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**Do professional service firms benefit from customer and supplier collaborations in competitive, turbulent environments?**

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## **Abstract**

Although recent research on business-to-business professional service firms (PSFs) emphasizes the role and consequences of collaboration with business partners, we know little about the conditions under which bright-side benefits of PSF interfirm collaboration turn into dark-side drawbacks. Our study shows that PSFs customer and supplier collaborations have both bright and dark sides, and their benefits with respect to helping a PSF to drive service performance are contingent on the levels of the environmental competition and turbulence. In particular, increasing levels of competitive intensity and environmental turbulence faced by a PSF can diminish its capacity to drive collaboration to improve service performance. When the level of competitive intensity increases, the benefits of customer collaboration become more positive, however, the dark-side of supplier collaboration becomes more pronounced. When the level of environmental turbulence increases, the dark-side of customer and supplier collaborations become more critical and the benefits derived from interfirm collaboration can be lost.

**Keywords:** *Professional service firms, customer collaboration, supplier collaboration, service performance, competitive intensity, environmental turbulence, partial least squares*

## 1. Introduction

Service firms now more than ever are operating in an increasingly confounding and uncertain environment, where the tempo is faster and the competition is stronger. In this competitive and turbulent environment, collaborating with external parties - customers and suppliers - is critical for service firms to maintain or strengthen their competitiveness by offering superior service to customers (see Carbonell et al., 2009; Villena et al., 2011). Despite the identified benefits of interfirm collaboration, there is evidence that interfirm collaborations that appear beneficial, can also be vulnerable to decline or result in drawbacks under certain conditions (Anderson & Jap, 2005; Fang et al., 2011; Mitrega et al., 2012; Yen & Barnes, 2011). This is especially true for business partners that are still engaged and optimistic about their collaboration, but may have less commitment to the collaboration and explicitly seek self-interest goals (Anderson & Jap, 2005; Noordhoff et al., 2011). The transformation of the benefits from collaboration into drawbacks raises issues of a dark-side to interfirm collaboration (e.g., Anderson & Jap, 2005; Noordhoff et al., 2011).

Indeed, the paradox of collaboration appears to emanate from the fact that while there are acknowledged benefits from interfirm collaboration, there is also evidence that outcomes of collaboration are not always positive, and the risks associated with failures in collaboration are high (Fang et al., 2011; Noordhoff et al., 2011; Yen & Barnes, 2011; Mitrega et al., 2012). In reality, benefiting from interfirm collaboration is never automatic and the current literature provides insights about factors such as trust, commitment, coordination, and social ties that help firms build effective interfirm collaboration. The literature also identifies factors that may diminish the effectiveness of interfirm collaboration such as, conflict, opportunism, tensions, and length of collaboration (Palmatier et al., 2007; Fang et al., 2011; Yen & Barnes, 2011; Zaefarian et al., 2013; Abosag & Naudé, 2014). While these inter-relational factors help explain reasons behind the termination of interfirm collaborations, the current literature

offers a limited reflection on wider environmental factors such as the pressure of market competition and turbulence. However, these environmental factors can potentially affect the firm's emphasis on interfirm collaboration to develop superior services and may turn the benefits of customer and supplier collaboration into a dark-side. Without accounting for environmental factors, the extent that the bright-side of supplier and customer collaboration can turn into a dark-side cannot be fully understood by managers and scholars.

We believe that the benefits and of interfirm collaboration can change over time and the dark-side appears to manifest under specific conditions, because interfirm collaborations are dynamic (Mitrega et al., 2012) and contextual factors can influence the outcomes of these collaborations (Palmatier et al., 2007; Das & Rahman, 2010). Among different contextual factors, competitive intensity and environmental turbulence are key contextual factors that influence firm performance (Slater and Narver 1994, Ward and Duray 2000). However, the question of how the firm's perception of the market's competitiveness and turbulence affects their collaboration with their business partners (e.g., with suppliers or business customers) remains unanswered and deserves further research attention (see also Kandemir et al., 2006).

Addressing this question is critical for business-to-business (B2B) professional service firms (PSFs) due to the customized and high-contact characteristics of their services and their dependence on business partners to develop and deliver services (Noordhoff et al., 2011; Zaefarian et al., 2013). Services provided by IBM, Accenture, and Deloitte, which hold a place among fortune 500 firms, are examples of B2B PSFs whose services are often developed by leveraging the resources and knowledge of their partners through collaboration. However, the field of B2B marketing contains limited research examining the role of PSFs' simultaneous collaboration with customers and suppliers under differing environmental conditions. Given this limitation, the present study addresses the following research question:

“To what extent do increasing levels of environmental turbulence and competitive intensity influence the dark and bright sides of a PSF’s collaboration with customers and suppliers?”

In line with previous works, we define interfirm collaboration as the degree a PSF engages with two or more independent partners (e.g., suppliers, customers) to jointly develop and provide professional services (see also Simatupang & Sridharan, 2005; Lee et al., 2007; Menguc et al., 2014; Millson, 2015). Furthermore, we adopt the position that collaboration with customers and suppliers have both bright and dark sides. In this sense, the benefits gained from collaboration can also be lost or diminished under certain conditions (Noordhoff et al., 2011; Mitrega et al., 2012). We use contingency theory as a theoretical foundation to develop our theory and investigate the extent that differing levels of competitive intensity and environmental turbulence turn the benefits PSFs gain from supplier and customer collaborations into the dark-side, **negatively influencing the PSF’s capacity to drive the performance of services**. Contingency theory adopts the premise of matching organizational activities with the corresponding environmental context, and supports the view that there is no universal set of choices for all businesses that produce optimal outcomes (Venkatraman & Prescott, 1990; Briggs & Grisaffe, 2009).

Our study advances the business-to-business services marketing literature by examining the extent that increasing levels of competitive intensity and environmental turbulence faced by a PSF diminish the capacity to drive service performance through collaboration with customers and suppliers. This study is among the first to address a lacuna in the professional service literature on the dark side of PSFs’ collaboration with both customers and suppliers.

## **2. Conceptual Background**

### *2.1 Service supply chains in the context of professional services*

As markets become more competitive and customers more demanding, PSFs need to look outside their organizational boundaries for opportunities to collaborate to ensure their service offerings are efficient and responsive to the increasing complexity of customer needs (Zaefarian et al., 2013). PSFs include firms operating in a range of sectors such as engineering, financial, and management consulting providers whose business is characterized as providing knowledge-intensive, customized services that are interactively designed and delivered by the PSF and the business customer (Greenwood & Empson, 2003; Aarikka-Stenroos & Jaakkola, 2012). The rise of specialization and knowledge-intensiveness prevalent in many industries has led many business customers to demand more from the services provided by PSFs (Jaakkola & Hakanen 2013). This increasing demand has contributed to an increasingly competitive market for PSFs (Chae, 2012; Probert et al., 2013). In this context, providing services with superior performance that address business customers' needs can be challenging, especially when high levels of collaboration are required to produce the service. In this sense, collaborating with business partners (e.g., suppliers, customers) can help PSFs to **access** complementary external resources and capabilities without the risks of internal development (Trkman & McCormack, 2009). In particular, interfirm collaboration provides a foundation that promotes knowledge sharing and learning (e.g., know-how to do a specific task), which in turn increases the PSF's capacity to develop and deliver superior services to customers (Cao & Zhang, 2011; Jaakkola & Hakanen, 2013; Menguc et al., 2014).

## *2.2 Dark-side of interfirm collaboration*

Understanding the antecedents and outcomes of effective interfirm collaboration represents an enduring and important issue for both scholars and practitioners over previous decades (Finch et al., 2013; Menguc et al., 2014). The current literature has focused heavily on factors

such as trust, commitment, coordination, formalization, and social ties that are now acknowledged as helping firms build effective collaboration with suppliers and customers to enhance financial performance (Palmatier et al., 2007; Carbonell et al., 2009; Mitrega et al., 2012; Zaefarian et al., 2013; Abosag & Naudé, 2014). However, along with this research, a growing body of work also investigates factors that may diminish the effectiveness of interfirm collaboration, focusing on factors such as, conflict, opportunism, tensions, and length of collaboration (Barnes, 2005; Fang et al., 2011; Villena et al., 2011; Yen & Barnes, 2011). In the latter stream of research, many suggest that interfirm collaborations that appear beneficial, can also be vulnerable to decline or have a dark-side (e.g., Anderson & Jap, 2005; Noordhoff et al., 2011).

Anderson and Jap (2005) argue that the dark-side of interfirm collaboration can be different to termination or breaking up the relationship due to conflicts and ongoing disagreements. Instead, the dark-side reflects business relationships in which the parties are still engaged and optimistic about their collaboration, but both parties may have less commitment to the collaboration and explicitly seeks self-interest goals, which ultimately influence the effectiveness and outcomes of the collaboration. **In this sense, partners engaged in the collaboration may not receive the benefits they initially expected, and become unsure about the relationship, losing their motivation for the collaboration.** Drawing on Noordhoff et al. (2011), we argue that collaboration with suppliers and customers in the context of B2B professional services has both bright and dark sides and the effectiveness of these collaborations changes based on contextual factors. We adopt the position that factors that drive PSFs to collaborate with suppliers and customers (e.g., intensifying competition and environmental turbulence) can also diminish the effectiveness of these collaborations (see the similar position in Anderson & Jap, 2005, p. 75).



### 3. Hypothesis Development

In this study, we focus on interfirm collaboration as the degree a PSF engages with two or more independent partners (e.g., suppliers, customers) to jointly develop and provide professional services (see also Simatupang & Sridharan, 2005; Lee et al., 2007; Menguc et al., 2014; Millson, 2015). According to Ragatz et al. (2002), this form of collaboration in new product development may range from simple consultation on design ideas, to making suppliers fully responsible for the design of components, systems, processes, or services. Building on the view of Ragatz et al. (2002), we argue that supplier collaboration enables a PSF and a supplier to combine and integrate their resources and capabilities to offer an effective service (Ordanini & Maglio, 2009). In particular, supplier collaboration allows PSFs to import the best practices from their suppliers and to complement their own resources with suppliers' resources in order to enhance resource synergy across the firms (Cao & Zhang, 2011).

Complementary resources are crucial in providing superior services because a PSF may not possess **required** resources and processes (Hansen & Nohria, 2004) to provide the service. **Because of knowledge sharing and complementary resource endowments coming from the collaboration (Hansen & Nohria, 2004; Cao & Zhang, 2011), the efficiencies and flexibility of the PSF to provide superior services and address customers' needs will be improved (Nyaga et al., 2010).** This view is in line with Ragatz et al. (2002) who suggest that using the knowledge and expertise of suppliers to complement internal capabilities may help reduce concept-to-customer cycle time, costs, quality problems, and improve the overall design effort. To this end, we argue that promoting supplier collaboration enhances the capacity of a PSF to access greater levels of diverse resources and capabilities to meet the customers' need and drive a service performance. Thus,

*H1: Supplier collaboration is positively related to service performance.*

It is increasingly accepted by scholars that PSFs must learn from and collaborate with customers to create services that meet customers' specific needs (Noordhoff et al., 2011; Aarikka-Stenroos & Jaakkola, 2012). The present study defines customer collaboration as the extent to which the PSF and the customer work jointly to develop and deliver customized services (O'Cass & Ngo, 2011). Recent advances in the service marketing literature view customers as crucial actors in the creation and delivery of services, rather than as passive receivers of service (Hoyer et al., 2010). In this sense, PSFs need to facilitate customer collaboration throughout the service design and provision process to encourage customers to become active collaborators (see Ngo & O'Cass, 2013). This view is also supported by Noordhoff et al. (2011) who assert that an 'embedded relationship' with a customer may prompt a firm to work harder to use its own knowledge to address customer needs. In the B2B professional services context, purchasing is often associated with high risk due to the inherent intangibility and complexity characteristics of professional services.

To have further control over the performance and attributes of a professional service, business customers may have a stronger desire to be actively involved in the design and delivery of the service. Therefore, encouraging customer collaboration not only helps PSFs to learn from customers, but it also represents a mechanism allowing the customer to interact with a PSF and customize the configuration and attributes of a service (Auh et al., 2007). As such, customer collaboration represents a key mechanism to satisfy customer needs and develop services that effectively solve customer problems (Chan et al., 2010; Hoyer et al., 2010).

We adopt the position that business customers are the best source of information regarding their own needs, preferences, and important sources of new service ideas (Noordhoff et al., 2011). Against this position, we argue that promoting customer collaboration allows a PSF to better identify a customer's specific needs, minimize design

errors, and ensure a service solution's attributes and functionality meet the customer's requirement (see also Hoyer et al., 2010; Aarikka-Stenroos & Jaakkola, 2012). This argument is in line with research that suggests customer collaboration helps to achieve a closer fit between a service's features and customer needs (e.g., Fang et al., 2008; Hoyer et al., 2010). To this end, we argue that promoting customer collaboration enhances a PSF's capacity to effectively identify customer needs, customize service attributes, and minimize design errors, which in turn drive service performance. Thus,

*H2: Customer collaboration is positively related to service performance.*

### *3.1 Contextual effects of competitive intensity*

Building on contingency theory, we reflect on how environmental factors such as competitive intensity and environmental turbulence can turn bright-side benefits of PSFs collaboration with partners into dark-side drawbacks. In this study, competitive intensity refers to the degree of competition a PSF faces in its industry (Jaworski & Kohli, 1993; Atuahene-Gima, 1995; Briggs & Grisaffe, 2009; Kemper et al., 2013). A higher degree of competitive intensity corresponds with the number of competitors, presence of strong competitors, availability of substitute products/services, and the degree of price competition (O'Cass & Weerawardena, 2010; Chan et al., 2012; Tsai & Yang, 2013; Eggert et al., 2015). Consequently, customers in highly competitive markets potentially have a greater number of options and are freer to switch to other PSFs, thus a PSF that offers superior services to its customers compared to its rivals is likely to achieve greater market success (Briggs & Grisaffe, 2009).

It is also argued that in intensely competitive environments, it is more difficult for firms to gain access to resources necessary to develop and commercialize an innovation successfully. In this sense, firms may be tempted to mimic competitors in order to reduce the

high cost of innovation (Briggs & Grisaffe, 2009; Molina-Castillo et al., 2011; Eggert et al., 2015). This is especially true in service contexts where there are no patent rights or barriers to the imitation of new offerings. However, blind imitation of competitors can be detrimental, because it may negatively influence the firm's ability to identify practices that are critical for market success and for coping with intensifying competition (Challagalla et al., 2014).

The literature on supply chain management suggests that firms operating in highly competitive markets are more likely to need close collaboration with their suppliers than firms in stable markets (Fynes et al., 2005). While this stream of literature suggests that supplier collaboration can help PSFs to gain access to complementary knowledge without the costs of internal development (Ragatz et al., 2002; Anderson & Jap, 2005), it can also be regarded as a knowledge transfer mechanism for firms to learn from each other. Importantly, knowledge transfers entail some level of risk and firms cannot fully control the use that the other partner may make of the knowledge (Becerra et al., 2008). This risk is more critical for PSFs compared to other service and manufacturing firms, because PSFs primary value-added activity is knowledge, which is both an input and output (Bettencourt et al. 2002). In knowledge-intensive sectors like B2B PSFs, organizational knowledge is often tacit based on academic knowledge or extensive experience, and causally ambiguous (Hansen et al., 1999; Bettencourt et al., 2002). This requires supplier partners to possess overlapping knowledge bases to overcome barriers in the knowledge exchange processes that underpin the ability to provide services that respond to customer needs (Hansen et al., 1999). However, in this sense, suppliers may learn how to develop comparable services over time and become future competitors.

Drawing on the above discussion, we argue that PSFs operating in a highly competitive market will be more concerned about sharing critical knowledge with suppliers. In this sense, a PSF may avoid engaging in in-depth collaboration with their suppliers, which, in turn, may

adversely influence the effectiveness of supplier collaboration. A supplier may provoke a similar response and begin to withhold sensitive knowledge, which then minimizes the PSF's ability to utilize the supplier's knowledge to bolster innovation and offer superior services to customers (see similar arguments in Noordhoff et al., 2011). **To this end, a PSF and its supplier(s) in highly competitive markets may tend to focus more on their own self-interests and be potentially distracted from building effective collaborations compared to PSFs and suppliers that are operating in less competitive markets.** Consequently, the service performance benefits derived from the PSF's collaboration with suppliers may diminish and turn to the dark-side when a PSF perceives its business environment as highly competitive. Thus,

*H3a: Competitive intensity negatively moderates the effect of the PSF's collaboration with suppliers on service performance.*

It is advocated that greater levels of competitive intensity force firms to find novel ways to differentiate themselves from competitors and develop services that offer superior benefits to customers over competing service providers (Carbonell & Rodriguez, 2006; Eggert et al., 2015). In this context, service performance is regarded as an effective means of differentiation, because it helps PSFs to offer superior solutions that satisfy customers' needs better than competitors (Eggert et al., 2015). Chan et al. (2012) contend that as firms need to be more market responsive to counter rivals' aggressive actions in a highly competitive market, those promoting customer collaboration to identify and satisfy customer needs in such a setting are expected to enjoy even better performance than firms doing the same when facing less competition.

Consistent with the foregoing line of reasoning, we argue that PSFs are more tempted to promote collaboration to boost service performance in highly competitive markets for two

reasons. First, customer collaboration allows accurate identification of customer needs, saves time capturing the knowledge held by customers, avoid mistakes in designing the service, and thereby offering services that effectively address customer problems (Fynes et al., 2005; Hoyer et al., 2010). Second, PSFs in responding to the competitors' actions directed to encourage existing customers to switch, may seek to build closer relationships with customers (Eggert et al., 2015). At the same time, in highly competitive markets when the number of suppliers is growing and customer find it hard to judge the quality of services, building closer relationships with customers may help customers to trust the PSF. Trust may help a customer to prompt the PSF to access its confidential knowledge (e.g., financial statistics), and guide the PSF to address its unmet needs (see also Noordhoff et al., 2011). Taken together, the above discussion draws attention to the importance of customer collaboration in highly competitive markets. This implies that the service performance benefits derived from the PSFs' collaboration with customers may escalate when it perceives its business environment as highly competitive and work more closely with customers to develop superior services. Thus,

*H3b: Competitive intensity positively moderates the effect of the PSF's collaboration with the customers on service performance.*

### *3.2 Contextual effects of environmental turbulence*

Building on Jaworski and Kohli (1993) and Molina-Castillo et al. (2011), we define environmental turbulence as the degree and frequency of changes in customer preferences and the unpredictability of technological changes in a PSF's business environment. As such, sources of environmental turbulence include market-related and technological changes. The marketing literature suggests that market-related changes arise from the instability and speed of changes in the customers' needs and market trends (Kandemir et al., 2006). Technological

changes arise from the instability and changes arising from technological innovations in the market (Kandemir et al., 2006). Emerging and fast changing technologies cannibalize prior services or make them less competitive in the market (see the comparable discussion in Droge et al., 2008). Therefore, PSFs operating in highly turbulent markets need to modify their services **to address** changing customer preferences, compared to those operating in more stable markets (Chen et al., 2012).

It is advocated that many managers in highly turbulent environments may have a sense of urgency and favor quick results (Das & Rahman, 2010). While some PSFs may hold a long-term view and are more oriented towards investments in financial assets and in building effective collaboration with their business partners (e.g., customers, suppliers), many may seek quick results from their collaboration for **three** reasons (see similar arguments in Anderson & Jap, 2005; Das & Rahman, 2010). First, some PSFs may lack the patience to allow interfirm relationships to develop and thereby tend to treat collaboration with a supplier or a customer merely as a one-off business transaction. Second, a PSF may simply not be able to afford to wait long enough for optimum collaboration outcomes due to the pressures **coming from the high level** of environmental turbulence (see Das & Rahman, 2010). **Consequently, the PSF** may place greater pressure on their suppliers to produce immediate results at the expense of an effective long-term collaboration (Trkman & McCormack, 2009; Das & Rahman, 2010).

**Third**, environmental turbulence can increase a PSF's doubt about the supplier's abilities to fill the gap caused by the environmental changes and core knowledge/processes required to address customer needs (see Kandemir et al., 2006; Zhao et al., 2013). In this sense, they may be more inclined to terminate collaboration with their existing suppliers and switch to **those perceived to possess** more appropriate technical competencies. Such

opportunistic behavior by PSFs can negatively influence the suppliers' commitment, intention to share critical information, and efforts to help the PSF satisfy its customers.

In particular, if the partners in a relationship are too short-term oriented, both parties will have an incentive to exploit each other as quickly as possible (Anderson & Jap, 2005). Consequently, suppliers may pay less attention to the outcomes of a service project and the customer's needs, when they perceive their collaboration as a one-off business transaction or believe that a focal PSF seeks to satisfy its self-interest goals (see Das & Rahman, 2010; Noordhoff et al., 2011). *In this sense, a PSF and its suppliers in turbulent environments may become more short-term oriented in the business relationship, focus more on self-interests, and devote less effort to build and maintain effective collaborations. To this end, we argue that* the service performance benefits derived from the PSF's collaboration with suppliers may diminish and turn to the dark-side, when a PSF perceives its business environment as highly turbulent. Thus,

*H4a: Environmental turbulence negatively moderates the effect of the PSF's collaboration with suppliers on service performance.*

While in turbulent markets customer collaboration can also help PSFs to better predict market changes and gain access to complementary knowledge, pursuing customer collaboration is relatively time-consuming. In particular, customers as business partners need to learn about their roles and responsibilities smoothly and efficiently (Das & Rahman, 2010). PSFs that are less patient because of the pressures of environmental turbulence may spend the insufficient time to interact properly with their customers, exchange critical information, learn about their needs, and instruct them about their roles. In this sense, PSFs may use unproven processes, solutions, and technologies to develop services faster, which may come at the expense of quality of services and meeting customer needs (see the comparable discussion in Chen et al., 2012). *On the other hand, customers may become less*



motivated to collaborate with a PSF and share important information, when a PSF pays less attention to building an effective customer dialogue that provides appropriate instructions about their role and collaboration requirements. In this sense, the customer may perceive its collaboration as an unfair task forced upon them by the PSF with no clear instruction, and devote less effort to actively collaborate with the PSF.

Further, it is plausible that as customer needs changes quickly, a PSF's existing services become obsolete and inefficient to address the customers' emerging needs. More importantly, when customers' needs change quickly, a customer may be still confused about how to adapt and how those changes may affect its business needs in a turbulent market (Li & Calantone, 1998; Carbonell et al., 2009). Under these conditions, interaction with customers may provide little insights at best and confusion at worst (see the similar argument in Carbonell et al., 2009). Therefore, the service performance benefits derived from the PSF's collaboration with customers may diminish and turn to the dark-side when a PSF perceives its business environment as highly turbulent. Thus,

*H4b: Environmental turbulence negatively moderates the effect of the PSF's collaboration with the customers on service performance.*

#### **4. Research method**

A survey of managers was used to gather the data to test the hypotheses. We collected data from a sample of PSFs in Iran, including industrial engineering consulting, management consulting, marketing consulting, IT services, and financial services. Following Aarikka-Stenroos and Jaakkola (2012), we focused on PSFs in different professional services sectors to increase generalizability of the results (see the similar approach in Theoharakis et al., 2009; Jalkala & Salminen, 2010; Mitrega et al., 2012), because PSFs in various sectors may face distinct market conditions. The informants in the PSFs were senior managers (e.g.,

CEOs, members of top management) who were deemed knowledgeable about the PSF's market conditions and the levels of customer and supplier collaboration in the service provision process (see the similar approach in Tsai & Yang, 2013; Zaefarian et al., 2013; Eggert et al., 2015). The questionnaires were prepared in English and then translated into Persian following the conventional back-translation process (O'Cass & Sok, 2013). Building on Theoharakis et al. (2009), we pre-tested the instruments using individual interviews with 20 senior managers to examine understanding of the questions and face validity of the constructs. During the interviews, managers were asked to complete the questionnaire with the authors present and comment on how they interpreted the questions, which helped to minimize response bias.

We employed a drop-and-collect data collection technique, because it can yield response rates similar to those of a person-administered approach at a cost equivalent to questionnaire mail-outs. Initially, we randomly telephoned 500 PSFs obtained from a business directory to elicit participation in the study. To increase the response rate, PSFs were promised a summary report of the final results delivered via e-mail (see the similar approach in Fang et al., 2011). From the firms contacted, 300 PSFs agreed to participate, and we received 190 completed surveys from these firms. We assessed the quality of returned surveys based on the number of missing values and the competence of informants. Following O'Cass et al. (2014), we assessed the competence of informants with respect to their knowledge about the questions asked and their confidence in their ability to answer questions on a seven-point Likert-type scale, anchored at "1= not at all" to "7= very much so". We dropped any respondent that scored below four on any of the two items (see also Zaefarian et al., 2013). The final sample consisted of 169 PSFs and the mean scores of the informants' knowledge about the questions asked and the informants' confidence in their ability to answer in the final sample were over 5.5, indicating satisfactory informant competency about the

issue being studied. The average firm size was 98, and the average firm age was 8 years. The informants included CEOs (59.4%), vice president (26.4%), managing directors (10.9%), and project managers (3.3%). The majority of respondents (58%) had over 10 years working experience, 38% had between 5 to 10 years, and 3% had less than 5 years. We assessed the potential for non-response bias by computing t-tests comparing the samples of participating and nonparticipating firms based on firm age and size. The results indicate that non-response bias was not a concern.

#### *4.1 Measures*

We measured all constructs using established items in the literature. All constructs' measures are outlined in Table 1. Supplier collaboration was measured using four items from Li and Atuahene-Gima (2001). Customer collaboration was measured using four items using Ngo and O'Cass (2013). Competitive intensity was measured using four items from Atuahene-Gima (1995). Environmental turbulence was measured using four items from Atuahene-Gima (2005) (see also Tsai & Yang, 2013). Service performance was measured using four items from Caruana (2002). We also assessed the effects of several control variables, including firm size, firm age, and firm type (e.g., engineering consulting, financial consulting). All items (except firm size, age, and type) were measured on seven-point scales ranging from "1= not at all" to "7= very much so".

### **5. Results**

#### *5.1 Measurement Model*

We employed partial least squares (PLS) to examine the measurement model and test the hypotheses. Based on reliability, convergent validity, and discriminant validity tests the measurement model meets psychometric property requirements. In particular, Table 1 shows

that all indicators had acceptable bootstrap critical ratios ( $>1.96$ ) and component loadings ( $>0.50$ ). As shown in Table 2, the constructs' average variance extracted (AVE) were uniformly acceptable ( $>0.50$ ), ranging from 0.51 to 0.67 and composite reliability were acceptable ( $>0.70$ ), ranging from 0.74 to 0.90, indicating satisfactory convergent validity. The results also indicate that the discriminant validity is satisfactory, because the square roots of the AVEs (the off-diagonal elements in Table 2) were greater than individual correlations. Following O'Brien (2007), we assessed the possibility of multicollinearity and found that it was not evident. The maximum variance of inflation factor score was 1.28 lower than the cut-off value of 5.00.

**--- Insert Table 1 about here ---**

**--- Insert Table 2 about here ---**

## *5.2 Structural Model*

We tested our hypotheses using a multiple-step procedure. As shown in Table 3, in step 1 we examined the main effects through a base model. In step 2, the moderating effects of competitive intensity and environmental turbulence were added to the base model. We examined the goodness of fit (GoF) for the base model following the approach suggested by Wetzels, Odekerken-Schröder, and van Oppen (2009). The GoF value for the base model was 0.47, indicating a good fit for the structural model. Building on Tsai, Chou, and Kuo (2008), one-tailed tests were used for testing hypotheses (particularly the interaction effects), because directional predictions were offered. The results provide support for H1 and H2, indicating that both supplier collaboration ( $\beta = 0.27$ ,  $t = 3.35$ ) and customer collaboration ( $\beta = 0.43$ ,  $t = 5.74$ ) positively influenced service performance.

The results also reveal that competitive intensity negatively moderates the relationship between supplier collaboration and service performance ( $\beta = -0.24$ ,  $t = 2.40$ ), supporting H3a.

To better illustrate the moderation effect of competitive intensity, the interaction was plotted using Cohen, Cohen, West, and Aiken's (2013) procedure of computing slopes one standard deviation above and below the means of the moderating variable. Figure 1 (Plot A) illustrates the simple slope analysis results indicating that the positive effect of supplier collaboration on service performance is diminished at high levels of competitive intensity. Further, competitive intensity positively moderates the relationship between customer collaboration and service performance ( $\beta = 0.23$ ,  $t = 2.11$ ), supporting H3b. Figure 1 (Plot B) also indicates that the positive effect of customer collaboration on service performance is enhanced at high levels of competitive intensity.

Table 3 also indicates that market turbulence negatively moderate the effects of both supplier collaboration ( $\beta = -0.18$ ,  $t = 1.87$ ) and customer collaboration ( $\beta = -0.27$ ,  $t = 2.28$ ) on service performance, supporting hypotheses 4a and 4b. Figure 1 (Plots C and D) also indicate that the positive link between supplier collaboration – service performance and customer collaboration – service performance diminishes at high levels of environmental turbulence. Finally, none of the control variables significantly influenced service performance.

--- Insert Table 3 about here ---

--- Insert Figure 1 about here ---

## 6. Discussion and conclusions

Although collaboration with both suppliers and customers is becoming more of a necessity for B2B PSFs to offer superior services, these interfirm collaborations are not always synonymous with beneficial relationships or positive outcomes. Despite the sizable literature on the inter-relational factors (e.g., conflict, opportunism, tension) that may diminish the effectiveness of interfirm collaboration (Fang et al., 2011; Yen & Barnes, 2011; Villena et al., 2011; Mitrega et al., 2012; Abosag & Naudé, 2014), little is known about the

environmental conditions that may turn the benefits of PSFs collaboration with suppliers and customers into a dark-side. Our study advances the literature by arguing that competitive intensity and environmental turbulence are important contingencies that determine when a PSF's collaboration with suppliers and customers enhance or diminish the capacity to drive performance of services. In particular, we contend that a PSF's collaboration with suppliers and customers can be detrimental and negatively influence service performance under specific market conditions. Building on contingency theory, we provide evidence that PSF managers should have a deep understanding of market characteristics and match their orientation towards interfirm collaboration with the corresponding levels of competitive intensity and turbulence to avoid the dark-side of collaboration.

Our study is among the first to show that customer and supplier collaborations have both bright and dark sides, and differing levels of competitive intensity and environmental turbulence can pronounce the dark-side (or drawbacks) of these collaborations. Initially, we found that both customer and supplier collaborations enhance the PSF's capacity to drive service performance. These findings are in line with research on the bright-side of interfirm collaboration, which shows customer and supplier collaborations boost the firm's capacity to offer superior product and service to customers (e.g., Ragatz et al., 2002; Fynes et al., 2005; Etgar, 2008; Carbonell et al., 2009; Hoyer et al., 2010). Our point of departure is through investigating environmental conditions under which the potential dark-side of supplier and customer collaborations increases by examining the contingency effects of competitive intensity and environmental turbulence.

The results of our study further advance the literature in two important ways. Our first contribution is illustrating that competitive intensity differentially influences the PSF's ability to leverage customer collaboration and supplier collaboration to boost service performance. Interestingly, the increasing level of competitive intensity increases the dark-side of supplier

collaboration, to the point where its positive effect on service performance diminishes. The underlying reason for this might be that PSFs operating in highly competitive markets may be more concerned about sharing critical knowledge with suppliers to avoid supplier opportunism. A supplier may also respond similarly, trying to keep the benefit of collaboration for themselves. In this sense, while both the PSF and supplier may continue their collaboration, they are less committed and less likely to help each other to enhance synergy, bolster innovation, and provide superior services to customers. Thus, supplier collaboration can be detrimental and have a significant dark-side for PSFs in highly competitive markets.

Our findings show that as the level of competitive intensity increases the effect of customer collaboration on service performance becomes stronger. Given that collaboration with customers helps them to identify customers' complex problems and needs, PSFs operating in a competitive market may rely more on customer collaboration to ensure their services are superior to competitors. At the same time, building close relationships with customers helps build customer trust, collaborate more effectively, and prompts the PSF to access its confidential information, which enhance the PSF's capacity to identify the customer's problems correctly and develop high performance services. Thus, customer collaboration is more critical for PSFs in highly competitive markets.

Our second contribution comes from revealing that both supplier and customer collaborations can also be detrimental and have a dark-side for PSFs in highly turbulent markets. Given that managers may have some sense of urgency and favor quick results in highly turbulent environments, many may seek quick results from their collaboration and put pressure on their suppliers and customers to produce immediate results or switch to suppliers that quickly address the PSF's requirements. We contend that PSFs in highly turbulent markets are more likely to adopt such opportunistic behavior to satisfy its self-interest goals,

which in turn may negatively affect the effectiveness and contribution to service performance from supplier collaboration. On the other hand, PSFs that seek quick results from customer collaboration in highly turbulent environments may spend insufficient time to properly interact with customers and learn about their preferences, which in turn increase the risk of mismatch between the service functionality and customer needs. The results support our contentions and show that with increasing levels of environmental turbulence there is a greater likelihood of experiencing negative effects from supplier and customer collaborations on service performance. Our results extend the conceptual work of Das and Rahman (2010) who that argue pressures for quick results can be positively associated with partner opportunism, which in turn can negatively influence the effectiveness of interfirm collaboration (see also the similar argument in Anderson & Jap, 2005).

### *6.1 Managerial Implications*

Our findings offer some guidance to PSF managers about the extent that differing levels of competitive intensity and environmental turbulence can turn the benefits gained from supplier and customer collaboration into the dark-side. Our findings should help managers of PSFs to assess the risks associated with supplier and customer collaborations as well as the circumstances of their emphasis on a form of collaboration (e.g., with customers or suppliers), **especially set within the context of the level of competition and turbulence in their markets**. Our study offers two important implications for managers. First, our study suggests that emphasizing supplier collaboration to promote service performance can be detrimental, if the PSF is operating in highly competitive and turbulent markets. While managers should be concerned about the risk of sharing critical knowledge with suppliers who can become potential future competitors, effective knowledge sharing is a key to avoiding the dark-side of supplier collaboration. Furthermore, **PSF** managers that put pressure on suppliers to produce



immediate results to satisfy **their own** self-interests in turbulent markets may negatively affect the supplier's attention and effort to satisfy the PSFs' **own** customer needs. We advise managers to leverage mechanisms that enable them to avoid the dark-side of supplier collaboration in competitive and turbulent markets, such as promoting suppliers' commitment through economical (e.g., mutual hostage such as sharing valuable patent and know-how) and relational (e.g., setting collaborative goals) tools (see also Das & Rahman, 2010).

Second, managers need to be aware of both the bright and dark sides of customer collaboration in competitive and turbulent markets. Consistent with our findings, we suggest managers to promote customer collaboration in highly competitive markets, where services with superior benefits and features help a PSF to face market competition. PSFs that effectively interact with and learn from customers can more accurately identify customers' complex problems and develop services that solve those problems better than competitors do. However, our results importantly reveal for managers that customer collaboration in turbulent markets may have a dark-side, when PSFs spend the insufficient time to build an effective dialogue with customers and learn about their needs. While the pressure of market turbulence may force PSFs to cut time-consuming processes and use practices from previous projects to develop new services **more** quickly, the customized nature of professional services and the dynamism of customer preferences can make previously used practices obsolete and less effective. Furthermore, although managers are commonly advised that identification of customer needs and building effective collaboration with customers is critical for firms operating in various manufacturing and service sectors, this task is more critical for B2B professional service providers. Business customers' problems and challenges are acknowledged as complex and the only way to identify their latent needs is building close relationships that help them to trust a PSF and share sensitive information that is necessary for the PSF to develop effective solutions. Therefore, we advise managers who seek

immediate results from customer collaboration in turbulent markets that they are less likely to develop services that effectively satisfy the customer's needs under such circumstances.

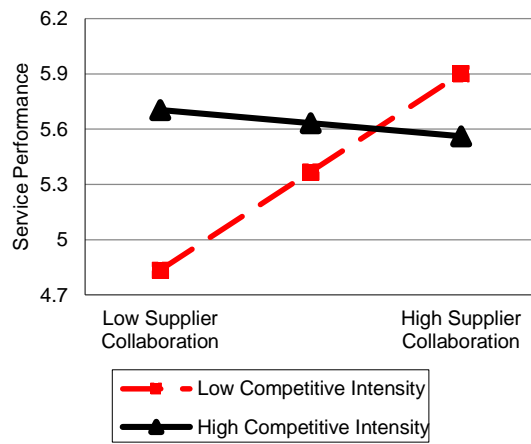
## *6.2 Limitations and Further Research*

Our study is limited to a certain extent because of our cross-sectional design, which leads to issues **associated with making causal** inference. Future research using longitudinal data may help in evaluating the prescribed order of collaboration on service performance over different conditions of B2B service projects, such as design, implementation, and post-implementation stages. Second, the sample is based on B2B service firms; thus, the results might be different for B2C services and not-for-profit services. Scholars are encouraged to replicate our study in different service sectors and countries in order to investigate the robustness and generalizability of our findings. Third, it is conceivable that other factors such as a service provider's service climate and employee's satisfaction also influence the service performance. Future research should, therefore, extend our study by investigating the role of these factors in the relationship between a B2B PSF's service performance and collaboration. Finally, we argue in accord with O'Cass and Sok (2013) that service performance is a multi-stage process involving different collaborators (e.g., service provider, customer) at different points in the service process. Therefore, another potential avenue for future research is to integrate the perspectives of both the PSF and the customer simultaneously (using a dyadic multi-informant research design) to provide a more advanced view of the effects of different components of a service.

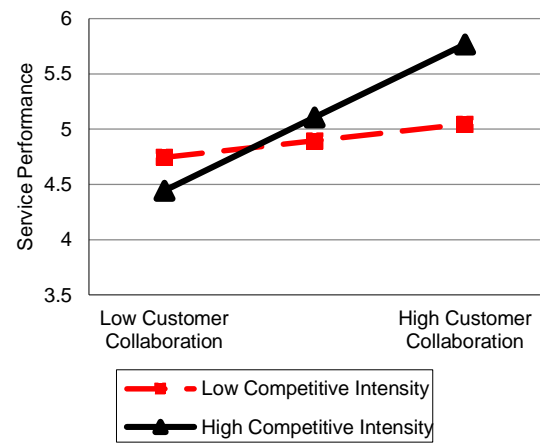
**Fig. 1**

**Interactions**

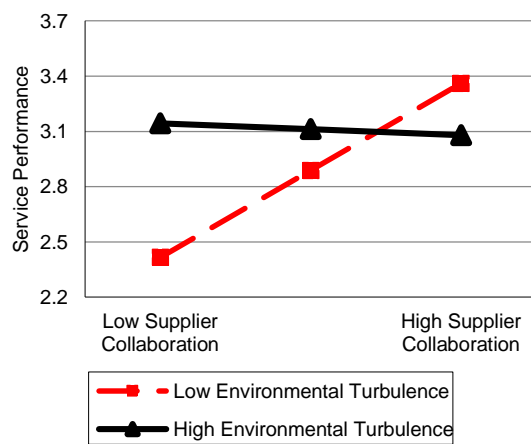
**A) Interaction between supplier collaboration and competitive intensity**



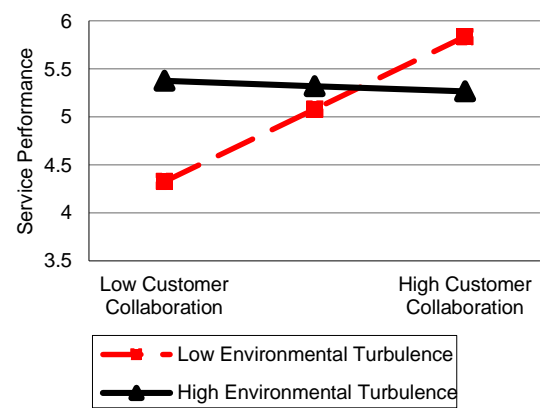
**B) Interaction between customer collaboration and competitive intensity**



**C) Interaction between supplier collaboration and environmental turbulence**



**D) Interaction between customer collaboration and environmental turbulence**



**Table 1**

## Constructs and manifest variables

| Constructs and Manifest Variables  | Loading | T-value |
|--|---------|---------|
| <b>Service Performance</b> AVE= 0.71 CR= 0.90 - <i>Our firm:</i>   |         |         |
| ...ensures customers' personal preferences were satisfied.   | 0.86    | 23.91   |
| ...delivers quality services.  | 0.84    | 27.01   |
| ...delivers services that exceed customers' expectations.  | 0.79    | 16.91   |
| ...delivers services with innovative performance features.   | 0.89    | 48.68   |
| <b>Customer Collaboration</b> AVE= 0.67 CR= 0.89 - <i>In our firm, we:</i>   |         |         |
| ...work with our customers to jointly design services that best fit the customers' internal and external conditions. | 0.85    | 18.82   |
| ...interact with our customers to jointly deploy (e.g., implement, operate) services.                                | 0.89    | 43.64   |
| ...work with customers to improve the efficiency of the deployed services.   | 0.77    | 13.92   |
| ...provide customers with supporting systems to help them get more value.  | 0.75    | 12.64   |
| <b>Supplier Collaboration</b> AVE= 0.63 CR= 0.88 - <i>In our firm, we:</i>   |         |         |
| ...collaborated with other firms (e.g., suppliers, partners) to deliver our services.                                | 0.75    | 10.17   |
| ...jointly developed and implemented our services with other firms.  | 0.82    | 18.25   |
| ...jointly promoted our services offering with other firms.  | 0.85    | 24.26   |
| ...jointly provided support for our services with other firms.   | 0.75    | 11.91   |
| <b>Competitive Intensity</b> AVE= 0.56 CR= 0.83 - <i>In our firm's business environment:</i>                         |         |         |
| ...competing services were similar to each other.  | 0.66    | 4.57    |
| ...there were many competitors.  | 0.75    | 6.56    |
| ...there was a strong, dominant competitor.  | 0.85    | 7.96    |
| ...price competition was intense.  | 0.70    | 5.25    |
| <b>Environmental Turbulence (SC)</b> AVE= 0.52 CR= 0.80 - <i>In our firm's business environment:</i>                 |         |         |
| ...customer needs and service preferences changed rapidly.   | 0.74    | 3.54    |
| ...customer service demands and preferences were uncertain.  | 0.64    | 2.39    |
| ...it was difficult to forecast technology developments.   | 0.63    | 2.62    |
| ...the technology environment was uncertain.   | 0.83    | 3.71    |

**Table 2**

Construct-level measurement statistics and correlation matrix

|                                    | <b>AVE</b> | <b>CR</b> | <b>1</b>    | <b>2</b>    | <b>3</b>    | <b>4</b>    | <b>5</b>    |
|------------------------------------|------------|-----------|-------------|-------------|-------------|-------------|-------------|
| <b>1.</b> Customer Collaboration   | 0.67       | 0.89      | <b>0.82</b> |             |             |             |             |
| <b>2.</b> Supplier Collaboration   | 0.63       | 0.88      | 0.18        | <b>0.80</b> |             |             |             |
| <b>3.</b> Competitive Intensity    | 0.56       | 0.83      | 0.08        | 0.24        | <b>0.75</b> |             |             |
| <b>4.</b> Environmental Turbulence | 0.52       | 0.80      | 0.14        | 0.09        | 0.04        | <b>0.72</b> |             |
| <b>5.</b> Service Performance      | 0.71       | 0.90      | 0.50        | 0.37        | 0.26        | 0.19        | <b>0.84</b> |

*Note: Diagonal entries show the square roots of average variance extracted; others represent correlation coefficients.*

**Table 3**

Structural results

| Independent Variables      |                               | Service Performance      |                            |
|----------------------------|-------------------------------|--------------------------|----------------------------|
|                            |                               | Base Model               | Interaction Model          |
| <b>H1</b>                  | Supplier Collaboration        | 0.27 (3.35)**            | 0.22 (2.20)**              |
| <b>H2</b>                  | Customer Collaboration        | 0.43 (5.74)**            | 0.35 (4.44)**              |
|                            | Competitive Intensity (CI)    | 0.17 (1.68) <sup>+</sup> | 0.11 (1.34)                |
|                            | Environmental Turbulence (ET) | 0.10 (1.07)              | 0.08 (1.03)                |
|                            | Firm size                     | 0.05 (0.65)              | 0.06 (0.75)                |
|                            | Firm age                      | -0.04 (0.53)             | -0.04 (0.49)               |
|                            | Firm type (dummy variable)    | 0.05 (0.64)              | 0.02 (0.44)                |
| <b>Interaction effects</b> |                               |                          |                            |
| <b>H3a</b>                 | CI × Supplier Collaboration   |                          | -0.24 (2.40)*              |
| <b>H3b</b>                 | CI × Customer Collaboration   |                          | 0.23 (2.11)*               |
| <b>H4a</b>                 | ET × Supplier Collaboration   |                          | - 0.18 (1.87) <sup>+</sup> |
| <b>H4b</b>                 | ET × Customer Collaboration   |                          | -0.27 (2.28)*              |
| <b>R<sup>2</sup></b>       |                               | 0.38                     | 0.57                       |

Notes: <sup>+</sup>:  $p < 0.01$ , \*:  $p < 0.05$ , \*\*:  $p < 0.01$ .

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