

How B2B relationships influence new product development in entrepreneurial firms? The role of psychological tension

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Abstract

Although tension commonly exists in business-to-business (B2B) relationships, past research pays little attention to the potential dark side effects of psychological tensions, especially those between entrepreneurial firms and their client firms, despite their significant impact on these firms' performance. We address this important research gap by exploring the nature and impact of psychological tensions between entrepreneurial firms and their client firms during the conceptualization and commercialization stages of the new product development (NPD) process. We employ a qualitative approach in this paper to conduct semi-structured interviews with 19 entrepreneurial firms in the artificial intelligence field in China, and identify two types of psychological tensions at the conceptualization stage (fear of losing the B2B relationship and divergent expectations) and one type of psychological tension at the commercialization stage (attention embeddedness). We find that fear of losing the B2B relationship and divergent expectations lead to technological decontextualization, while attention embeddedness yields singular learning.

Keywords: entrepreneurial firm; business-to-business (B2B) relationship; psychological tension; new product development (NPD)

1. Introduction

Customer relationships are the most critical and relevant catalysts driving the development of new products in technology-based entrepreneurial firms (Dutta & Hora, 2017). Business-to-business (B2B) relationships not only comprise the channels through which entrepreneurial firms commercialize their new products, but also serve as an instrument for generating ideas to enter new product areas, especially when business customers are the more established of the two (Bonner & Walker, 2004; Noordhoff et al., 2011; Zander & Zander, 2005). It is common for technology-based entrepreneurial firms to develop relationships with established firms to acquire information and co-create value (Bonner & Walker, 2004; Das & He, 2006; Hallen et al., 2014).

Entrepreneurial firms are typically small, with limited resources, capabilities, and experience to bring to bear in commercializing their products (Das & He, 2006; Diestre & Rajagopalan, 2012; He et al., 2021; Liu et al., 2021; Zheng et al., 2021b). Established customers may provide the resources that entrepreneurial suppliers lack (i.e., information, experience, and markets). Meanwhile, for established customers, purchasing inventions from entrepreneurial suppliers is a proactive way of rapidly increasing innovativeness and enhancing competitive advantage (Das & He, 2006). This resource complementarity increases mutual attraction between technology-based entrepreneurial suppliers and established customers (Das & Teng, 2000; Diestre & Rajagopalan, 2012; Dutta & Hora, 2017; Zheng et al., 2021a).

Most prior studies show that close B2B relationships with established customers entail both a bright side and a dark side for suppliers' new product development (NPD). For

example, strong and close relationships between a new product developer and its external partners can promote open exchange of information and increase the ability to exchange rich, complex, sensitive information because commitment and trust lower fears of opportunism and appropriation behavior (Bonner & Walker, 2004; Noordhoff et al., 2011). However, innovation researchers suggest that forming close relationships with established customers with resistance to new technology and products and a short-term, homogeneous view of customer needs may also hamper the improvement of new products (Bonner, 2010).

A dark side of NPD is also likely to occur even before forming a close relationship. The relational literature suggests that it is difficult for parties in asymmetric relationships to actually achieve “cooperation.” One salient obstacle in forming close relationships that has been overlooked in the extant literature is the distinct differences between established customers and entrepreneurial firms, including in organizational structure, resources, business focus, innovativeness, status in competition, economic/political power, and attention to relationships (Das & He, 2006). Such differences lead to inconsistency in expectations regarding relationships between established customers and entrepreneurial suppliers.

The concept of tension captures contradictions and disagreements between two parties—another salient, but underexplored, characteristic of relationships (Das & Teng, 2000; Öberg et al., 2020). Tension has been conceptualized across structural, behavioral, and psychological dimensions. Psychological tension refers to the contradictions in or disagreements about perceptions of the relationship between two parties, such as its long-term or short-term orientation (Fang et al., 2011), perceived dependence on / commitment to the relationship (Jakobsen, 2020), or the meaning of interactions (Quinton & Wilson, 2016).

Such tension is particularly salient in B2B relationships between entrepreneurial firms and established firms, because these two types of firms are at different developmental stages; thus, they have different developmental needs and different expectations of the relationship.

Entrepreneurial firms are likely to find it frustrating to work with established firms, particularly if established firms are exploitation-oriented and focused on strategy execution rather than competence creation in the longer term (Prashantham & Birkinshaw, 2020). Despite the mutual attraction arising from complementary information and knowledge between established and entrepreneurial firms, such psychological inconsistency may negatively influence entrepreneurial firms' perceptions of the relationship and their engagement with it. Passive and limited participation by entrepreneurial firms may compromise the potential benefits of resource complementarity, negatively influencing their NPD (Abosag et al., 2016; Tóth et al., 2018). In light of the above, we examine this phenomenon by addressing three research questions: (1) What are the manifestations of psychological tension in B2B relationships? (2) What negative aspects may emerge from psychological tension? (3) How do these negative aspects form?

Through an inductive case analysis of 19 entrepreneurial firms in the artificial intelligence (AI) field, we find that B2B relationships generate three types of psychological tension and two types of resultant dark side effects on NPD during the conceptualization and commercialization stages. This study advances our understanding of what and how relational factors hamper entrepreneurial suppliers' NPD at different stages, and provides new insights into the question of why entrepreneurial suppliers' NPD hardly benefits from their established customers. The majority of studies focus on the dark side of close relationships

with established customers in terms of information and knowledge sharing (Bonner & Walker, 2004; Noordhoff et al., 2011); however, this dark side may also arise before relationships become close, especially in asymmetric relationships where the two parties have several distinct differences. Our research finds that contradictions in expectations (i.e., psychological tension), characterized as fear of losing the B2B relationship and divergent expectations, and attention embedded in the relationship, are also critical factors that influence NPD. We also show how different types of psychological tension at different stages hinder NPD.

These findings also shed new light on the dark side of B2B relationships by offering a theoretical explication of how psychological tension impedes entrepreneurial suppliers' new NPD. Although the literature has identified tension as an adverse factor in relational performance (Abosag et al., 2016; Fang et al., 2011), we lack knowledge about the effect of such negative consequences on each party in a relationship and the ways through which these negative consequences are formed. Our findings respond to the recent call for further research on the possible effect of tension on dangerous levels of misbehavior in relationships (Abosag et al., 2016; Öberg et al., 2020; Oliveira & Lumineau, 2019).

This study also contributes to the literature on relationship tension by identifying several concrete manifestations of psychological tension in a specific B2B context (i.e., entrepreneurial suppliers and established customers). We find that psychological tension stems from fear of losing the relationship with the established customer and the divergent expectations between these two parties at the conceptualization stage. Psychological tension changes to a form of attention embeddedness for entrepreneurial firms at the

commercialization stage, when they face the cognitive dilemma of whether to maintain or change the current relationship. These psychological tensions can generate two dark side effects on the NPD of entrepreneurial firms: (1) technological decontextualization at the conceptualization stage and (2) singular learning at the commercialization stage. We also identify mechanisms through which psychological tensions generate dark side effects at these two stages during NPD, based on which we develop two testable propositions. We conclude this paper by discussing the limitations of our study and some useful directions for future research on this important topic.

2. Theoretical background

2.1. Entrepreneurial firms and established firms

Established customers can exert dramatic influence over understanding of the voice of the customer and the development of market competence, in turn affecting NPD. A sizable literature explores the characteristics of business relationships with established, influential customers, such as closeness/attachment of the relationship (Bonner & Walker, 2004; Noordhoff et al., 2011). For example, Bonner and Walker (2004) propose two opposing views on the effects of close relationships with established customers based on the relation literature and innovation literature respectively. Relational scholars propose that established customers are likely to possess more internal resources (i.e., information, experience, and expertise) (Chang & Taylor, 2016). Close relationships with established customers can facilitate open exchange of rich, complex, and sensible information from established customers, which is critical to suppliers' NPD. By contrast, innovation scholars argue that too-close relationships with established customers may impede NPD because established

customers tend to resist new technology and products, but supplier firms are likely to fall into line with their demands for incremental innovation and find it difficult to switch to new partners.

These two research streams propose both a bright side and a dark side to the closeness of relationships with established customers. However, closeness is a characteristic of any type of B2B relationship, and thus cannot reflect the uniqueness of relationships between entrepreneurial and established firms. In fact, it is challenging for entrepreneurial firms to develop close relationships with established customers. The two parties show distinct differences, and prior studies show that asymmetric relationships are unlikely to achieve cooperation. Therefore, the dark side of NPD is also likely to be present even before forming a close relationship. However, there is a lack of exploration in the literature into other relational characteristics that may influence the role of established customers in NPD and how these impede NPD.

2.2 Relational characteristics of relationships between entrepreneurial and established firms

Inter-organizational relationships between entrepreneurial firms and established firms have been widely studied in different contexts, including R&D partnerships (Colombo & Shafi, 2016; Diestre & Rajagopalan, 2012; Feng et al., 2019; Knoblen & Bakker, 2019; Oukes et al., 2019), acquirer–merger relationships (Graebner, 2009), and buyer–supplier relationships (Caniëls & Gelderman, 2007; Dutta & Hora, 2017; Prashantham & Birkinshaw, 2020). Compared with large, established firms, entrepreneurial firms are more innovative, but are smaller and lack resources, capability, and experience (Colombo & Shafi, 2016; Diestre & Rajagopalan, 2012; Oukes et al., 2019).

There are significant differences between entrepreneurial and established firms in terms of a wide range of factors: organizational structure, resources, business focus, innovativeness, status in competition, economic/political power, and attention to the relationship (Das & He, 2006). The majority of previous studies characterize this type of relationship as asymmetrical in dependence and power (Colombo & Shafi, 2016; Diestre & Rajagopalan, 2012)—a structure described as “dancing with gorillas” (Prashantham & Birkinshaw, 2008, 2020) or “swimming with sharks” (Colombo & Shafi, 2016; Diestre & Rajagopalan, 2012), because entrepreneurial firms generally lack capability, experience, and access to key resources, which makes them dependent on established customers, such that they gradually lose bargaining power when distributing co-created benefits. Extensive evidence shows that such asymmetric characteristics have negative impacts on relationships and relational outcomes (Colombo & Shafi, 2016; Diestre & Rajagopalan, 2012; Oukes et al., 2019).

Apart from dependence/power, another salient, but underexplored, dimension of the relationship between entrepreneurial and established firms is differing expectations. For example, entrepreneurial firms may seek long-term embedded relationships with established suppliers, whereas established customer firms may seek a high-quality arm’s length supplier. Moreover, entrepreneurial firms are more likely to upgrade capabilities and pursue growth than established firms (Prashantham & Birkinshaw, 2008, 2020). This creates tension between entrepreneurial supplier firms and established customer firms (Diestre & Rajagopalan, 2012). However, we are still left with the question of how to capture such inconsistent expectations, and more importantly, whether such psychological inconsistency may have a negative influence on NPD. Exploring this psychological dimension of

relationships may help to advance our knowledge on the impacts relational characteristics have on the role of established customers in NPD and how these relational factors impede NPD.

2.2. *Psychological tension*

Tension refers to contradictions and disagreements between two parties in a relationship (Abosag et al., 2016; Fang et al., 2011; Heirati et al., 2016; Öberg et al., 2020). Unlike the asymmetric characteristic of a relationship, in which the more powerful member can harm the weaker one, relational tension applies to both parties, and manifests as stress, discomfort, and increased psychological distance. The extant literature conceptualizes tension across structural (i.e., rigidity versus flexibility), behavioral (i.e., competition versus cooperation), and psychological (i.e., short-term versus long-term orientation) dimensions (Das & Teng, 2000; Fang et al., 2011). Psychological tension includes inconsistency in perceptions, attitudes, and orientations of the actors involved in the relationship (Fang et al., 2011; Ring & Van de Ven, 1992; Tura et al., 2019). It refers to contradictions or disagreements regarding perceptions of the relationship between two parties, such as long-term or short-term orientation (Fang et al., 2008), perceived dependence on / commitment to the relationship (Jakobsen, 2020), or the meaning of interactions (Quinton & Wilson, 2016).

For example, Fang et al. (2011) propose that psychological tension results from the different attitudes regarding the short- and long-term orientations of two parties in a relationship. When psychological tension is balanced, both parties may regard relationships as transitional in nature, with an expectation of quick and tangible outcomes (i.e., short-term orientation), or alternatively, both may view the partnership as relational in nature,

emphasizing dedication and commitment (i.e., long-term orientation). Once this tension becomes imbalanced, it may influence the sustainable development and maintenance of a relationship, giving rise to relationship lock-in or unproductive relationships (Anderson & Jap, 2005; Kim et al., 2006). Building on the definition of psychological tension in a relationship, we explore specific types in a B2B relationship between entrepreneurial suppliers and established customers. In particular, we identify potential dark side effects on the NPD of entrepreneurial suppliers and the mechanisms that form such effects.

3. Methodology

The NPD process comprises a sequence of innovative activities, typically starting with the conceptualization of an idea or technology and ending with its commercialization in the form of a new product or service (Barczak et al., 2007; Cooper et al., 2002; Marion et al., 2015). Our study explores the dark side of psychological tension in relation to NPD, and how it forms at the conceptualization as well as the commercialization stages of NPD. Given the limited research on the dark side of B2B relationships and its effect on the NPD of firms, particularly in entrepreneurial firms, it was considered necessary to adopt an explorative theory-building case study approach (Eisenhardt, 1989). Case studies are often employed in management research to explore unexplained phenomena in a holistic way (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). Such an approach would allow for an understanding of the dynamics present in the dark side effects of the B2B relationship at the conceptualization and commercialization stages of entrepreneurial firms' NPD. This holistic approach enables us to collect data from the starting point of B2B relationship formation and NPD, and employ multiple methods of data collection, such as semi-structured interviews, informal interviews,

and archival data (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Yin, 2003).

3.1. Research setting

We use the B2B relationships between nascent entrepreneurial firms and their matched customer firms in the AI field (e.g., autonomous vehicles, autonomous robots, and autonomous robot arms) as our research setting. The development of new products and/or technologies for such entrepreneurial firms is highly dependent on where they will be used, which means that these firms often need to identify a specific matched application for the development of their initial new products. To do so, they often need to pinpoint their customers (early adopters) at the conceptualization stage of NPD. We identified firms that only built a B2B relationship with one established firm, in which the B2B relationship was formed during the conceptualization stage of the initial NPD of the firm and maintained until the initial new product introduction. This setting allows us to investigate the B2B relationship from the conceptualization stage to the commercialization stage of NPD.

3.2. Data collection

3.2.1. Sampling

We began our fieldwork with a purposive sample of AI entrepreneurial firms that were officially established in 2014. This ensured that the firms had been founded between six and 12 months prior to the first semi-structured interview. We identified our sample firms through a directory of Beijing small enterprises and startups that we obtained from the Beijing Municipal Bureau of Economy and Information Technology. We followed a similar inductive approach to that used in other multiple-case studies (Bremner et al., 2017), applying a

“homogenous” sampling strategy to ensure that all sampled firms had certain theoretically relevant antecedents (Miles et al., 2018). Hence, we contacted firms, selecting only those at the conceptualization stage of their initial product development, with a B2B relationship with only one established firm. Thereafter, we selected firms that met the following criteria: (1) the firm had at least one founding team member who was a scientist in an AI field; (2) the AI firm invested over 70% of total investment in R&D expenditure; and (3) none of the founders had prior working experience in established firms. In addition, following the “homogenous” sampling strategy, we selected firms from the greater Zhongguancun area in Beijing, China, to monitor for possible institutional and spatial contingencies that could affect their product development (Hemmert et al., 2019). Some firms ceased trading during the data collection process, whereas others did not experience the conceptualization and commercialization stages during their life cycle. Following these exclusions, 19 AI entrepreneurial firms were left in our final sample.

We split the 19 entrepreneurial firms into five groups based on their NPD performance levels. The high group (Group/H) consisted of four fast-growing entrepreneurial AI firms with the highest performance in the sample in terms of both the number of sales and the sales revenue of new products. The low group (Group/L) consisted of four firms with the lowest level of performance in terms of the number of new products and sales revenue. The moderate group (Group/M) consisted of four firms with moderate performance (lower than Group/H but higher than Group/L). Group D consisted of three firms that declined from high or moderate performance in the three years following venture creation (2014–2016) to low performance in terms of the number and sales revenue of new products from 2018 to April

2020. Group U consisted of four firms that improved from zero or low performance to moderate or high performance on these counts across the period between the first three years and the later three years and four months (see Appendix 1).

3.2.2. Interviews and data collection

We conducted 153 semi-structured interviews through four rounds of interviews with founding CEOs and co-founders as well as the senior managers of the corresponding established firms. The first three rounds of interviews were face-to-face at the firms' offices. Each interview with founders lasted between 45 and 180 minutes, whereas each interview with senior managers of the established firms lasted between 30 and 90 minutes.

In the first round of interviews, semi-structured questions were used to guide the interviews. The questions sought to collect information about the interviewees themselves, the entrepreneurial firm's history, the development of product concepts, the nature and development process of the firm's B2B relationship, and background information about the B2B partner. We first asked the interviewees general questions to understand the background on the B2B relationship between the entrepreneurial supplier firm and the established customer firm. After obtaining a basic understanding on B2B cooperation, we moved to explore the psychological tension in the B2B relationship and cooperation. These questions were asked in the subsequent rounds of interviews. In the second, third, and fourth rounds of interviews, semi-structured interview questions elicited information about the development of the products and the nature of the B2B relationship, particularly in light of psychological tensions with the established firms, from the time of founding onwards. Apart from these questions on aspects of psychology, we added several follow-up questions (see Appendix 2).

During the data collection process, we summarized each case and provided the summaries to the interviewee and industry experts to seek feedback and comments. Thus, they provided further detailed information and materials to enrich the descriptions of each case. All the data were collected from multiple real-time and retrospective sources (Eisenhardt & Graebner, 2007). Apart from the semi-structured interviews, other sources of data included site visits, email correspondence for feedback and comments, clarification and comments, archival records (e.g., accelerators, firm websites, media news, funding databases such as Zero2IPO and CVSource), and private documents (e.g., firm business plan, annual reports, new product descriptions, B2B relationship descriptions, team members' profiles). Archival data, both public and private, were used to supplement the primary interview data. The primary sources comprised semi-structured interviews with entrepreneurs (e.g., founder CEO, co-founder CTO, co-founder CMO, co-founder COO) and participating managers from their B2B partners who were directly involved in and managed the B2B relationship with the entrepreneurial firm. All interviews were recorded with permission, transcribed verbatim, and analyzed by the authors (see Appendix 3).

3.3. Data analysis

Based on an inductively exploratory research approach, we began data analysis with a broad lens, seeking to understand how and why building a B2B relationship with established firms generated dark side effects at the conceptualization as well as the commercialization stages of entrepreneurial firms' NPD. For our entire data analysis process, we used NVivo software for data storage and categorization. We explored our data analyses for the dark side effects of B2B relationships, psychological tension present in the B2B relationship, and the

linking mechanisms between such psychological tension and dark side effects by following three steps.

Step 1. We started the data analysis using an open coding approach, reading and categorizing the participants' verbatim comments. Through an iterative process of coding, we identified the first-order codes for each case. These were sent to the participants and industry experts to obtain feedback and comments, which were used to recode and categorize the participants' own words into the first-order codes. For instance, we coded descriptions of the B2B relationship, such as "we had to switch our original technological directions to follow [the established firms' business development directions] to fulfil their urgent needs" and established firms "made us feel that we were stuck and we had to change a lot ... to follow their steps and paths," as "psychological tension in the conceptualization stage." Alongside this evolving coding scheme, we compared all cases and their matched B2B partners, identifying similarities and differences between the cases. Then, we gradually expanded cross-case analysis by using the new permutations of each iteration. Common statements were generated, which we then refined and constructed into first-order codes. This process is shown in Figure 1.

Step 2. In this step, we consolidated the first-order codes into second-order themes, which made these codes more abstract and theoretical; thus, the data analysis shifted from open to axial coding. In this phase, we also connected the data analysis with the literature, which helped to further consolidate the first-order codes into the second-order themes. These themes enabled us to clearly identify the nature of the dark side effects generated by the psychological tension in B2B relationships. For instance, we used "misfitting

contextualization” as the second-order theme to consolidate the first-order codes of “over-fitting,” “under-fitting,” “asymmetry between our technology and the applications,” “gap between knowledge and needs,” “difficult to fulfil demands,” and “misunderstanding.” After compiling the second-order themes, we reviewed and discussed the themes to ensure they reflected the first-order codes.

Step 3. We extracted the consolidated second-order themes into aggregate dimensions. In this phase, we explored the dimensions underlying the second-order theoretical themes. We compared and reviewed the aggregation between the themes and dimensions to determine if they provided new insights into the dark side of B2B relationships. The whole framework, including the first-order codes, theoretical themes, and aggregate dimensions, was shared with all the interviewees to seek their comments and criticisms. All feedback was further reviewed to refine the final framework. Figures 1–3 present the final data structure.

<Insert Figures 1, 2, and 3 here>

4. Findings

4.1. Psychological tensions

To answer the first research question—“What are the psychological tensions that emerge for entrepreneurial firms during B2B cooperation with established firms?”—we identified two types of concrete psychological tension at the conceptualization stage and one at the commercialization stage (see Appendix 4). At the conceptualization stage, two types of psychological tension were identified; namely, *fear of losing the B2B relationship* and *divergent expectations*. These tensions were identified as psychological states of

entrepreneurial firms when reflecting on the B2B relationship. In contrast, psychological tension at the commercialization stage manifests as attention embeddedness in the B2B relationship.

4.1.1 Conceptualization stage

Fear of losing the B2B relationship. From the information collected from the participating founders, it emerged that all founders acknowledged that B2B relationships with established firms strongly contributed to the conceptualization of the ventures' product development. Given this significant value, once the partnership was formed, the founders of the newly entrepreneurial firms strove to develop and maintain the formed B2B relationship through conceptualizing their new products. As the B2B relationship evolved over time during the conceptualization stage, a psychological state of fear of losing the current B2B relationship emerged.

This fear of losing the early adopter embedded in the relationship between entrepreneurial suppliers and established customers can be specifically categorized primarily as high perceived uncertainty, with strong motivation to build a close rapport also playing a role. The founders expressed that, during the conceptualization stage, they always felt uncertain, and were afraid of being "abandoned." For example, the founder of venture AI_H4 explained that "we were extremely worried about whether [the established firms] really wanted to work with us. They seemed to have multiple cooperation [relationships] with other ventures like us." Similarly, the founder of AI_M2 stated that "we had always been in a state of fear and anxiety because we were terrified that we could not seize this chance [to work with this potential early adopter]." Other founders also expressed their fear of losing their

B2B partner. The founder of venture AI_L1 expressed his fear that “of course, we worried that we would be replaced by other [ventures].”

Moreover, this fear of losing their client was reflected in the strong motivation of founders to build close relationships with the established firm at the conceptualization stage. The founders were aware that building a close relationship with the established firm enhanced the interdependence of the cooperative partnership and supported iterations of conceptualization. This motivated entrepreneurs to continue nurturing their relationship with the established firm. For example, the founder of AI_H3 stated that “we kept making great efforts to strengthen the partnership with the established firm [because this relationship] provided us with great potential opportunities.” Similarly, the founder of AI_U2 explained that “by continuously reinforcing our willingness to cooperate in the B2B relationship, we constantly tried our best to overcome any challenges and fears ... to build the relationship so that we could finish our conceptualization.”

Divergent expectations in the B2B relationship. The founders pointed out that both entrepreneurial and established firms in the relationship considered the B2B cooperation a channel for opportunity identification for their innovations. However, both parties held distinctive viewpoints about the directions and orientations of this B2B cooperation. The entrepreneurial firms tended to treat the established firms as long-term collaborators and considered the established firms as co-creators for product iterations, whereas the established firms often viewed the B2B cooperation as a transaction (short-term orientation) for their future innovations. For instance, the founder of AI_H3 shook his head, stating that the established firm “told us that they had found many partners like us because their intention

was to find good candidates to test their innovative ideas.” The founder of AI_M4 commented that “We viewed this relationship as a long-term cooperation venture with a longer time frame. But they seemed to treat this as a once-off deal.” Similarly, the founder of AI_U2 noted that “the co-founder and I had many interactions and communications with the managers of the established firm. We found that they only looked out for their own interests.”

4.1.2 Commercialization stage

Attention embeddedness in the B2B relationship. With the evolution of the B2B relationship from the conceptualization to the commercialization stage, entrepreneurial suppliers kept working to build a close rapport with the established firms and gradually adapted and attached to the established firms’ expectations and orientations. As the B2B relationship evolved over time, the entrepreneurial firms were cumulatively embedded into the B2B relationship, and fully committed to as well as highly engaged in it. Consequently, the entrepreneurial firms’ attention was occupied by and gradually embedded in the B2B relationship, a phenomenon termed attention embeddedness. Attention embeddedness is manifested as increased dependence on the established customer, resistance to learning, fear of being stuck with the established customer, and an over-commitment risk.

First, with the evolution of the B2B relationship, the entrepreneurial firms gradually became dependent on the established B2B partner to commercialize the newly developed product. This is because the B2B cooperation was an enabler that supported the development and iteration of new products, thereby sustaining the survival and growth of the firm. For instance, the founder of AI_U2 observed that “the introduction of our new product depended on this B2B cooperation ... We had a technical advantage ... and it was hoped that both sides

could strengthen the mutual cooperation.”

Second, resistance to learning is one of the main features of attention embeddedness. Entrepreneurs came to feel a rigidity in their relationship with the established customer, which prevented them from continuing to learn. The entrepreneurs indicated that there was a strong resistance from the established firm, which inhibited entrepreneurial firms from acquiring externally fresh knowledge to initiate adoptive actions for future commercialization. One founder (AI_U₂) explained that “we focused on this B2B relationship for a long time, and we needed to continue to serve it. We did not have any energy left for the exploration of other possibilities.” Another founder (AI_H₃) stated that “We faced great inertia that prevented us from identifying and building new relationships with other potential B2B partners for future learning and growth.”

Third, entrepreneurial firms experienced a psychological state of fear of being stuck with the established customer. They feared being adhered to the established customer and were unable to predict whether they could maintain the relationship or what they could retrieve from their investment in the relationship in the future. For instance, when mentioning their investment in the relationship, the founders expressed the following concerns: “We were not sure if they [the established firm] would keep working with us in the future” (AI_H₄), “It was risky. We made such a huge investment in the relationship, but the future was uncertain and unclear ... [would the relationship be] dead or alive?” (AI_U₁), “We thought we could handle [the relationship], but we found that once you were caught, it was difficult to escape ... This was a feeling of anxiety” (AI_M₁), and “At that stage, the relationship was like a comfortable bed: it was easy to get into, but hard to get out of” (AI_L₃).

Fourth, attention embeddedness is also manifested as over-commitment risk.

Entrepreneurs expressed that they had over-committed to the B2B relationship, which induced a potential risk of discontinuity of the commercialization if the B2B relationship was disharmonious or suffered a breakdown. For instance, an entrepreneur stated that “the potential rewards (of the commitment) were uncertain and even risky” (AI_H1). Another founder said that “we were not sure if they (the established firms) would keep working with us in the future, but as a new startup, we devoted too much to the relationship” (AI_M2). Similarly, an informant stated that “It was risky. We made such a huge investment in the relationship, but the future was uncertain and unclear ... [would the relationship be] dead or alive?” (AI_U2). Therefore, the psychological tension at the conceptualization stage presented itself as attention embeddedness, which caused entrepreneurial firms to dedicate themselves to the existing B2B relationship.

4.2. Negative effects of B2B relationships on newly entrepreneurial firms

After addressing the first research question, we moved to the second research question: “What are the negative effects of psychological tensions for entrepreneurial firms during B2B cooperation with established firms across the conceptualization and commercialization stages of NPD?” Based on our analysis of the specific psychological tensions and their subsequent effects on the entrepreneurial firm, we identified two main negative effects at both NPD stages: (1) technological decontextualization during the conceptualization stage and (2) singular learning during the commercialization stage. These negative effects may lock the entrepreneurial firm into the existing B2B relationship, preventing the firm from moving forward and thus benefiting from the existing relationship, or starting over again and finding

another established firm with which to form a new relationship.

4.2.1. Technological decontextualization

The interview participants indicated that one of the main tasks during the conceptualization stage was to identify the “fit” between the innovative technologies and their application in practice. In other words, the entrepreneurial firms needed to determine how to conceptualize the technologies to best satisfy the needs of their B2B partner. B2B cooperation with established firms allowed the entrepreneurial firms to commercialize their advanced technologies by starting conceptualization development in practical scenarios. However, the B2B relationship also carried the entrepreneurial firms through difficult periods. The most visible result was persistent technological decontextualization, defined as the entrepreneurial firm not finding “a good fit” during technological conceptualization, implying that the firm had difficulty finding the best application scenario from the B2B partner to contextualize their technology. This technological decontextualization mainly presents as misfitting contextualization and ambiguous understanding.

Misfitting contextualization. The interview participants expressed that they experienced challenges in contextualizing their technologies and finding the right application scenarios through the B2B relationship; they called this “misfitting contextualization.” For instance, the founder of AI_H2 expressed the following concern:

There was great information asymmetry between our technologies and the application scenarios in the established firm. This asymmetry prevented us from effectively and accurately finding a fit among the technologies and the practical context to conceptualize the

business idea. As a result, we worked on an inappropriate contextualization, which continued to adversely influence our conceptualization development.

Similarly, the founder of AI_D1 found that “the darkest times during the conceptualization was finding the best fit between the technologies and the needs of the B2B partner.” This led to a mismatch (either “over-fitting” or “under-fitting”) between the innovative technologies of the entrepreneurial firms and the application scenarios of the established firms (AI_H3, AI_H4, AI_M2, AI_M3, AI_D2, and AI_U3). This misfitting contextualization prevented the entrepreneurial firms from effectively promoting their technologies within the context of the B2B partner. For example, the founder of AI_M2 indicated that “such a misfit reduced the speed of our conceptualization.” The founder of AI_H3 remarked that this misfit “persistently produced challenges in our technological iterations, which made us miss good timing to practice and refine our technologies.” Similarly, the founder of AI_U3 stated that this misfit “made us lose a good opportunity to act immediately to save extra work later, which meant that we needed to expend greater costs to fix the misfit problem.”

Ambiguous understanding. The interview participants found that interactions between the entrepreneurial firms and the established firms were ambiguous. This resulted in the entrepreneurial firms having an unclear understanding of the application scenarios of the B2B partner. For example, firms AI_U1 and AI_U4 managed to launch several new products through cooperation with their established partner after a long period of stagnation. The founders of these firms explained that such ambiguous understanding meant they had to “cross the river by touching the stones, which cost [us] lots of resources and energy.” Thus,

during the early stages, the B2B relationship did not provide enough contextual information on the established firms, and this ineffective communication and interaction between the two parties affected entrepreneurial firms' technological contextualization. Resultantly, the entrepreneurial firms struggled to contextualize the technologies through cooperation with the established firms during the conceptualization development stage. For instance, the entrepreneurs stated that the B2B relationship forced them to integrate the contexts of the B2B partners into the conceptualization of technologies. However, according to the founder of AI_L1, during the early stage of the relationship, the established firms "did not pay much attention to understanding our needs; instead, they emphasized their needs." Other founders expressed similar views about the established firms, which "excessively focused on themselves and not on the cooperation relationship" (AI_U2), "paid close attention to what they wanted" (AI_D2), and "heavily emphasized the sharing of our advanced technologies" (AI_H1). A lack of understanding of the application scenarios in which the technology would be applied made it difficult for the entrepreneurial firms to conceptualize their new products in a way that would attract established firms.

4.2.2. Singular learning

During the commercialization stage, newly entrepreneurial firms need to enrich their resource and knowledge base to support product iterations and further commercialization. The interview participants indicated that their existing B2B relationship provided opportunities to acquire contextual and practical knowledge that helped them to commercialize new products. For instance, the founder of AI_H3 mentioned that "cooperation with the established firm greatly helped us to officially introduce the first generation of our

product to the market.” However, the relatively fixed nature of the relationship prevented them from exploring the learning advantages of newness, thereby resulting in “singular learning.” For example, the founder of AI_U₁ conveyed that “the current B2B relationship required us to throw ourselves into the project whole-heartedly, not half-heartedly ... But such an over-focalization made us miss good timing to explore other possibilities.” Such singular learning is manifested as “homogenous knowledge” and “enveloped contexts.”

Homogenous knowledge. Entrepreneurial firms, by their very nature, are in an important stage of their life cycle in which they need to enjoy the learning advantages of newness to explore future possibilities. Most of the founders acknowledged that they needed to acquire new information to ensure further expansion; thus, they truly needed to broaden their resource and knowledge base. For example, the founder of AI_M₁ noted that “we should have refreshed ourselves continuously by expanding our knowledge base by constantly improving and enlarging our B2B relationship.” However, the existing B2B relationship consumed a considerable amount of energy and resources of the newly entrepreneurial firms, which drove them to overly focus on their one B2B relationship. As a result, the newly entrepreneurial firm absorbed “homogenous knowledge” from the existing B2B relationship. For instance, the founder of AI_U₁ expressed that “we were trapped in an imminent dilemma due to the limited accumulation of practical and applied knowledge ... we needed to improve [our knowledge base] by cooperating with more B2B partners.” Other founders made similar comments: “We were in a B2B context with a lack of industrial practices” (AI_H₃); “We have only received information from the existing B2B relationship over the past few years” (AI_M₄); “There was a closed interactive routine with the B2B partner” (AI_U₂); and “Our

firm did not accumulate enough market knowledge for further product iterations over the past five years” (AI_D₃). Thus, the entrepreneurial firms struggled with their learning, a situation termed “homogenous knowledge.”

Enveloped context. As the B2B relationship evolved over time, the founders indicated that their firm was “locked in,” and found it difficult to unlock the “enveloped context” of the existing B2B relationship. For instance, the founder of AI_H₂ explained that “The fixed mindset of the existing relationship constrained our motivation and ability to change the relationship or to initiate a new relationship with other B2B partners.” Similarly, the founder of AI_M₂ stated that:

We did find some new B2B partners to form a new B2B relationship ... but we found our business and products were deeply rooted in the context of our existing B2B partners ... We had great difficulty in getting our technologies and products to fit the needs of new B2B partners within a short time.

Other participants reiterated this concept: “We were locked in this B2B relationship” (AI_H₄); “We tried to establish new ties, but it was not easy” (AI_L₃); “We wanted to go, but there was resistance” (AI_M₄); and “We were in the situation of a self-reinforcing relationship with [the established firm] and we did not know how to make a change” (AI_L₁). Thus, the enveloped context prevented the newly entrepreneurial firms from changing the existing relationship, which further reinforced the enveloped context. Thus, we categorized homogenous knowledge and enveloped context as singular learning.

4.3. Mechanisms underlying psychological tensions and negative effects

We then identified specific types of psychological tension created by the B2B relationship and the resultant negative effects for newly entrepreneurial firms, along with the mechanisms through which such effects occurred during the conceptualization and commercialization stages.

4.3.1. Conceptualization stage

Unilateral compromising. This refers to the entrepreneurial firms avoiding disagreements and acting in a submissive manner during the cooperation process. We found that, psychologically, entrepreneurs considered B2B relationships with established customers important. This led to fear of losing this early adopter, and thus, motivation to build close relationships. As a result, the entrepreneurs felt compelled to reduce or avoid disagreements between their firm and the established firm. For example, the founder of AI_M4 explained that “we really wanted our [established firm] to be our early adopter, not an early discarder ... [Thus], we acceded to their requirements at the outset ... [because] we were afraid of being replaced.” The founders of AI_H1 indicated that “during the conceptualization stage, we kept in mind that minimizing clashes between the two parties would build the relationship.” Thus, at this stage, fear of losing the B2B relationship led entrepreneurial firms to pay more attention to relationship building and acceding to the requests of their customers in terms of product development.

Weak context stimulus. As discussed earlier, psychological tensions also manifest as divergent temporal orientations. Thus, entrepreneurial firms treated the B2B relationship as

having a long-term orientation to jointly develop their products, whereas the established firms often treated this as a transaction. Such divergent expectations created asymmetric interactions and communications between the entrepreneurial firms and the established firms. The founder of AI_H4 stated that “We could see that with our different orientations, we had completely different directions, goals, and emphases ... This led to asymmetric communication.” The founders indicated that they needed the feedback from the application scenarios (embedded in the established firms), because this feedback could provide a real context for them to better understand the application context of technological contextualization. However, because of these divergent expectations, the newly entrepreneurial firms received limited context stimulus. For instance, the founder of AI_U2 mentioned that “the number of sensations was limited ... we were struggling.” Similarly, the founder of AI_M1 stated that “we needed more specific knowledge and information provided by the B2B partner.” We conclude that the psychological tensions inherent in divergent temporal orientations lead to weak context stimulus for newly entrepreneurial firms. Without sufficient context stimulus, it is difficult for such firms to draw “technological contextualization” for conceptualization development, leading to an ambiguous understanding of the real application context of the established firm. For instance, a participant explained that “We went through difficult times and survived. But our understanding of the application context was still unclear. This was because we did not draw a clear boundary for our technological conceptualization.”

To conclude, for established firms, their short-term orientation creates ambiguity for entrepreneurial suppliers and limited contextual information to conduct technology iterations

and updates. Meanwhile, for entrepreneurial firms, the fear of losing the relationship prevents them from asking more of customers, in case this may generate an unforeseen collision. Thus, a lack of effective communication between the two parties eventually leads to technological decontextualization, and thus, failure to meet customer needs and employ application scenarios to develop their technologies. Therefore, we propose:

Proposition 1: In the conceptualization stage of NPD, fear of losing the B2B relationship and divergent expectations between entrepreneurial suppliers and established customers lead to technological decontextualization through the mechanisms of unilateral compromising and weak context stimulus.

4.3.2. Commercialization stage

Relationship inertia. During the commercialization stage of NPD, psychological tensions become more of a cognitive dilemma, whereby entrepreneurial firms deliberate whether to maintain an existing B2B relationship or to change it. Although entrepreneurial suppliers are concerned about the uncertainty of cooperation and the risk of over-committing to the relationship with their established customer, they hesitate to change because of the investment they have made in the relationship and the readily available resources it offers. This gradually results in relationship inertia for entrepreneurial firms. Relationship inertia can lead to resistance within the firm, preventing it from acquiring new knowledge, as it gradually becomes dependent on the existing relationship. The founder of AI_U₂ explained that they “faced big constraints and challenges to learn new knowledge from outside the existing relationship,” thereby exposing the firm to a “homogenous environment.” The founder of AI_M₄ also explained that “the situation led us to overlearn from the [B2B]

partner, but the depth and scope of learning were limited because of the inactive environment.” Thus, homogenous stimulus leads to homogenous knowledge. For instance, the founder of AI_M1 stated that “We should have refreshed ourselves by expanding our knowledge base by continuously improving and growing our B2B relationship.”

However, entrepreneurial firms that are caught in this dilemma for a long time also find it more difficult to seek out new relationships. The founder of AI_L3 explained that “our ongoing investments [in B2B cooperation] locked us into the existing relationship, and we suffered a lot.” The founder of AI_H2 questioned whether “to continue to invest? Or to draw back from the [relationship]? The answer was that we do not have a choice. We have to continue with the [relationship].”

This relationship inertia generates an enveloped context for newly entrepreneurial firms, implying that they are enveloped in the existing B2B relationship with the established firm. It was difficult for firms to break up such a strong relationship or to initiate alternative relationships at that stage. For instance, the founder of AI_H4 confirmed that “it was impossible for us to establish new ties with other potential customers.” Similarly, the founder of AI_M1 conveyed that “the existing relationship made it harder for the founders to switch to another one.” Thus, the dilemma between the choice to remain or to change the existing relationship with established customers brought about relationship inertia, which trapped the firms in the current relationship, objectively and subjectively preventing them from accessing diverse information. Accordingly, entrepreneurial firms could only obtain homogenous information within that particular context. Therefore, we propose:

Proposition 2: In the commercialization stage of NPD, the cognitive dilemma of whether

to maintain or change the existing B2B relationship generates singular learning for entrepreneurial firms through the mechanism of relationship inertia.

5. Discussion and implications

5.1. Main findings and theoretical implications

This study explores the negative role of psychological tension existing between entrepreneurial suppliers and their established customers in suppliers' NPD by answering three questions: (1) How does psychological tension in B2B relationships manifest? (2) What negative aspects may emerge from psychological tension? (3) How are these negative aspects formed? As shown in Figure 2, we identified two types of psychological tension at the conceptualization stage and one type at the commercialization stage of NPD. At the conceptualization stage, psychological tensions manifest primarily as fear of losing the relationship and divergent expectations between entrepreneurial suppliers and established customers. In contrast, at the commercialization stage, psychological tensions manifest primarily as attention embeddedness of entrepreneurial firms in the relationship.

< Insert Figure 4 about here >

Fear of losing refers to entrepreneurial firms holding a psychological state of constant fear regarding losing their current B2B relationship. Divergent expectations occur when one party in the relationship expects short-term cooperation, whereas the other party expects long-term cooperation; such tension in B2B relationships is consistent with the conceptualization in the extant literature (Das & Teng, 2000; Fang et al., 2011). There is scant research on fear of losing the B2B relationship in the literature on relational tension,

which opens up a new dimension for future studies. Moreover, psychological tension in the relationship evolves into attention embeddedness in the relationship at the commercialization stage, reflected as a psychological state of attention embedded in the B2B relationship, implying that entrepreneurial firms have difficulties in allocating any of their attention toward acquiring externally fresh knowledge via building new B2B relationship or an alternative pathway.

Our findings also reveal two types of dark side effects of B2B relationships: technological decontextualization at the conceptualization stage and singular learning at the commercialization stage. Technological decontextualization occurs when entrepreneurial suppliers fail to find the right “fit” between innovative technologies and application scenarios during the technological conceptualization stage to satisfy customer needs. This dark side has not drawn extensive attention in the innovation literature. Decontextualization at the conceptualization stage refers to the state wherein technology is still put to regular use but cannot meet the specific needs of established customers (Janneck, 2009). It suggests that the progress that entrepreneurial firms make in getting to know their established firm’s needs and the new context where their technologies apply is slow; hence, new information and knowledge absorption is difficult at this stage. Singular learning occurs when the parties in a relationship repeatedly receive the same or similar information, technologies, or resources from the current relationship, and thus the technology or new products are unlikely to apply to other contexts or diverted to find new customers. This weakens the firm’s dynamic capabilities in the long run.

In addition, we identified the specific mechanisms by which psychological tensions

generate dark side effects for entrepreneurial firms. At the conceptualization stage, entrepreneurial suppliers perceive the relationship with the established firm as extremely important, which leads them to respond favorably and rapidly to the needs of this customer. Their tendency to avoid disagreements makes it difficult for entrepreneurial firms to fully communicate their expectations regarding NPD; instead, they tend to passively receive ideas from their customer. Meanwhile, entrepreneurial suppliers unilaterally expect long-term cooperation, and such divergent expectations create asymmetric interactions and communications between the entrepreneurial firm and the established firm. Without specific information on the context to which the technologies or products apply, it is very slow for entrepreneurial suppliers to quickly and comprehensively understand the application scenarios. Accordingly, their products remain for regular use and cannot fully match the customer's needs. At the commercialization stage, as progress toward cooperation is slow, the psychologically tension within the relationship evolves into internal tension for entrepreneurial suppliers, who struggle to decide if they should continue to maintain the existing relationship or switch to a new one. Such struggle further locks entrepreneurial suppliers into the current relationship because they need to evaluate the resources already invested therein and gradually lose their competitiveness during the long process. Thus, they have to repeatedly adapt themselves to the singular needs of their established customer.

These findings contribute to advancing our understanding of the unresolved question of why entrepreneurial suppliers' NPD hardly benefits from established customers by exploring a new relational dimension that has received limited attention from the extent literature. The majority of studies demonstrate extensive evidence that the closeness of a relationship may

have a dark side for suppliers' NPD because suppliers always adapt to their customer's needs, and established customers tend to seek merely incremental development of technologies (Bonner & Walker, 2004; Noordhoff et al., 2011). However, this dark side may also arise before the relationship becomes close, especially given an asymmetric relationship, wherein the two parties exhibit several differences. Our research finds that the contradiction in expectations (i.e., psychological tension), reflected either as fear of losing the relationship or divergent expectations, and attention embeddedness in the relationship are also critical factors that influence NPD, showing how different types of psychological tension at different stages hinder NPD.

Moreover, these findings provide new insights into the literature on the dark side effects of B2B relationships in general. Previous studies find that tension is an important factor that may hamper relationships, thus exerting a negative influence on relational outcomes (Abosag et al., 2016; Fang et al., 2011). However, limited studies take the further step to explore how tension may exert a negative influence over firm outcomes. By offering a theoretical explication of how psychological tension impedes entrepreneurial suppliers' new NPD, we find psychological tension can generate two dark side effects on the NPD of newly entrepreneurial firms: (1) technological decontextualization at the conceptualization stage and (2) singular learning at the commercialization stage. We also identify mechanisms through which psychological tensions generate dark side effects at these two stages during NPD, based on which we develop two testable propositions. Our findings respond to the recent call for further research on the possible effect of tension on dangerous levels of misbehavior in relationships (Abosag et al., 2016; Öberg et al., 2020; Oliveira & Lumineau, 2019).

Finally, this study contributes to the literature on relationship tensions by identifying several concrete manifestations of psychological tension in a specific B2B context (i.e., entrepreneurial suppliers and established customers). We find that psychological tension stems from the fear of losing the B2B relationship and divergent expectations between the two parties in the relationship at the conceptualization stage. Psychological tension evolves to a psychological state of attention embeddedness for entrepreneurial firms at the commercialization stage, when they face the cognitive dilemma of whether to maintain or change the current relationship.

5.2. Managerial implications

This study has useful managerial implications for entrepreneurial firms. We identified two types of negative consequences on entrepreneurial firms' NPD brought about by psychological tension in the B2B relationship between the entrepreneurial firm and the established firm. The study provides a diagnostic framework for entrepreneurs and managers to identify how asymmetric B2B relationships can exert a negative effect on the NPD of firms. When dark side effects emerge at each stage of the NPD process, entrepreneurs and managers should be aware of the potential risks and take action to manage the problematic aspects of B2B relationships.

In addition, our study offers important insights for entrepreneurs, indicating how to deal with relational tensions. Avoiding conflict and compromising is not effective in alleviating the negative effects of tension in the long run, especially for the weaker party in the relationship. The weaker party should develop its own strengths (e.g., innovativeness) and enhance resource complementarity to incentivize the stronger party to invest resources in the

relationship. Entrepreneurs also need to continuously monitor each stage of the NPD process and to proactively deal with any psychological tensions to cope with their dark side effects.

Our recommendations also offer valuable insights for established companies faced with relationship tensions. Entrepreneurial and innovative behaviors are not determined by firm age or size, and every firm needs to maintain dynamic capability to cope with the changing environment (Coviello & Joseph, 2012). Therefore, our findings should be equally relevant for more established firms seeking to address the challenges of imbalanced psychological tensions related to NPD.

6. Limitations and future research

This study has a few limitations that future research may address. First, we explore the NPD mechanisms based on a unique type of B2B relationship, exhibiting asymmetry of power, learning ability, and innovation behavior. Such conditions naturally lead to relational tensions (Das & He, 2006). However, tensions may exist in every B2B relationship. Hence, future research may design questionnaires to measure psychological tension and its negative consequences to test the generalizability of our findings to a broader range of high-tech firms that may be similarly vulnerable to the negative influence of relational tension on NPD.

Second, we provide a broad overview of the NPD process, with the starting point as “conceptualization” and the end point as “commercialization.” We do not consider the various “sub-stages” within this process because there is a lack of uniform process models used by firms in NPD, and in practice, not every firm experiences uniform stages of NPD. However, the period between the start and the end points may provide adequate time to

observe the changes in psychological tension and its negative consequences. Thus, future studies could explore process models to identify how tension or dark side effects evolve during each stage of NPD. Such studies could consider particular industries in which firms tend to experience the same NPD stages.

Third, when coding the interview data, we focus on the commonalities rather than the differences between the cases we examine. It was observed that some aspects of the model were more salient in some cases than in others. It would be useful to explore in depth why some lock-in effects are particularly pronounced for some cases and not for others, and the circumstances in which such lock-in effects are more pronounced. Finally, it would be useful to investigate the means by which firms can overcome dark side effects arising from psychological tensions in the NPD process.

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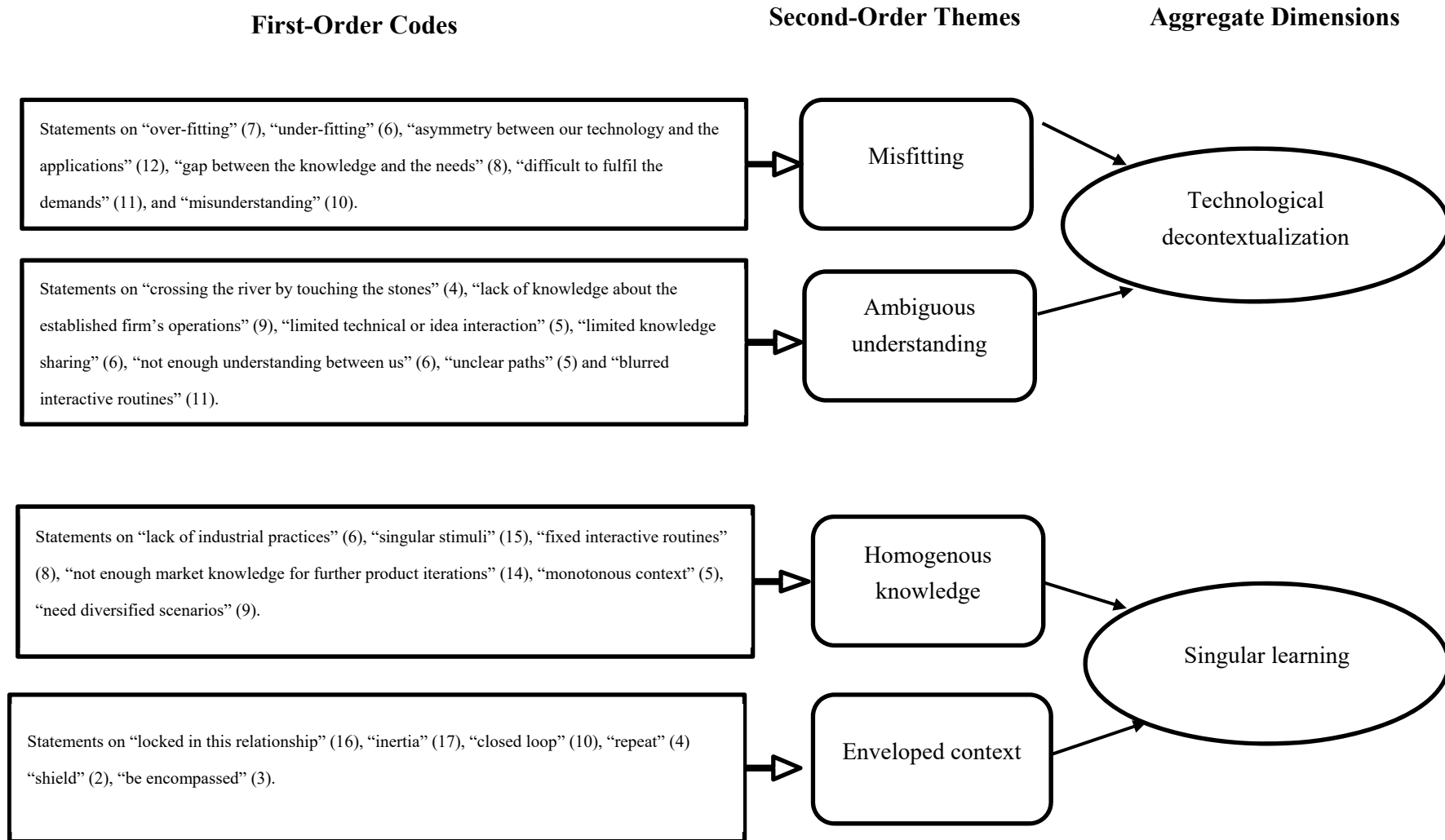
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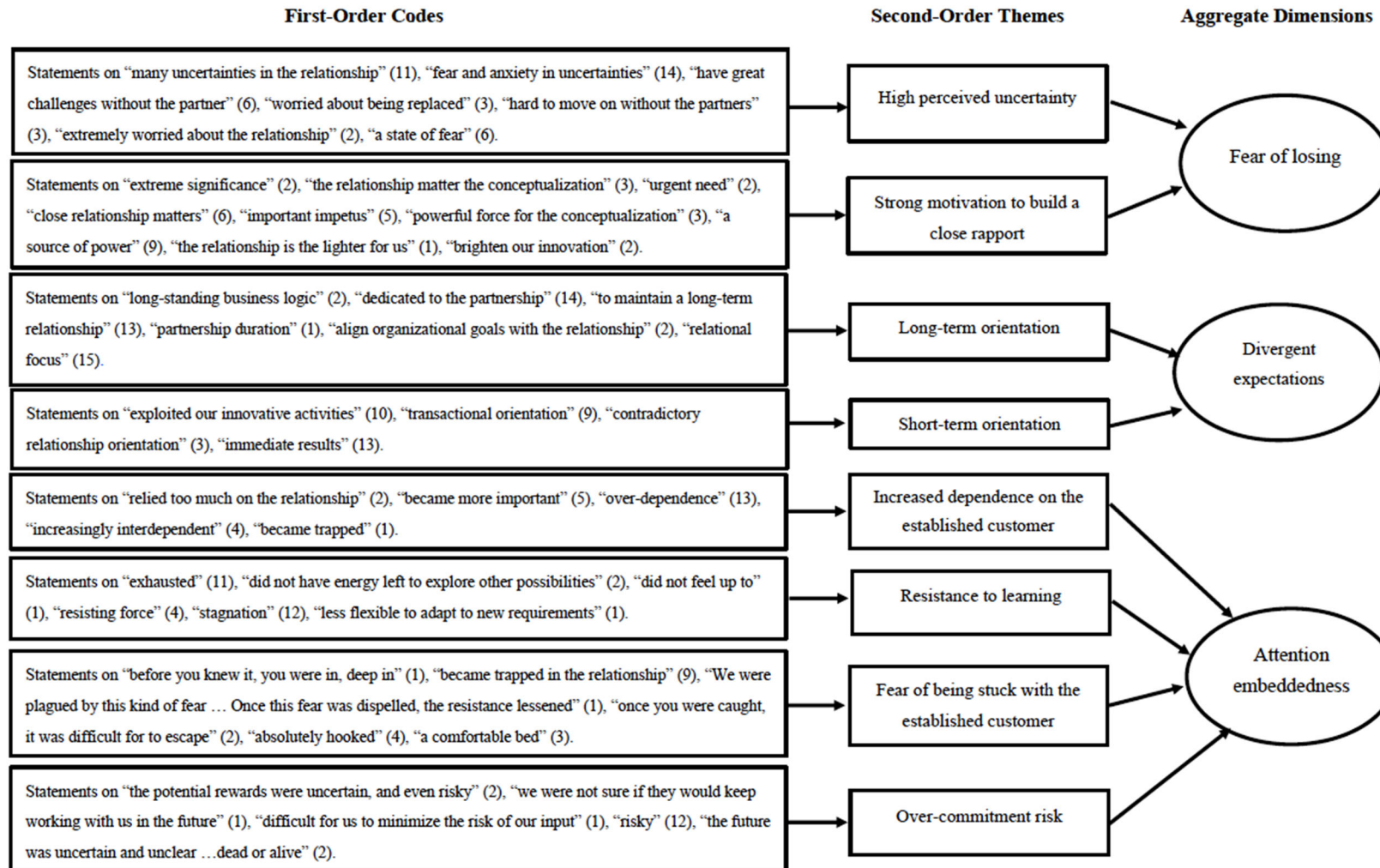
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Figure 1. Data structure of dark side effects of B2B relationships



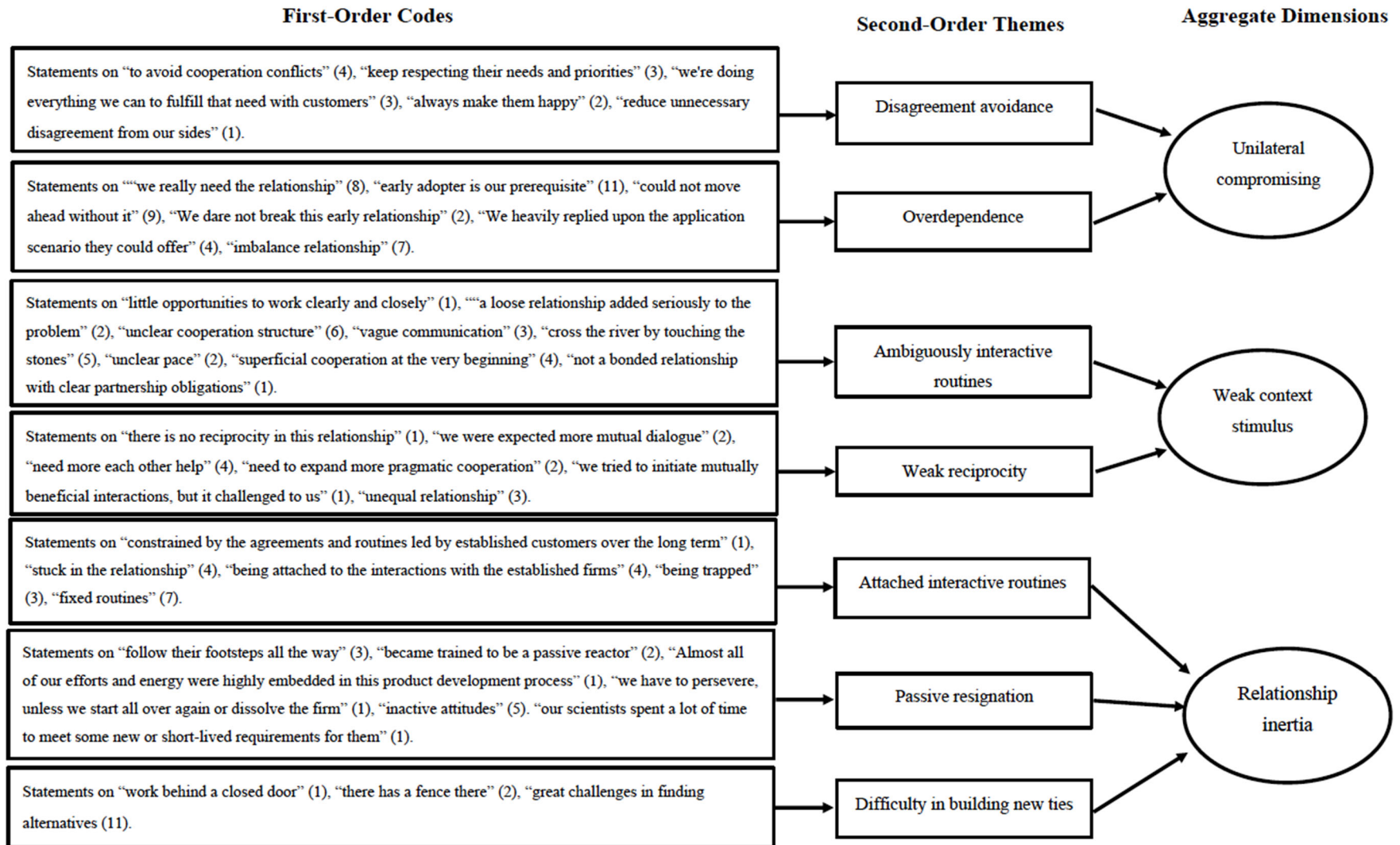
Note: All the numbers within the brackets represent the number of quotations obtained from the interviews.

Figure 2. Data structure of psychological tension



Note: All the numbers within the brackets represent the number of quotations obtained from the interviews.

Figure 3. Data structure of the linking mechanisms



Note: All the numbers within the brackets represent the number of quotations obtained from the interviews.

Figure 4. Conceptual framework of dark side effects of B2B relationships on entrepreneurial firms' new product development

