the ability to better absorb the externally provided knowledge and apply the provided solution in the future (Den Bosch et al. 1999). Thus, we propose:

- *H11: Social expertise of the client positively impacts on absorptive capacity.*

Similar to the consultant's technological expertise, clients also need to provide technological expertise, otherwise they will not have the ability to identify, transform, or assimilate valuable external knowledge and then apply it (Gassmann et al. 2011). Thus, the client needs technological expertise to assess whether the service provided by an IT consulting firm is applicable and valuable for future work processes. We therefore propose:

- *H12: Technological expertise of the client positively impacts on absorptive capacity.*

Clients also need functional expertise to understand all the functional aspects of the project and to assess whether the external knowledge provided in the form of the IT consulting service is valuable to them and fits their organization (Richter and Niewiem 2009). Only a deep understanding of all of a project's functional aspects enables clients to identify, transform, or assimilate the externally provided knowledge provided and then apply it. Thus, we conclude:

- *H13: Functional expertise of the client positively impacts on absorptive capacity.*

Further, in line with Roberts et al. (2012), we integrated the determinant *experience with consultants* into our model. Past experience of working with consultants increases a client's ability to identify the knowledge that adds value. This is essential for clients, since it reflects the learning process of how to interact, govern, and judge the relationship with consultants (Gentile et al. 2007), and determine the beneficial external knowledge. Thus, we hypothesize:

- *H14: Experience with consultants positively impacts on absorptive capacity.*

In sum, the presented capabilities focus on a client's and a consultant's operant resources. In our context, the client of an IT consulting service should also provide knowledge, skills, and social expertise for value co-creation. In sum, we propose that the determinants provided positively influence a client's absorptive capacity. We provide an overview of our entire structural model in Fig. 3.

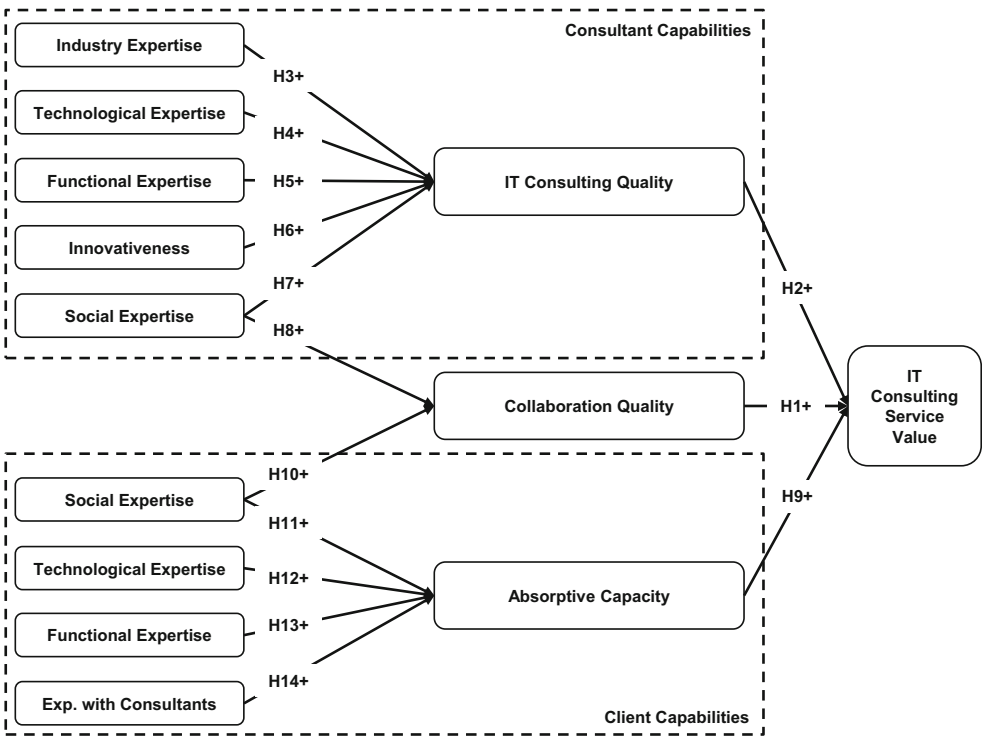

Fig. 3 Research model

Research method

We seek to explain and measure IT consulting service value based on client and consultant capabilities as a service system and drawing on S-D logic as a theoretical foundation. To analyze our model, we used quantitative-empirical methods owing to their advantages in terms of statistical generalization (Johnson and Duberley 2000). The online questionnaire we used had the advantage that respondents were more likely to state their unbiased true opinion compared to a face-to-face interview. We developed a suitable survey instrument to empirically validate our theoretical model. Thus, we relied on established measurement items where possible and developed new ones where necessary. To enhance our measurement model's validity and reliability, we performed card-sorting procedures (Moore and Benbasat 1991) and then used structural equation modeling to analyze our gathered data.

Construct operationalization

While existing measurement scales served as a good starting point, we adapted them in wording, language, and formality to best resemble our research context. In cases where we found no suitable measurement scales, the existing measurement scales did not fit our context, or a specific aspect of our construct definition was not covered, we developed additional items – as were the cases for the constructs experience with consultants, social expertise, and IT consulting quality. After iteratively adjusting the initial long-list of raw items to fit our context and to provide a common style, we continued our instrument development and conducted two rounds of card-sorting to assess construct validity, following the card-sorting procedure proposed by Moore and Benbasat (1991). Thus, we asked seven judges, consisting of clients, consultants, and researchers, to assign the items on the long-list (84 items) to constructs on basis of the constructs' definitions (Davis 1986, 1989). We then asked the judges to rank the items of every construct according to the construct's representativeness. Thus, we can identify the most suitable items on the initial item long-list for every construct. In round 1, we achieved a satisfying overall hit ratio of 82.96%. However, because the spread of the continuum was quite broad, we decided to slightly revise the construct definitions and items. The long-list of items allowed us to consider only items in the second round of card-sorting that were mainly assigned to the intended target constructs, excluding the items with the lowest scores and the highest cross-loadings, which resulted in a short-list of 47 items, which we used in round 2 of card-sorting with the same judges. The overall hit ratio increased to 95.14% in card-sorting round 2, which we summarize in Appendix 1. We then conducted a pre-test with 20 participants (researchers, IT consultants, and clients) to identify possible shortcomings; this showed no need for further action. The final questionnaire appears in Appendix 2.

Matched pair data collection

The matched pair approach focuses on the formation of related dyads. The dyadic data analysis is mainly rooted in social and behavioral science (Bakeman and Beck 1974; Bond and Kenny 2002; Kashy and Kenny 1990; Kenny et al. 2006), but has also been applied in IS research (Gerow et al. 2014; Preston and Karahanna 2009; Tallon 2007, 2010; Tallon and Pinsonneault 2011). Dyadic measurements generally reflect the contributions of two entities, whereby the individual function of each contribution can be very different (Bond and Kenny 2002; Kenny et al. 2006). The literature has shown that matched pairs are preferable over individual respondents, because the researcher can measure both sides of the dyad (Croteau and Raymond 2004; Gerow et al. 2014; Kearns and Sabherwal 2006) and so avoids relying on single respondents, which may foster common method bias (e.g., Armstrong and Sambamurthy 1999; Jarvenpaa and Ives 1993; Lai et al. 2009). In our case, a dyad always consists of an IT consultant and one project-related client representative; each evaluates the other's capabilities, and both evaluate the collaboration quality and the IT consulting service value. We decided to choose the superior matched pair approach so as to be able to comprehensively evaluate both parties' capabilities, and to avoid research designs that are affected by single-respondent bias (Gerow et al. 2014).

To account for our matched pair approach, our target populations were IT consultants and corresponding IT project-related client representatives. We chose a convenience sampling approach and sent an individualized e-mail to potential participants from our business networks with a personalized participation link. The invitation contained a brief description of our research endeavor and the assurance that we will handle all gathered data confidentially. The survey period lasted 12 weeks and was conducted in English to be valid for a wide range of participants. Due to the matched pair approach, we asked the invited participants to hand over the individual link to their counterpart. If we contacted IT consultants to participate, they were asked to send their individualized links to their client, and vice versa. This gave us a two-sided evaluation of IT consultants and their project partners. Thus, we received an objective dataset of the evaluation of the client capabilities from the consultant perspective as well as an objective evaluation of the consultant capabilities from the client organization perspective. Both clients and consultants assessed the collaboration quality and our dependent variable, IT consulting service value. For the further analysis of our matched pairs approach, we calculated the arithmetic mean for each item value of the constructs collaboration quality and IT consulting service value. We sought to account also for the small differences

in a project's evaluation in these two constructs by both client and IT consultants, because consultants typically slightly overestimate their own performance, while client organizations underestimate the consultants' performance. Accordingly, we show the percentage agreement values for the two constructs: on average for the items of the constructs, the client organization and the IT consultancy identically evaluated the IT projects in 37% of the IT projects, with ± 1 unit differences in the seven-point Likert scale in 76% of the IT projects, and in ± 2 unit differences in the Likert scale in 90% of the IT projects; in the same vein, the agreement values for the construct collaboration quality were 33%, 77%, and 94%.

We invited 781 participants from German-speaking countries; 191 fully completed the questionnaire. Owing to the lack of one half of the matched pairs, we had to exclude 37 project evaluations from the analysis. Thus, we included the questionnaires of 154 participants into our matched pair approach, leading to the evaluation of 77 IT consulting projects, i.e., each project was evaluated by a consultant and a client employee working together on the same project. The 77 project evaluations served as the basis for our subsequent analyses, starting with an overview of the project demographics.

All incorporated projects are from German-speaking countries and were IT-related projects. 38% of the incorporated dyads referred to IT audit projects followed by IT implementation projects (17%), IT strategy and management projects (12%), and IT transformation projects (11%). Of the client participants, 39% worked for companies with more than 10,000 employees, and 38% of the consultant participants were employed by consultancies with more than 2500 employees. Further, nearly half of the projects had one to five full-time equivalents on the client side working on the projects, and 80% of the projects were staffed by one to five consultants. The client survey participants can mostly be assigned to higher management. Of the client participants, 51% were from IT, followed by 21% from finance and controlling. In the projects we considered, the client employees' roles were mainly overall project managers (57%) or project leaders of substreams (22%). On the consultant side, 82% were senior consultants or higher (35% senior consultants; 23% managers; 16% senior managers; 8% partners). Regarding the dominant consultancy types, 64% were IT consultancies, followed by management consultancies (13%). Of the projects, 69% had an overall client-consultant relationship duration of >12 months.

Data analysis and results

Based on our empirical data from the online questionnaire, we tested our derived hypotheses using the partial least squares (PLS) approach (Chin 1998). In the case of complex research models with a high number of indicators and a measurement model that is not yet well established, PLS approaches have advantages over covariance-based approaches (Fornell and Bookstein 1982; Urbach et al. 2010). The PLS approach also has fewer requirements on sample size and residual distribution (Fornell and Bookstein 1982; Gefen et al. 2000), and is therefore more suitable for our project. To analyze our data and carry out our statistical calculation, we used the software SmartPLS 3 (Ringle et al. 2015).

Assessment of the measurement model

To assess our measurement model, which consisted of solely reflective indicators, we tested for unidimensionality, internal consistency, indicator reliability, convergent validity, and discriminant validity, following the advice of Hair et al. (2016), Urbach and Ahlemann (2010), and Straub et al. (2004).

To measure unidimensionality, we conducted an exploratory factor analysis (EFA) using SPSS 25 with a principal component analysis in combination with the Varimax rotation. All of the identified factors had an Eigenvalue above 1.0 and loaded on their corresponding factor. Following Gefen and Straub (2005), we dropped three items, since these did not reach the threshold of .600. Thus, we deleted two items of the construct collaboration quality and one item of the construct functional expertise of the consultant. All other factor loadings were above .600, and unidimensionality was shown.

To test for internal consistency, we calculated the Cronbach's alpha (CA) and the composite reliability (CR). Both CA and CR values should be higher than .800 (Chin 1998), which was the case for our data, suggesting high internal consistency (Table 1).

Further, we checked our measurement model for indicator reliability, as the ratio of indicator variance explained by the latent variable (Götz et al. 2010). According to Chin (1998) and Segars (1997), all indicators should be higher than .707 and should be significant at the .05 level. We therefore checked our measurement model's outer loadings. All outer loadings were higher than .707 and were significant at the .05 level, showing indicator reliability (Appendix 3).

To assess convergent validity, we checked the average variance extracted (AVE) (Fornell and Larcker 1981), which should be at least .500 (Cool et al. 1989), which was the case in our data (Table 1).

Finally, we tested for discriminant validity. We calculated the Fornell-Larcker criterion (Fornell and Larcker 1981), the heterotrait-monotrait (HTMT) ratio (Henseler et al. 2015), and checked the cross-loadings (Chin 1998). Assessing the Fornell-Larcker criteria, all constructs had the highest correlation with themselves, shown in Table 2. Further, all constructs had an HTMT

Table 1 Reliability and convergent validity

Construct	Cronbach's Alpha	Composite reliability	Average variance extracted
ACap	.909	.937	.788
CollQual	.896	.927	.762
ConVal	.909	.936	.787
ExWCon	.923	.910	.672
FuncCli	.919	.939	.757
FuncCon	.919	.943	.806
IndExp	.883	.924	.801
Inno	.963	.970	.844
ConQual	.901	.931	.771
SocCli	.915	.936	.747
SocCon	.934	.950	.790
TechCli	.953	.964	.844
TechCon	.930	.947	.780

ratio below the threshold of .850 (Henseler et al. 2015) (Appendix 4), and the cross-loadings also met the requirement to have the highest correlation with the corresponding construct (Appendix 5). Thus, we concluded that there is discriminant validity in our measurement model.

Assessment of the structural model

Having evaluated the measurement model, we analyzed the structural model. Since we only considered fully completed questionnaires in our analyses, we did not have to cope with missing values. To assess our structural model for

Table 2 Fornell-Larcker criteria

	ACap	Coll Qual	Con Val	ExW Con	Func Cli	Func Con	Ind Exp	Inno	Con Qual	Soc Cli	Soc Con	Tech Cli	Tech Con
ACap	.887												
CollQual	.198	.873											
ConVal	.338	.231	.887										
ExWCon	.355	.041	−.035	.820									
FuncCli	.555	.025	.117	.450	.870								
FuncCon	.000	.339	.620	−.054	−.012	.898							
IndExp	.138	−.033	.309	.100	.167	.399	.895						
Inno	.073	.524	.429	−.114	−.083	.472	.118	.919					
ConQual	−.010	.463	.588	−.186	−.077	.604	.195	.649	.878				
SocCli	.324	.452	.198	.163	.490	.227	−.072	.268	.173	.864			
SocCon	−.007	.512	.282	−.094	.089	.460	−.004	.589	.603	.503	.889		
TechCli	.667	.210	.048	.333	.437	.032	.097	.051	.013	.246	−.014	.919	
TechCon	.184	.309	.458	.041	.001	.507	.406	.382	.547	.169	.248	−.001	.883

significance, we applied the bootstrapping procedure (Efron and Tibshirani 1986) with 5000 subsamples. Figure 4 shows our model with our analyses' results showing the coefficients of determination (R^2 values), the path coefficients, and the significance level. We also checked our model for collinearity issues by calculating the variance inflation factor (VIF). The results showed that all VIF values were far below the threshold of 5 (Hair et al. 2011), indicating the absence of multicollinearity issues (Appendix 6).

To assess our model's explanatory power, we calculated the R^2 values and the effect size (f^2). Based on Chin's (1998) classification, our structural model explains a moderate amount of variance. For the latent variables absorptive capacity ($R^2 = .534$) and IT consulting quality ($R^2 = .623$), the model explained more than half of the variance and, for IT consulting service value ($R^2 = .410$) and collaboration quality ($R^2 = .313$), still a moderate amount of variance (Chin 1998) (Fig. 4).

According to Hair et al. (2016, p. 222) the f^2 effect size determines "how much a predictor construct contributes to the R^2 value of a target construct." Thus, J. Cohen (1988) proposed three categories of effect size: small (f^2 between .02 and .15), medium (f^2 between .15 and .35), and large effect size (f^2 exceeding .35). The assessment of our structural model showed that all significant structural paths had at least a small effect size (Table 3, Appendix 7).

Having evaluated the in-sample prediction measures of our model (explanatory power), we also assessed the out-of-sample predictive power with a nonparametric Stone-Geisser test (Geisser 1974; Stone 1974) and calculated the Q^2 values. Thus, we used the blindfolding procedure of SmartPLS 3 (Ringle et al. 2015). To avoid an integer number when dividing the sample by the omission distance, we chose an omission distance of 8 (Hair et al. 2016). Positive Q^2 values express the predictive power and confirm predictive relevance. Moreover, higher Q^2 values indicate a higher prediction of the model. Our results showed positive values for our endogenous variables (IT consulting quality: $Q^2 = .445$; absorptive capacity: $Q^2 = .381$; IT consulting value: $Q^2 = .285$; collaboration quality: $Q^2 = .214$). Thus, the results showed that our model had predictive power.

We provide an overview of our structural assessment in Fig. 4 and Table 3.

Discussion

We set out to investigate determinants of IT consulting value by drawing on a matched pair approach. First and most importantly, we argued and saw in our empirical data that IT consulting quality (H2; $\beta = .645$; $p = .000$) and the client organization's absorptive capacity (H9; $\beta = .257$; $p = .044$) positively impacted on our dependent variable IT consulting service value. As noted, IT consulting quality represents the consultants' capabilities, absorptive capacity represents the clients' abilities, and collaboration quality is a joint determinant by clients and consultants. Against the background of the existing S-D logic literature in the B2B context, our findings not only reconfirm the results of existing qualitative-empirical research contributions that S-D logic is applicable and value is

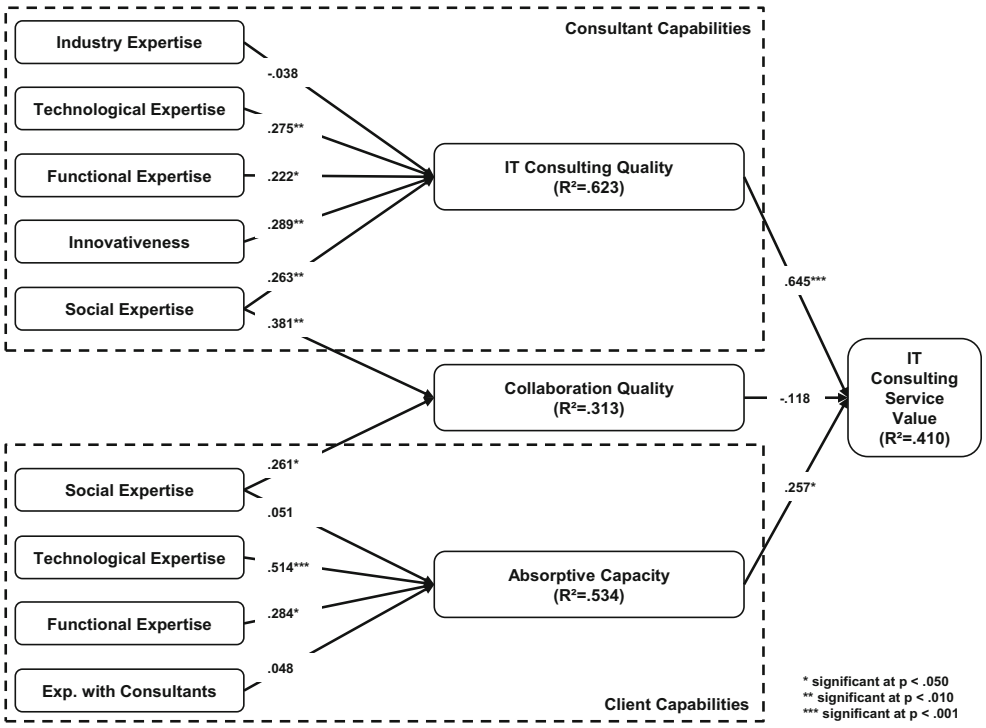

Fig. 4 Results of the structural analysis

Table 3 Results of the hypothesis tests

Hypothesis		β	f^2	Support	Effect size
H1:	CollQual → ConVal	−.118	.018	No	–
H2:	ConQual → ConVal	.645***	.547	Yes	Large
H3:	IndExp → ConQual	−.038	.003	No	–
H4:	TechCon → ConQual	.275**	.132	Yes	Small
H5:	FuncCon → ConQual	.222*	.071	Yes	Small
H6:	Inno → ConQual	.289**	.128	Yes	Small
H7:	SocCon → ConQual	.263**	.106	Yes	Small
H8:	SocCon → CollQual	.381**	.158	Yes	Medium
H9:	ACap → ConVal	.257*	.106	Yes	Small
H10:	SocCli → CollQual	.261*	.074	Yes	Small
H11:	SocCli → ACap	.051	.004	No	–
H12:	TechCli → ACap	.514***	.444	Yes	Large
H13:	FuncCli → ACap	.284*	.099	Yes	Small
H14:	ExWCon → ACap	.048	.004	No	–

Path-β: * significant at $p < .050$; ** significant at $p < .010$; *** significant at $p < .001$.
Effect size: >.350 large; >.150 and ≤.350 medium; >.020 and ≤.150 small.

co-created, but also strengthen und extend these by a quantitative-empirical matched pair approach, showing evidence that the assumption of S-D logic and value co-creation remain valid in an IT consulting service context (e.g., Blaschke et al. 2018, 2019; Breidbach et al. 2013a; Breidbach and Maglio 2015; Hein et al. 2019). IT consulting quality is a robust and significant determinant of IT consulting service value. Clients acknowledge that IT consultants approach incumbents' problems in structured and understandable ways. Further, clients can assess whether IT consultants have the required skills and knowledge, which in turn contributes to the IT consulting service value. Service quality's importance for value has also been confirmed by other studies (Barrutia and Gilsanz 2013; Caruana et al. 2000; Lin et al. 2014; Yaşlıoğlu et al. 2013). Turning to client capabilities, our study stresses that a client's absorptive capacity has a significant positive impact on IT consulting value. This means that the clients' ability to identify externally provided relevant knowledge and to transform, assimilate, and apply it is an key determinant for achieving IT consulting service value (Lau and Lo 2015). Thus, we conclude that, in the domain of IT consulting, the outcome in the form of perceived IT consulting service value is ultimately co-created by the client's and the IT consultant's operant capabilities.

Surprisingly, however, and in contrast to our hypothesis, our data showed no support for the relationship between the joint determinant of collaboration quality and IT consulting service value (H1; $\beta = -.118$; $p = .221$). Previous studies suggested that mutual interactions of IT consultants and clients in terms of information exchange and communication openness seemed important, especially in knowledge-intensive industries such as IT consulting (Bettencourt et al. 2002; González-Benito et al. 2016). Previous empirical studies have found positive influences of collaboration, for instance in R&D projects (e.g., Wurst et al. 2001) and in manufacturing (e.g., Faems et al. 2005; Lee et al. 2015). We assume that, in R&D projects, the collaboration is even closer than in IT consulting; thus, collaboration could be a more decisive determinant in the R&D context. However, our findings are in line with Chen et al. (2009), who conducted a study in the service industry and proposed a positive impact of external partner collaboration on service delivery innovation, but also found no empirical support for this. Looking at our empirical data in greater detail, this discrepancy could also be due to the different IT consulting project types in our sample. While consultants can successfully complete some IT consulting projects with a fairly low-touch collaboration level (e.g., IT audit), others need fairly high-touch collaboration (e.g., IT strategy) (O'Mahoney and Markham 2013). Also, we found a significant positive impact of collaboration quality on IT consulting service value in a single regression analysis ($\beta = .262$; $p = .010$). Thus, we conclude that our overarching capabilities – IT consulting quality and absorption capacity – have a higher explanatory power compared to the single determinant collaboration quality.

Focusing on the more detailed level of the antecedents of IT consulting quality, our data showed support for five of our six hypotheses regarding the required operant resources of IT consultants. We hypothesized that consultants need specific industry expertise that they lever in projects in order for a project to succeed, i.e., have a thorough understanding of how business is conducted in the client industry. Our data showed no support for this hypothesis, which means that the specific expertise of a client's industry is not decisive in the

context of an IT consulting project (H3: β = −.038; p = .682). While for instance Goles (2003) found evidence that the business understanding (i.e., industry expertise) is a decisive antecedent of overall vendor capabilities, our findings are in line with Pandit (1999), who also found no support when examining industry expertise's impact on retaining auditors. Regarding our findings, the reason for this discrepancy could be rooted in the nature of IT consulting projects, since these may be more or less universal and include few of the client industry's particularities. Further, we assume that the pivotal reason is the structure of the IT consulting projects we focused on. Our data has a large part of low-touch IT consulting projects (e.g., IT audit), for which a deeper industry expertise of IT consultants seems not to be decisive. For instance, IT audit projects examine and evaluate a client's IT infrastructure, operations, and policies based on a predefined set of rules and regulations. It may be that these rules and regulations can be applied to many industries. Thus, we assume that specific expertise of a client's industry plays a subordinate role in IT audits and is not a decisive determinant in our context.

We found support for our hypothesis that IT consultant technological expertise (H4: β = .275; p = .005) is needed to provide high IT consulting quality. Especially in the IT consulting industry, assigned IT consultants must have specific technological skills to support a client in IT-related issues. Especially against the backdrop of the increasing digital transformation, technology-related expertise such as knowledge of emerging technologies, their disruptive forces, and possible usage cases seems to be crucial for IT consultants. In this regard, our results are in line with previous findings (e.g., Davis and Woodward 2006; Goles 2003; Ifinedo 2011; Yoon et al. 1995).

Moving on to the next hypothesis, IT consultants also need functional expertise to fully understand all facets of a project and must apply their specialized skills to the problem at hand, thereby improving the IT consulting quality (H5: β = .222; p = .040). Our results provide support for the theoretically derived positive impact of IT consultant functional expertise on IT consulting quality, as also suggested in previous literature (Das et al. 1999; Ferguson et al. 1994; Holdford and Schulz 1999).

Also, our results reveal that IT consultants must be innovative so as to achieve high IT consulting quality (H6: β = .289; p = .007). We argue that an IT consultant's innovativeness contributes to unique solutions for a client and fosters IT consulting quality (Garcia and Calantone 2002; Kunz et al. 2011). We assume that the broad context of digital transformation is closely linked to digital innovation and knowledge of emerging technologies and is therefore highly relevant in today's digital age. Next, we hypothesized that the social expertise of the consultants influences IT consulting quality.

Our data supports the assumption that the more personal skills IT consultants have (which help to direct their actions from an individual to a shared action orientation), the higher the IT consulting quality (H7: β = .263; p = .009). Consultants are trained to swiftly adapt to different social conditions in order to effectively respond to their clients' needs and obtain the required information in order to be able to solve problems. Our finding is in line with previous studies in various contexts (e.g., Garavan 1997; Korczynski 2005; Osei-Frimpong et al. 2015).

Further, we found evidence that consultants' social expertise contributes significantly to collaboration quality (H8: β = .381; p = .003). Thus, we argued that a person's social skills promote their ability to work together (Hughes and DeForest 1993; Wilson et al. 2006). In sum, consultants need to offer innovative solutions from the client's perspective and need strong technological expertise in order to offer high-quality IT consulting rather than being an expert in the client industry.

Third, and turning to the client's absorptive capacity, we found support for the assumption that a client's capabilities also significantly impact on IT consulting service value, as discussed above (H9; β = .257; p = .044). Zeroing in on the determinants of a client organization's operant capabilities, our data show that a client's social expertise positively impacts on collaboration quality (H10: β = .261; p = .023). However, in contrast to our conceptualization, a client's social expertise did not influence their absorptive capacity, i.e., the ability to identify externally provided knowledge and to assimilate, transform, and apply it (H11: β = .051; p = .608). We postulate that this insignificant relationship can be drawn back to the setup of the matched pair approach, in which IT consultants evaluated their clients' social expertise. IT consultants are assigned to solve specific client problems and are trained to provide solutions to clients with either high or low social skills. Thus, in the IT consultants' view, social expertise is not conducive to a client's absorptive capacity.

Further, we hypothesized that clients, like IT consultants, need technological expertise (H12: β = .514; p = .000) as well as functional expertise (H13: β = .284; p = .023) so as to increase their ability to absorb externally provided knowledge; this was confirmed by our data and in previous studies (e.g., Jensen et al. 2004; Todorova and Durisin 2007).

Finally, we hypothesized that clients' prior knowledge on how to work with consultants positively impacts their absorptive capacity, yet this was not supported by our results (H14: β = .048; p = .677). Absorptive capacity is based on prior related knowledge, which forms a client's ability to absorb valuable knowledge (Roberts et al. 2012). This result is surprising and could be explained by the fact that most of the client respondents self-classified as overall project managers or leaders of substreams. Thus, we assume that working with IT consultants is nothing new to them and that they have high sophistication in working with IT consultants. Our assumption is reinforced by the demographic distribution of the

relationship duration between a client and an IT consultant. This relationship's demographic distribution showed that, in almost half of the 77 analyzed dyads, there was a relationship duration of more than 24 months. In sum, from a consultant perspective, a client's absorptive capacity is mainly determined by the client's technological and functional understanding. Nonproject-related skills such as social expertise and a client's past experience with consultants had negligible influence.

In sum, we have shown empirical evidence for 10 out of 14 hypotheses. With our dyadic research design, we empirically showed that both a client's and a consultant's operant resources determine the value in the IT consulting projects.

Conclusion

Increasing digital transformation is forcing organizations to rapidly adapt their processes and business models to changing conditions in order to remain well positioned in future. On the one hand, organizations need to deal with much more technology-driven issues than ever before, but they also lack the relevant knowledge and skills to address these issues. To overcome the gap between the required and the available knowledge and skills, organizations strongly rely on the services of IT consulting firms. Thus, the relationship between IT consulting firms and client organizations is transforming into a more partner-oriented relationship rather than a solely service provider one. By taking S-D logic and value co-creation as the theoretical lens, we set out to investigate whether the emergence of value in IT consulting projects is co-created and which factors determine the IT consulting service value. We developed a conceptual model based on the literature and conducted a quantitative-empirical study in the IT consulting domain, simultaneously considering both a client's and an IT consultant's capabilities with a dyadic matched pair approach. We have provided evidence that consultants and clients co-determine the IT consulting service's value in an IT consulting project. In the IT consultant sphere, technological and social expertise and a consultant's innovativeness mainly predict IT consulting service quality. In the client sphere, a client's technological expertise and functional expertise impact on their absorptive capacity.

Contributions to theory

We have made two primary theoretical contributions. First, our study contributes to the consulting research domain. There is still little knowledge in the consulting research. We investigated and empirically validated the determinants of value creation in the consulting domain. Further, we contributed to the understanding of IT consulting value emergence by showing that not only the IT service quality provided by an IT consultant's knowledge and skills is decisive for value to be perceived, but also a client's absorptive capacity of the consulting services. Specifically, we provided in-depth insights as to which individual operant capabilities IT consultants and clients require so as to increase IT consulting service's value. Thus, we provide a deeper understanding of the inner mechanisms in IT consulting projects, extending the discourse on which skills are most valuable in consulting.

Second, we have contributed to the discourses of S-D logic and value co-creation. Most of the research contributions in the S-D logic field were more conceptual (Blaschke et al. 2019), although more and more empirical research contributions are emerging. We limited our study to the B2B S-D logic context and contributed to the ongoing S-D logic discourse in two ways. First, existing qualitative-empirical studies have underscored and corroborated the assumption of S-D logic in B2B relationships (e.g., Blaschke et al. 2018, 2019; Breidbach and Maglio 2016; Breidbach et al. 2013b; DeLeon and Chatterjee 2017; Hein et al. 2019; Mele 2009; Skålén et al. 2015). Like previous qualitative-empirical studies, our quantitative-empirical findings also provide evidence of the applicability of S-D logic and value co-creation in a specific B2B context. Specifically, we approached the peculiarities of S-D logic and value co-creation with a rarely used but promising survey design. While matched pair approaches have already been used in IS research (e.g., Gerow et al. 2014; Pee et al. 2010; Preston and Karahanna 2009; Tallon 2007), to our best knowledge, we are among the first who account for S-D logic's peculiarities with a quantitative-empirical dyadic approach that simultaneously considers both actors in the service. For quantitative-empirical researchers in the S-D logic and value co-creation domain, the matched pair approach seems to be a promising instrument to capture the inner mechanisms in S-D logic and value co-creation settings and can be transferred to other B2B contexts.

In sum, we have broadened the knowledge base of consulting research and have corroborated the assumptions of S-D logic and value co-creation for the IT consulting service industry. Thus, our findings have enriched the theory of S-D logic by providing quantitative-empirical evidence from a matched pair approach to shape and verify the ongoing S-D logic discourse (Brodie et al. 2011).

Implications for practice

Our results also have significant implications for practitioners. In the digital age and with increasing digital transformation, organizations strongly rely on IT consulting services to overcome their shortages in required skills and knowledge. On the one hand, this may be a well-established and promising approach, but when organizations engage IT consulting firms, the client employees tend to reduce their workload and rely exclusively on the IT consultants' results. Our findings

showed that purchasing IT consulting services and allowing the IT consultants to solely take the helm for the entire project do not automatically lead to valuable solutions for the client. Further, client employees should play an active role in the service delivery process so as to co-create and create the highest possible IT consulting service value. Thus, when internally staffing the client employees on IT consulting projects, managers should carefully evaluate the required skills and knowledge for an IT project and should then allocate the most appropriate employee with the right skills and knowledge to an IT project. Thus, client organizations can best contribute to value in IT projects.

On a more detailed level, we have provided interesting insights for both IT consultancies and client organizations. Against the backdrop of high competition in the IT consulting market and the emergence of ever-new market players, it is becoming more and more important for IT consulting firms to satisfy their clients by providing customized and valuable service (Momparler et al. 2015). Based on our findings, IT consultancies may learn which determinants lead clients to perceive a high consulting service value. We see that IT consulting quality is particularly determined by technological expertise and social expertise as well as by innovative solutions. A stronger focus on these topics in internal human resources development will contribute in future IT projects to the overall perception of value and may contribute to sustainable revenues. Knowing which determinants foster client employees' absorptive capacity and contribute to the overall perception of value helps IT consulting firms to focus on key client players in their consulting projects. Further, our findings are helpful for client organizations, who now know which determinants lead to high consulting quality and can focus on the right factors in their consulting selection processes. We support client organizations in their digital transformation journey by providing insights into their current relationships with IT consulting firms. Based on our study's results, client organizations can draw their individual conclusions and can derive measures to govern their IT consulting projects to achieve the highest possible value out of an IT consulting project.

Limitations and future research directions

Having presented our contributions to theory and implications for practice, we will now discuss our study's limitations. First, we only focused on perceived IT consulting service value. Value may also be influenced by additional factors such as price, political connections, and sales capabilities. We explicitly focused on IT consulting service value as the tradeoff between benefits and sacrifices; thus, in our view, the individual value perception remains the best proxy. Nonetheless, future research could incorporate a more objective and quantifiable value definition to investigate how an IT consulting project contributes to overall organizational performance. Second, owing to the cross-sectional design, our study faced the typical limitations that accompany this methodology. At the same time, we think that we provide a sound starting point for follow-up studies that compare the findings over time to allow for a longitudinal perspective. Third, despite our adequate number of observations, our dataset is limited to IT consulting firms and their clients, which differed greatly in size and their relationship duration, and were from Europe. Further, we did not demarcate different IT consulting segments (i.e., system integrator, audit, niche strategists, and freelancers). As one of the first quantitative-empirical studies in this field, we opted for a broader approach so as to cover all aspects of the IT consulting industry as a whole. To understand the specific inner mechanisms of the industry's different consulting segments and possible influences of regional IT consulting styles, researchers could extend our study's regional scope and could include different IT consulting segments. Also, a dedicated comparison of low-touch and high-touch IT projects (e.g., IT implementation or IT strategy) as well as a comparison of IT projects regarding their consulting theme (such as software, cloud, hardware, platform development) could also reveal in-depth insights into possible different determinants of consulting value co-creation.

An interesting additional research avenue could be to compare the findings of IT consulting firms with other consulting domains such as management and strategy consulting firms. Multigroup analysis (Henseler 2007) could therefore be fruitful to expand the statistical analyses and could reveal additional insights. Fifth, our model concentrated on the relationship between an IT consulting firm and the corresponding client in one project, neglecting the socio-dynamic environment and dependencies on other projects and resource-integrating parties. Researchers may investigate the entire B2B consulting ecosystem by conducting a multiple-case study, an approach that may reveal how important operand resources are, which we did not incorporate into our model. Sixth, although the matched pair approach is most suitable for our empirical validation, the two-sided evaluation of the capabilities may be biased owing to interpersonal differences, project progress, and general opinions.

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Appendix

Appendix 1 Results of round 2 of the card-sorting procedure

			Actual												
Construct		No. of items	ACap	Coll Qual	Con Qual	Con Val	ExW Con	Func Cli/ Con	Ind Exp	Inno	Soc Cli/ Con	Tech Cli/ Con	Amb./ Un-clear	Total	Hits
Theoretical	ACap	4	**23**		1							3	1	28	82.14%
	CollQual	6		**41**							1			42	97.62%
	ConQual	4			**26**		1					1		28	92.86%
	ConVal	4				**28**								28	100%
	ExWCon	5					**35**							35	100%
	FuncCli/Con	5			1			**34**						35	97.14%
	IndExp	3					1		**20**					21	95.24%
	Inno	6			1					**41**				42	97.62%
	SocCli/Con	5		4							**31**			35	88.57%
	TechCli/Con	5					1					**34**		35	97.14%
	$N = 7$		**Total placements: 329**				**Correct placements: 313**				**Overall hit ratio: 95.14%**				

Appendix 2 Survey items

Absorptive capacity (based on: Ko et al. 2005)

ACap_1: The client has the necessary skills to implement the delivered service.

ACap_2: The client has the managerial competence to absorb the business knowledge.

ACap_3: The client has the technical competence to absorb the technical knowledge about the delivered service.

ACap_4: Overall, the client's absorptive capacity is high.

Collaboration quality (based on: Han et al. 2008; Zacharia et al. 2011)

CollQual_1: We and our client/consultant project team are interested in each other's problems.*

CollQual_2: We and our client/consultant project team solve most problems together.

CollQual_3: We and our client/consultant project team are generally cooperative in conducting business.

CollQual_4: We and the client/consultant project team shared a lot of information.

CollQual_5: We and the client/consultant project team made joint decisions on most issues.*

CollQual_6: Overall, the quality of collaboration between us and the client/consultant project team is high.

IT consulting quality

ConQual_1: The consulting project team follows a clear project schedule.

ConQual_2: The consulting project team follows a clear structure in our specific project methodology.

ConQual_3: The consulting project team uses methods that are appropriate for the specific project.

ConQual_4: Overall, the consulting quality is high.

IT consulting service value (based on: Barrutia and Gilsanz 2013; Gruen et al. 2007)

ConVal_1: The overall value we/the client get/s from the provided service is worth its money and effort.

ConVal_2: Considering the price we/the client pay/s, we believe that the provided service is sufficient.

ConVal_3: The price we/the client pay/s is reasonable.

ConVal_4: Overall, our/the client's value of the provided service is high.

Experience with consultants

ExWCon_1: The client employees know how to work efficiently with consultants.

ExWCon_2: The client employees often collaborate with consultants in their project domain.

ExWCon_3: Working with consultants is not unusual to the client employees in their project domain.

Appendix 2 (continued)

ExWCon_4: The client employees are experienced at working with consultants.

ExWCon_5: Overall, our/the client's value of the provided service is high.

Functional expertise of the client/consultant (based on: Brady and Cronin 2001; Sharma and Patterson 2000)

FuncCli/Con_1: The client employees/consulting project team understand/s the functional aspects of the actual problem addressed by the project.

FuncCli/Con_2: The client employees/consulting project team have/has good functional knowledge in the project domain.

FuncCli/Con_3: The client employees/consulting project team are/is quite experienced in the functional project domain.

FuncCli/Con_4: The client employees/consulting project team apply/applies their functional expertise well on the actual problem addressed by the project.*

FuncCli/Con_5: Overall, the functional expertise of the client employees/consulting project team is high.

Industry expertise (based on: Goles 2003)

IndExp_1: The consulting project team has a sound reputation in the client's industry.

IndExp_2: The consulting project team is experienced in our industry.

IndExp_3: Overall, the consulting project team's industry expertise is high.

Innovativeness (based on: Calantone et al. 2002; Wang 2008)

Inno_1: The consulting project team often tries out new ideas.

Inno_2: The consulting project team seeks out new ways to do things.

Inno_3: The consulting project team actively seeks innovative ideas.

Inno_4: The consulting project team is willing to try new ways to do things.

Inno_5: The consulting project team seeks unusual, novel solutions.

Inno_6: Overall, the consulting project team can be considered as innovative.

Social expertise of the client/consultant

SocCli/Con_1: The client employees/consulting project team have/has an open attitude toward others.

SocCli/Con_2: The client employees/consulting project team treat/s others in a sensitive way.

SocCli/Con_3: The client employees/consulting project team treat/s others with respect.

SocCli/Con_4: The client employees/consulting project team have/has the social ability to be empathic.

SocCli/Con_5: Overall, the client employees/consulting project team have/has high social expertise.

Technological expertise of the client/consultant (based on: Barrutia and Gilsanz 2013; Goles 2003)

TechCli/Con_1: The client employees/consulting project team give/s appropriate advice on relevant technologies.

TechCli/Con_2: The client employees/consulting project team know/s more about the relevant technologies than others.

TechCli/Con_3: The client employees/consulting project team have/has strong technological capabilities.

TechCli/Con_4: The client employees/consulting project team have/has high technical competence.

TechCli/Con_5: Overall, the technological expertise of the client employees/consulting project is high.

*We deleted the items CollQual_1, CollQual_5, and FuncCon_5 based on the explorative factor analysis' findings

All items were measured using a seven-point Likert-type scale (from 1 = strongly disagree to 7 = strongly agree).

Appendix 3 Indicator reliability: Outer loadings

	ACap	Coll Qual	Con Val	ExW Con	Func Cli	Func Con	Ind Exp	Inno	Con Qual	Soc Cli	Soc Con	Tech Cli	Tech Con	p-values
ACap_1	.922													.000
ACap_2	.834													.000
ACap_3	.848													.000
ACap_4	.941													.000
CollQual_2		.856												.000
CollQual_3		.889												.000
CollQual_4		.830												.000
CollQual_6		.914												.000
ConVal_1			.932											.000
ConVal_2			.924											.000
ConVal_3			.861											.000
ConVal_4			.827											.000
ExWCon_1				.943										.000
ExWCon_2				.833										.000
ExWCon_3				.776										.001
ExWCon_4				.705										.008
ExWCon_5				.823										.001
FuncCli_1					.742									.000
FuncCli_2					.923									.000
FuncCli_3					.906									.000
FuncCli_4					.816									.000
FuncCli_5					.946									.000
FuncCon_1						.866								.000
FuncCon_2						.874								.000
FuncCon_3						.892								.000
FuncCon_5						.956								.000
IndExp_1							.924							.000
IndExp_2							.847							.000
IndExp_3							.913							.000
Inno_1								.934						.000
Inno_2								.932						.000
Inno_3								.940						.000
Inno_4								.865						.000
Inno_5								.884						.000
Inno_6								.955						.000
ConQual_1									.892					.000
ConQual_2									.851					.000
ConQual_3									.833					.000
ConQual_4									.933					.000
SocCli_1										.852				.000
SocCli_2										.895				.000
SocCli_3										.826				.000
SocCli_4										.832				.000
SocCli_5										.912				.000
SocCon_1											.840			.000
SocCon_2											.901			.000
SocCon_3											.881			.000

Appendix 3 (continued)

	ACap	Coll Qual	Con Val	ExW Con	Func Cli	Func Con	Ind Exp	Inno	Con Qual	Soc Cli	Soc Con	Tech Cli	Tech Con	p-values
SocCon_4											.907			.000
SocCon_5											.913			.000
TechCli_1												.891		.000
TechCli_2												.859		.000
TechCli_3												.932		.000
TechCli_4												.946		.000
TechCli_5												.964		.000
TechCon_1													.841	.000
TechCon_2													.870	.000
TechCon_3													.879	.000
TechCon_4													.872	.000
TechCon_5													.952	.000

Appendix 4 Heterotrait-monotrait ratio of correlation

	ACap	Coll Qual	Con Val	ExW Con	Func Cli	Func Con	Ind Exp	Inno	Con Qual	Soc Cli	Soc Con	Tech Cli	Tech Con
ACap													
CollQual	.215												
ConVal	.247	.257											
ExWCon	.208	.152	.071										
FuncCli	.598	.073	.131	.407									
FuncCon	.075	.365	.681	.084	.099								
IndExp	.142	.138	.322	.129	.193	.452							
Inno	.083	.568	.454	.150	.093	.495	.125						
ConQual	.080	.510	.638	.205	.091	.649	.195	.690					
SocCli	.350	.482	.218	.156	.542	.237	.108	.285	.189				
SocCon	.059	.544	.300	.116	.104	.481	.050	.618	.654	.538			
TechCli	.705	.232	.079	.243	.456	.083	.122	.077	.110	.257	.082		
TechCon	.203	.325	.491	.103	.097	.542	.438	.387	.578	.182	.247	.088	

Appendix 5 Cross-loading

	ACap	Coll Qual	Con Val	ExW Con	Func Cli	Func Con	Ind Exp	Inno	Con Qual	Soc Cli	Soc Con	Tech Cli	Tech Con
ACap_1	**.922**	.151	.278	.305	.469	.082	.174	.093	.025	.318	−.005	.614	.171
ACap_2	**.834**	.130	.152	.329	.543	−.051	.051	.023	−.100	.309	.001	.440	.131
ACap_3	**.848**	.174	.194	.258	.399	.019	.157	.058	.007	.193	−.053	.730	.128
ACap_4	**.941**	.244	.173	.377	.576	−.062	.094	.078	.016	.340	.036	.553	.220
CollQual_2	.084	**.856**	.138	.139	.028	.341	.103	.489	.439	.369	.467	.209	.334
CollQual_3	.241	**.889**	.289	.053	.064	.260	−.074	.486	.488	.452	.418	.178	.302
CollQual_4	.166	**.830**	.147	−.055	−.060	.247	.014	.438	.289	.291	.357	.219	.170
CollQual_6	.191	**.914**	.213	−.006	.031	.331	−.126	.425	.379	.439	.524	.145	.257
ConVal_1	.257	.203	**.932**	−.048	.144	.590	.320	.410	.559	.251	.280	.055	.470
ConVal_2	.206	.149	**.924**	−.069	.168	.564	.314	.365	.552	.149	.284	.049	.406
ConVal_3	.124	.206	**.861**	.016	.010	.518	.210	.419	.543	.094	.213	−.010	.400
ConVal_4	.219	.288	**.827**	−.012	.081	.528	.240	.322	.412	.214	.214	.085	.332

Appendix 5 (continued)

	ACap	Coll Qual	Con Val	ExW Con	Func Cli	Func Con	Ind Exp	Inno	Con Qual	Soc Cli	Soc Con	Tech Cli	Tech Con
ExWCon_1	.460	.120	−.045	**.943**	.473	−.047	.035	−.087	−.185	.227	−.060	.387	.044
ExWCon_2	.144	−.131	−.002	**.833**	.225	−.059	.222	−.149	−.141	−.053	−.220	.191	.068
ExWCon_3	.041	.001	−.040	**.776**	.219	−.069	.053	−.148	−.149	.041	−.093	.147	−.087
ExWCon_4	.022	−.178	−.058	**.705**	.312	−.103	.079	−.158	−.187	.017	−.055	.119	−.047
ExWCon_5	.126	−.028	−.003	**.823**	.406	−.019	.148	−.073	−.121	.128	−.012	.160	.029
FuncCli_1	.359	.000	.069	.399	**.742**	.018	.189	−.012	−.019	.428	.070	.300	.147
FuncCli_2	.533	.073	.146	.400	**.923**	.004	.080	−.055	−.041	.431	.087	.412	−.049
FuncCli_3	.564	−.031	.087	.460	**.906**	−.036	.175	−.146	−.151	.380	.034	.438	−.076
FuncCli_4	.360	.086	.044	.299	**.816**	.029	.213	−.005	−.022	.524	.135	.298	.018
FuncCli_5	.539	−.002	.142	.388	**.946**	−.042	.112	−.102	−.070	.424	.082	.417	.022
FuncCon_1	.035	.379	.539	−.036	.062	**.866**	.233	.491	.519	.256	.484	.071	.321
FuncCon_2	.060	.289	.626	−.057	−.113	**.874**	.425	.345	.495	.128	.325	.089	.519
FuncCon_3	−.059	.171	.510	−.073	−.077	**.892**	.422	.405	.470	.113	.295	−.045	.446
FuncCon_5	−.029	.357	.559	−.034	.057	**.956**	.367	.448	.654	.289	.513	.003	.525
IndExp_1	.181	.076	.330	.106	.148	.343	**.924**	.171	.218	−.023	.033	.125	.385
IndExp_2	.048	−.129	.199	.068	.132	.360	**.847**	.068	.096	−.161	−.064	.118	.246
IndExp_3	.096	−.110	.259	.083	.166	.385	**.913**	.046	.170	−.066	−.017	.021	.414
Inno_1	.099	.531	.305	−.088	−.104	.402	.030	**.934**	.550	.220	.567	.032	.308
Inno_2	.040	.458	.431	−.141	−.028	.485	.081	**.932**	.665	.280	.580	.068	.301
Inno_3	.001	.480	.341	−.140	−.074	.363	.023	**.940**	.572	.246	.585	−.032	.291
Inno_4	.119	.476	.399	.003	−.075	.387	.132	**.865**	.495	.201	.474	.138	.339
Inno_5	.094	.466	.444	−.101	−.102	.515	.242	**.884**	.658	.252	.496	.089	.470
Inno_6	.059	.490	.430	−.138	−.081	.425	.125	**.955**	.602	.264	.538	−.009	.382
ConQual_1	−.093	.410	.498	−.212	−.136	.511	.196	.582	**.892**	.106	.553	−.099	.531
ConQual_2	.049	.408	.535	−.101	−.031	.580	.140	.587	**.851**	.216	.589	.120	.388
ConQual_3	.051	.419	.405	−.254	−.100	.421	.083	.537	**.833**	.139	.492	.052	.397
ConQual_4	−.031	.396	.605	−.107	−.015	.590	.249	.572	**.933**	.146	.486	−.019	.589
SocCli_1	.281	.444	.057	.221	.441	.128	−.094	.194	.146	**.852**	.479	.241	.121
SocCli_2	.334	.429	.294	.065	.402	.294	−.067	.272	.234	**.895**	.435	.318	.185
SocCli_3	.195	.280	.148	−.003	.330	.174	−.053	.274	.187	**.826**	.457	.225	.143
SocCli_4	.211	.397	.197	.226	.399	.209	−.003	.183	.051	**.832**	.341	.118	.104
SocCli_5	.345	.369	.154	.163	.518	.170	−.084	.244	.125	**.912**	.462	.149	.170
SocCon_1	.020	.304	.286	−.177	.113	.377	−.020	.481	.530	.348	**.840**	−.047	.191
SocCon_2	−.001	.488	.263	−.061	.090	.480	.051	.530	.525	.493	**.901**	.016	.237
SocCon_3	.024	.536	.321	−.078	.064	.476	.005	.543	.621	.511	**.881**	.043	.273
SocCon_4	−.006	.503	.197	−.038	.043	.347	−.022	.539	.491	.396	**.907**	−.002	.236
SocCon_5	−.075	.404	.173	−.078	.091	.343	−.041	.515	.496	.462	**.913**	−.093	.144
TechCli_1	.661	.232	.182	.342	.473	.130	.178	.115	.110	.349	.114	**.891**	.154
TechCli_2	.613	.145	−.019	.358	.412	.013	.087	.012	−.068	.194	−.091	**.859**	−.030
TechCli_3	.571	.206	.028	.231	.378	.033	.107	.023	.005	.194	−.028	**.932**	−.023
TechCli_4	.609	.199	.012	.342	.349	−.061	.023	.033	−.013	.189	−.051	**.946**	−.065
TechCli_5	.596	.179	.005	.243	.384	.024	.039	.043	.018	.191	−.018	**.964**	−.057
TechCon_1	.135	.326	.387	−.068	−.091	.488	.326	.483	.552	.079	.338	−.038	**.841**
TechCon_2	.085	.270	.379	.058	−.020	.371	.267	.302	.506	.170	.203	−.065	**.870**
TechCon_3	.201	.227	.390	.053	.051	.466	.486	.273	.349	.128	.105	.040	**.879**
TechCon_4	.194	.204	.374	.139	.075	.361	.380	.195	.433	.159	.124	.029	**.872**
TechCon_5	.214	.306	.480	.029	.024	.538	.379	.377	.519	.208	.263	.049	**.952**

Appendix 6 Collinearity statistic: Inner VIF values

	ACap	Coll Qual	Con Val	ExW Con	Func Cli	Func Con	Ind Exp	Inno	Con Qual	Soc Cli	Soc Con	Tech Cli	Tech Con
ACap			1.056										
CollQual			1.343										
ConVal													
ExWCon	1.299												
FuncCli	1.754												
FuncCon									1.841				
IndExp									1.357				
Inno									1.734				
ConQual			1.290										
SocCli	1.326	1.338											
SocCon		1.338							1.719				
TechCli	1.277												
TechCon									1.514				

Appendix 7 Effect size: f^2

	ACap	Coll Qual	Con Val	ExW Con	Func Cli	Func Con	Ind Exp	Inno	Con Qual	Soc Cli	Soc Con	Tech Cli	Tech Con
ACap			.106										
CollQual			.018										
ConVal													
ExWCon	.004												
FuncCli	.099												
FuncCon									.071				
IndExp									.003				
Inno									.128				
ConQual			.547										
SocCli	.004	.074											
SocCon		.158							.106				
TechCli	.444												
TechCon									.132				

Effect size: >.350 large; >.150 and ≤ .350 medium; >.020 and ≤ .150 small

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