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Building industrial brand equity by leveraging firm capabilities and co-creating value with customers

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ABSTRACT

Few studies have examined potential impacts of firm's capabilities upon industrial brand equity, and it remains unclear how value co-creation exerts an effect in the capabilities–branding link. This paper reports the findings of an empirical study conducted among 212 Chinese firms regarding the roles of firm's capabilities in value co-creation, customer value and brand equity development in B2B environment. The result indicates that marketing capability and networking capability build up brand equity both directly and indirectly via value co-creation and customer value, while innovation capability positively impacts brand equity indirectly by facilitating value co-creation and improving customer value. The study contributes to literature of industrial branding and value co-creation by probing into capabilities as their determinants. The findings provide managerial implications for building B2B brand equity by leveraging firm's capabilities and co-creating value with customers.

1. Introduction

The significance of enhancing brand equity for company's success is well documented in the marketing literature (e.g., Backhaus, Steiner, & Lügger, 2011). Branding studies have demonstrated that brand equity is an important concern for business customers in their purchase decision processes. Therefore, it could give rise to similar positive outcomes in B2B setting as observed in B2C setting (Bendixen, Bukasa, & Abratt, 2004; Kotler & Pfoertsch, 2007). Brand equity motivates organizational customers to repurchase, to pay a price premium, to consider brand extensions, and to recommend the brand to others (Bendixen et al., 2004; Michell, King, & Reast, 2001). In addition, successful B2B brands with high levels of brand equity serve as the key for building trust, which is important for the exchange in industrial markets, relevant for the maintenance of a relationship, and finally affects transaction performance, market performance and profitability performance of the firm (Roberts & Merrilees, 2007).

Since branding is an important way to improve business performance, the logical next question should be: how can industrial firms build powerful brands? Unfortunately, while brand management has long been a central tenet of consumer marketing, "only a limited number of studies have been conducted … to investigate the phenomena of brand equity in business markets" (Kim & Hyun, 2011, p. 425). In addition, studies on the determinants of B2B brand equity mostly elaborate on the influence of marketing-mix efforts on brand equity (Kim & Hyun, 2011) by following the logic of Brand Value Chain framework (Keller & Lehmann, 2003), and few papers focus on the role of firm's capabilities and value creation in building strong industrial brand.

Capability is a crucial source of organizational competitive advantages based on the Resource-Based View (RBV) (Wernerfelt, 1984). When a firm deeply engrains its capabilities of leveraging and integrating organizational assets and resources within the structure of the firm, these capabilities are difficult to imitate and transfer, thereby offering sustainable competitive advantages (Day, 1994). Numerous studies have examined the impacts of capabilities on overall firm performance and competitiveness (Lin & Wu, 2014). Although building brand equity is an integral part of company's performance outcome, research on the importance of capabilities for industrial brand equity is rather scarce. Little guidance is available to provide insightful managerial implications for B2B brand managers as to building strong brand by leveraging firm's capabilities.

Furthermore, discussions on the nature of and means to create and deliver value are central to business marketing theory and practice (Beverland, 2012). According to the traditional perspective, value is created by one party and consumed by another. However, contemporary marketing literature has increasingly abandoned this perspective, instead considering value as a jointly created phenomenon that emerges in interaction and through integration of resources between actors (Vargo & Lusch, 2004; Vargo, Maglio, & Akaka, 2008). According to the Service-Dominant Logic (SDL) viewpoint, actors are connected through value propositions which are "reciprocal promises of value, operating

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to and from suppliers and customers seeking an equitable exchange" (Ballantyne & Varey, 2006, pp. 344–345), and value is co-created by suppliers and customers. However, the discussions about value co-creation are largely conceptual or case studies. It's still not clear how firm's capabilities impact value co-creation activities and how customer value leads to improved industrial brand equity.

To address the above-mentioned research gaps, this paper attempts to shed some light on the role of innovation, marketing and networking capabilities as key driving forces in promoting value co-creation activities, creating customer value and building brand equity in B2B environment and, in doing so, to provide recommendations about industrial branding strategies. By adopting the views of RBV, SDL and value creation process model presented by Beverland (2012), this study argues that the firm's capabilities can be catalysts to brand equity through customer value co-creation, and makes theoretical contributions to the literature of branding, firm's capability and value co-creation.

This paper is organized as follows. Firstly, we review literature about B2B brand equity, customer value co-creation and firm's capabilities. Then we develop conceptual model and articulate research hypotheses. Next, the research design is outlined, followed by the statistical results. Finally, we discuss conclusions and relevant managerial implications, and put forward limitations and future research directions.

2. Theoretical background

2.1. Industrial brand equity

The concept of brand equity was originally developed in B2C market and it is a well-accepted fact that brand equity and brand management are crucial for success in this setting. The authors argue that the same branding concepts are likely to apply in both B2B and B2C contexts (Davis, Golicic, & Marquardt, 2009). Consequently, many studies in various industrial contexts also rely on brand equity concepts developed in B2C marketing literature (e.g., Kuhn, Alpert, & Pope, 2008; Torres & Bijmolt, 2009).

Brand equity is generally defined as the added value of a brand that forms part of a product created in the minds of consumers in response to past investments in the marketing of the brand (Keller, 1998). Customer-based brand equity seems a good starting point to assess brand equity, and it consists of several interrelated dimensions: brand awareness, perceived quality, brand associations and brand loyalty (Aaker, 1991; Keller, 1993, 1998). Scholars argue that these four dimensions can be directly transferable to industrial branding context. Specifically, brand awareness is shown to explain a significant amount of the variance in brand equity in industrial firms (Davis, Golicic, & Marquardt, 2008). It is also argued that B2B brand equity is significantly driven by perceived quality (Bendixen et al., 2004; Chen, Su, & Lin, 2011; McQuiston, 2004; van Riel, de Mortanges, & Streukens, 2005) and brand association (Jensen & Klastrup, 2008). Besides, brand loyalty is often recognized as a dimension or indicator of brand equity in B2B marketing context (Chen et al., 2011).

Recent research indicates that brand equity is of high importance for B2B companies' competitive positions and performance (Backhaus et al., 2011; Kim & Hyun, 2011; Kotler & Pfoertsch, 2007). However, despite the increasing interest on B2B branding, the extant literature remains fragmented, and areas with limited or inconclusive research warrant further examination (Keränen, Piirainen, & Salminen, 2012). Previous studies on B2B branding have primarily focused on identifying differences between branding in consumer versus industrial contexts (e.g., Brown, Bellenger, & Johnston, 2007), implementing branding strategies which have been successfully applied in consumer markets to industrial context (e.g., Kuhn et al., 2008), developing new measurements of brand equity for industrial firms (e.g., Jensen & Klastrup, 2008), and exploring potential benefits of cultivating strong B2B brands (e.g., Ohnemus, 2009; Wise & Zednickova, 2009).

Branding literature also examines the relationships between the dimensions of brand equity and their determinants in industrial marketing. Early studies about antecedents specific to B2B brand equity are exploratory and qualitative in nature (Bendixen et al., 2004; McQuiston, 2004; Michell et al., 2001). Recently researchers have begun to empirically explore limited set of antecedent factors of industrial brand equity, such as: value for the money, distribution performance, promotion and personnel (van Riel et al., 2005); corporate image, product and service quality, price and costs (Cretu & Brodie, 2007); service quality, responsiveness, and empowerment (Roberts & Merrilees, 2007); product quality, service quality, price, differentiation, promise, and trust and credibility (Jensen & Klastrup, 2008); supplier's competence and buyer's purchasing value (Han & Sung, 2008); customer experience (Biedenbach & Marell, 2010); CSR and corporate reputation (Lai, Chiu, Yang, & Pai, 2010); sales force (behavior and personality); product and promotion (Baumgarth & Binckebanck, 2011); customers' perception of employees' behavior (Biedenbach, Bengtsson, & Wincent, 2011); country-of-manufacture and country-of-design (Chen & Su, 2011).

2.2. Customer value co-creation

Creating superior customer value becomes the core purpose and central process of economic exchange (Vargo et al., 2008) and therefore a strategic issue that should be of interest to researchers and practitioners. Particularly, branding literature suggests that customer perceived value can directly contribute to his/her assessment of and loyalty to the brand (e.g., Anderson & Srinivasan, 2003; Han & Sung, 2008; Lam, Shankar, Erramilli, & Murthy, 2004).

In business relationships and networks, value creation may be examined from three perspectives: value creation for the customer, value creation for the supplier, and joint customer–supplier value creation (Ulaga, 2001). The customer perspective relates to how customers perceive superior value in a supplier's offering compared to that of available alternatives. The supplier's perspective recognizes the need to consider customers as key asset of the firm and places emphasis on attracting, developing and retaining customers through management of customer equity. The customer–supplier perspective highlights that value is created through relationships, partnerships and alliances (Ulaga, 2001). In the value co-creation process, resources of the companies involved are combined and new combinations of capabilities are developed, thereby enabling firms to achieve something that none of the parties could have achieved alone.

Amongst, recent research increasingly emphasizes that value emerges not only through the use of the good or service, but also from the reciprocal interaction processes between sellers and buyers (Ballantyne & Varey, 2006; Grönroos, 2011; Payne, Storbacka, & Frow, 2008). In other words, co-creation has become a central tenet in marketing. Value co-creation differs from and extends the value chain concept of Porter (1985) by positing that the customer is not outside of the value creation process as a passive actor in receiving value, but rather participates in the value creation process through interactions with the firm and its partners (Normann & Ramirez, 1993). These interactions can occur in a variety of business processes, ranging from co-production of new products or services, to physical production, assembly, inventorying, distribution, retail, after sales service and usage, and returns (Duray, 2002). This emphasis appears consistent with SDL developed by Vargo and Lusch (2004), which argues that the customer becomes a co-creator of value.

Discussions about value co-creation are primarily conceptual paper or case studies, focusing on the co-creation process. Cova and Salle (2008) apply SDL to solutions marketing, and suggest an approach to co-create value in customer networks based on a switch from customer value proposition to customer network value proposition. Payne et al. (2008) examine the concept of brand relationship experience in the context of co-creation and service-dominant logic. Andreu, Sánchez,

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and Mele (2010) probe into the applicability of a value co-creation framework in furniture retail stores using SDL and multiple case studies. Aarikka-Stenroos and Jaakkola (2012) examine the collaborative process of value co-creation in the context of knowledge intensive business services, including the activities, roles and resources of buyers and suppliers, as well as their implications for the resulting value-in-use. Saarijärvi (2012) explore the strategic implications of value co-creation by investigating the possibilities of different value co-creation mechanisms from the perspectives of economic, functional, emotional, and symbolic customer value propositions. Roseira and Brito (2014) find that joint value creation must be regarded as a strategic option, which depends on two conditions: suppliers' capabilities and the way the buyer–seller relationships are configured.

2.3. Firm's capabilities

An individual organization's value creation, that is, the set of value activities it controls and carries out as an actor in the value system, is based on its collection of capabilities. According to Day (1994, p. 38), capabilities are "complex bundles of skills and accumulated knowledge, exercised through organizational processes, which enable firms to coordinate activities and make use of their assets." There are arguments that firms should develop varied sets of superior capabilities that enable them to achieve superior performance and distinguish a company's strength from that of other firms (Gallon, Stilman, & Coates, 1995). It would be, of course, impossible to list them all. However, one may build on the premise of Drucker (1954) that marketing and innovation play the most significant role in the success of any firms. Importantly, marketing capability and innovation capability have been put at the forefront of discussion and have appeared in many leading marketing and management journals. For example, Ngo and O'Cass (2012) and Shou, Chen, Zhu, and Yang (2014) focus on innovation capability and marketing capability when they examine capabilities–performance link, because "in a dynamic global business-to-business (B2B) environment, innovation and marketing appear crucial to providing supplier firms' positional advantage through the ability to create value for customers" (Ngo & O'Cass, 2012, p. 125) and therefore they "represent two primary ways that firms can achieve competitive advantage" (Shou et al., 2014, p. 78). Sok, O'Cass, and Sok (2013) also put innovation and marketing capabilities at the first and second places in a list of important capabilities. In a meta-analysis of firm capability–performance relationship, Krasnikov and Jayachandran (2008) find that marketing capability and innovation capability have highest impacts upon performance across B2B and B2C contexts. Besides, in industrial markets characterized by the far more limited number of players involved in the B2B sphere and the greater breadth and depth of collaborative interaction between business partners (Beverland, Napoli, & Yakimova, 2007), networking capability should be especially relevant for creating sustainable competitive advantage. Therefore, we focus on these three kinds of capabilities and examine their roles in co-creating value and developing brand equity.

Firstly, there has been a significant interest among scholars on the role of innovation capability in driving business performance (e.g., Rosenbusch, Brinckmann, & Bausch, 2011). Ngo and O'Cass (2009, p. 48) provide a comprehensive understanding of this construct and define innovation-based capability as "the integrative process of applying the collective knowledge, skills, and resources of the firm to perform innovation activities pertaining to technical innovations (products and/or services, and production process technology), and non-technical innovations (managerial, market, and marketing)". Empirical studies have proved that superior innovation capability is a key contributor to firm's success, leading to improved innovation performance (Yeşil, Koska, & Büyükbeşe, 2013), competitive advantage (Salunke, Weerawardena, & McColl-Kennedy, 2011) and business performance (Yang, Marlow, & Lu, 2009).

Secondly, some authors argue that the capacity to create superior customer value stems from the marketing capabilities a company possesses (Guenzi & Troilo, 2006). O'Cass and Sok (2012) define marketing capability as the bundle of interrelated processes a firm has in place to facilitate successful development, evolution and execution of marketing mix strategies against competitors. Firms must possess superior marketing capability to bring their products to the marketplace faster and serve the customers better than their rivals (Vorhies & Morgan, 2005). The role of marketing capability in driving business performance has been of significant interest to scholars (Doole, Grimes, & Demack, 2006).

Thirdly, networking capability is also vital for industrial companies to achieve superior competitive advantage. Walter, Auer, and Ritter (2006) define it as a firm's ability to develop and utilize inter-organizational relationships and distinguish several dimensions of network capability including coordination, relational skills and market knowledge. Mitrega, Forkmann, Ramos, and Henneberg (2012) propose the concept of networking capability as the complex organizational capability oriented toward managing business relationships along all their main development stages. Networking capability has been found to play a key role in increasing sales volume or profits, gaining access to new markets, developing innovations (Ritter & Gemunden, 2003), co-creating value in relationships (Ulaga, 2001) and improving supplier performance as well as buyer performance (Ziggers & Henseler, 2009).

2.4. Research gaps

Research gaps exist in the discussions of links among industrial branding, customer value creation and firm's capabilities. Firstly, extant studies on the determinants of B2B branding mostly elaborate on the influence of marketing-mix efforts on brand equity (Kim & Hyun, 2011) by following the logic of Brand Value Chain model (Keller & Lehmann, 2003), and are silent about the role of firm's capabilities and value creation in building strong industrial brands. Secondly, in B2B markets, adding value to customers is one of key objectives for firms (Beverland et al., 2007). Although some authors argue that customer value is critical antecedent of brand equity, they still focus on such value creation where the value is embodied in a marketable offering, and the received view is silent about the joint value creation which requires combined activities of the buyer and the seller. Literature lacks empirical evidences about the antecedents and consequences of value co-creation, especially its mediating role in capability–branding link. Thirdly, studies on outcomes of firm's capabilities seldom focus on brand performance, and existing literature often examines separately the impact of marketing capability, innovation capability and networking capability on firm performance. Nonetheless, little effort, if any, has been put to investigating their simultaneous effects on B2B brand equity through value co-creation. Based on these research gaps, this paper aims at developing a comprehensive conceptual framework of link among firm's capabilities, value co-creation and brand equity, and providing empirical evidence in the business marketing context.

3. Conceptual model and hypotheses development

3.1. Conceptual model

The conceptual model of this study, as shown in Fig. 1, argues that firm's innovation capability, marketing capability and networking capability can help to build strong brand equity both directly and indirectly via value co-creation and customer value as mediating variables. This framework originates from three streams of theories.

Firstly, SDL argues that value is co-created between firms and customers, and operant resources are important inputs in this process (Vargo & Lusch, 2004; Vargo et al., 2008). Based on this logic, we can infer that firm's capabilities are necessary operant resources possessed

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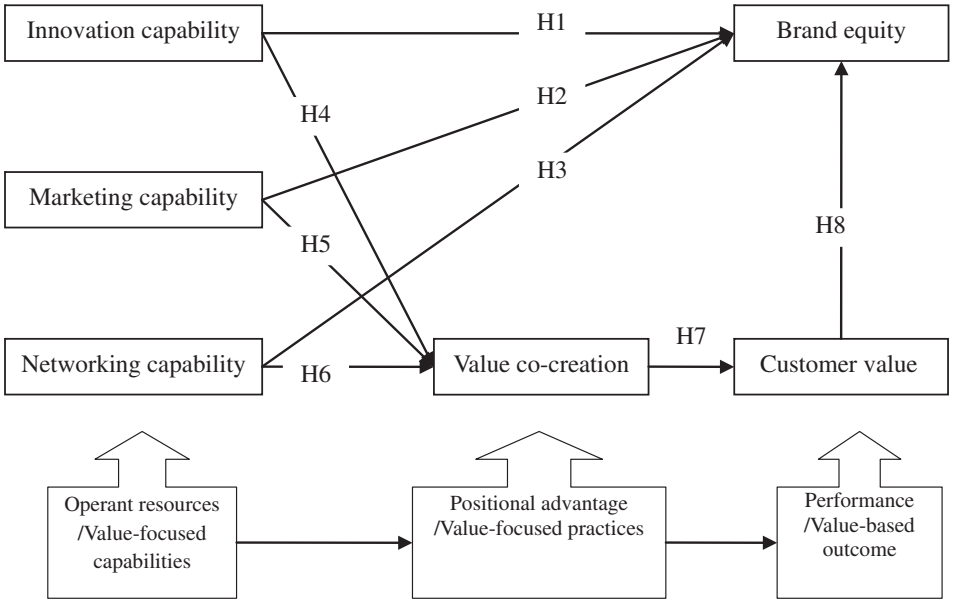

Fig. 1. Conceptual model and underlying theories.

by industrial firms, for it can facilitate value co-creation and finally improve business performance.

Secondly, RBV (Barney, 1991) and the theoretical perspective of positional advantage (Day & Wensley, 1988) state that possession of key resources and capabilities can help to improve critical activities, which will bring about positional advantage in the market and in turn lead to better business performance. To be more specific, RBV posits that resources that are valuable, rare, inimitable, and non-substitutable are sources of superior performance (Barney, 1991). Scholars note that a complete diagnosis of competitive superiority should make a distinction between the sources of positional advantage and their consequences for the firm's relative competitive position, and performance superiority (Carbonell & Rodriguez, 2006; Day & Wensley, 1988). Drawing on the two preceding theoretical perspectives of RBV and positional advantage, this study argues that firms possessing higher degree of capabilities can achieve positional advantage in their continuous joint creation of superior value for and with customers, and finally obtain better brand performance.

Thirdly, this conceptual framework also echoes the second half of conceptual model presented by Beverland (2012), which unpacks value creation and delivery into four categories: orientation, capabilities, practices, and outcomes. In our model, capabilities in innovation, marketing and networking, as critical value-focused capabilities, will improve value-focused practices in terms of value co-creation, and finally lead to improved customer value and brand performance as value-based outcomes.

Starting from the three streams of theories mentioned above, the conceptual model in Fig. 1 depicts firm's capabilities as important operant resources/value-focused capabilities, which can lead to positional advantage in and improve the effectiveness and efficiency of value co-creation activities/value-focused practices. And finally, superior performance in terms of customer perceived value and brand equity as key value-based outcomes can be achieved.

3.2. Firm's capabilities and industrial brand equity

Innovation capability is the most important determinant of firm performance, which has been supported by many empirical studies (Calantone, Cavusgil, & Zhao, 2002; Sok & O'Cass, 2011). At the brand level, empirical evidence also shows that innovation is a positive antecedent of brand performance (Weerawardena, O'Cass, & Julian, 2006). We believe innovation capability can help in building brand equity, for the reason that firms with stronger innovation capabilities can provide differentiated product or service offerings, design attractive marketing programs, and communicate highly creative corporate image to customers, which will in turn contribute to favorable brand awareness and association, as well as strong brand loyalty. To put it further, innovation capability can substantiate a brand's competitiveness at least in three ways.

Firstly, brands need continuous innovative and differentiated product or service offerings to outperform their competitors and exceed the customers' expectation in the markets (Wong & Merrilees, 2008). Thus, firms should have systems in place to identify, select and implement innovative ideas that can help in building successful brands.

Secondly, innovative ideas for advertising and promoting creative products/services are more likely to draw the attention of target customers and, therefore, improve brand awareness among them.

Thirdly, industrial firms can strengthen their brand identity by communicating companies' innovation capabilities to potential customers. Innovation capability represents a favorable atmosphere that is promotable to customers in a cost-efficient manner (Song, Nason, & Di Benedetto, 2008). When a firm's innovation system has distinguished advantage over its competitors, its brand is more likely to create a superior reputation and win customer brand loyalty.

Empirical studies have also shown that innovation contributes to brand performance. Nowlis and Simonsen (1996) have found that successful new brands are more distinctive, novel and superior in comparison to established brands. Wong and Merrilees (2008) provide empirical evidence supporting the positive link between innovation level and brand performance (measured by brand awareness, brand image and brand loyalty).

Therefore, this study offers the following hypothesis:

H1. Firm's innovation capability positively impacts brand equity.

Marketing capability is defined as the integrative process, in which a firm uses its tangible and intangible resources to understand complex consumer specific needs, achieve product differentiation relative to competition, and achieve superior brand equity (Day, 1994). It is a crucial component in firm's overall branding strategy (Madhavaram, Badrinarayanan, & McDonald, 2005). A firm with excellent marketing capability is skillful at marketing decisions and actions, which have a

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potential impact on changing consumer knowledge regarding the brand (Ewing, Napoli, & Pitt, 2001). It can also foster brand loyalty that leads to certain marketing advantages, such as lower marketing costs, new customers and greater trade leverage (Calderon, Cervera, & Molla, 1997; Ewing et al., 2001; Wong & Merrilees, 2007).

In particular, strong marketing capability enables a firm to effectively enhance its reputation and build strong brand awareness among customers through supporting marketing programs (i.e., communication and promotion) and competent sales forces (Madhavaram et al., 2005). The IMC (integrated marketing communication)–branding link is, in principle, supported in the literature, with IMC providing significant brand benefits (Schultz, Cole, & Bailey, 2004). Keller (2000) advocates that consistent marketing support is necessary in order for brands to be successful. Ample empirical research has confirmed the direct positive influence of various marketing activities upon B2B brand equity (Jensen & Klastrup, 2008; van Riel et al., 2005; Wong & Merrilees, 2008). For instance, Baumgarth and Binckebanck (2011) find that in the context of B2B marketing, the elements of marketing mix (such as product, sales force and promotion) are essential drivers of brand equity.

All these works suggest the following hypothesis:

H2. Firm's marketing capability positively impacts brand equity.

Few studies have examined the relationship between networking capability and brand equity. We believe networking capability can improve brand equity at least in three ways.

Firstly, networking capability enables a firm to connect its own resources to those of other firms by building relationships (Mitrega et al., 2012). On the one hand, companies can take advantage of good reputation of suppliers or partners to impact customers' brand knowledge. For instance, advertising companies tend to maintain good cooperative relationship with prestigious media, and then communicate this message to downstream clients. On the other hand, B2B firms can use ingredient branding strategy by linking itself with customers of client companies (Bengtsson & Servais, 2005).

Secondly, relationships are important in understanding customer needs when sellers develop marketable offerings (Ziggers & Henseler, 2009). Networking capability, as a mechanism for anticipating market opportunities, leads to a more focused, market-oriented resource deployment (Han, Kim, & Srivastava, 1998). In addition, customers need to be educated in the use of innovative products, which again requires interaction between seller and buyer. All these will improve customer experience during the encounter with the brand and, in turn, build up better brand image in customers' minds (Biedenbach & Marell, 2010).

Thirdly, coordination as well as relational skills can improve the direct interaction and mutual trust between suppliers and buyers. Some studies have found that trust is a key driver of brand equity (Chaudhuri & Holbrook, 2001), especially in B2B context (Han & Sung, 2008). Brand communications and advertising, which are widely used in B2C market, are not so relevant as that in B2B market (Gordon, Calantone, & Di Benedetto, 1993), because organizational buyers are more rational and professional (Zablah, Brown, & Donthu, 2010), and mass communications are much less effective in reaching specific subsegments of buyers within customer organizations (Webster & Keller, 2004). Zablah et al. (2010) analyze business vs. consumer market differences and their implications for the relative importance of B2B brands. They argue that "interpersonal communication has a heightened role in business markets when compared to consumer markets, … as interpersonal interactions strongly inform buyer decision processes" (p. 250). Therefore, in an industrial setting, the direct personal interaction and inter-firm coordination can help in building brand trust and developing brand knowledge among potential buyers.

Based on these arguments, we propose:

H3. Firm's networking capability positively impacts brand equity.

3.3. Firm's capabilities, value co-creation and industrial brand equity

We contend that while possessing important capabilities is imperative, sometimes it is still not sufficient to build strong brand equity. Customers are loyal to the brand not simply because the firm possesses some capabilities. Instead they are attracted by and stay with firms that are able to act on the developed knowledge about customers' needs and serve them better through delivering greater customer value (Zhou, Yim, & Tse, 2005). In this sense, we believe value creation should be potential mediator between three kinds of firm's capabilities mentioned above and brand equity.

Drawing on socio-technical system theory, this study addresses two types of innovation capabilities: technical and non-technical (Damanpour, Walker, & Avellaneda, 2009; Jiménez-Jiménez & Sanz-Valle, 2011). It is argued that innovation capability plays important role in the effort of value co-creation for three reasons. Firstly, value co-creation involves transition from traditional good-dominant logic to emerging service-dominant logic. Firms with superior innovation capability can more readily realize such a transition which involves changes in terms of business philosophy, value creation and delivery process, and human resources competence. Secondly, in the framework of value co-creation, sellers are responsible for providing value proposition. Firms with superior innovation capabilities can continuously innovate the customer value proposition not only to satisfy the current customer needs, but also to create value that goes beyond the expectations of customers (Ngo & O'Cass, 2009). Thirdly, innovation capability and customer's participation in co-creation are closely associated. To be more specific, innovation capability encourages firms to seek customer participation opportunities through creating innovation experience environments (Ngo, & O'Cass, 2013). Firms can develop new ways (e.g., managerial and marketing innovations) to motivate customer participation and to successfully monitor and manage the co-creation activities.

The study by O'Cass and Ngo (2012) finds that innovation capability contributes to co-creation value in the dynamic global B2B environment, based on a survey of 155 large industrial firms. The authors also provided empirical evidence from 259 Australian firms, supporting the proposition that innovation capabilities positively impact customer involvement and co-creation activity (Ngo, & O'Cass, 2013). Therefore, we propose that:

H4. Firm's innovation capability positively impacts value co-creation.

The second value co-creation capability involves effective marketing of firm's offerings for three reasons. Firstly, the firms with high marketing capability are skillful in collecting market information and understanding customers' expressed and latent needs (Day, 1994; O'Cass & Ngo, 2012), so they are in a better position to interpret what kinds of benefits customers expect from the bargain (Krasnikov & Jayachandran, 2008). In this sense, marketing capability can help suppliers to set the goal and direction of customer value co-creation, and provide appropriate value proposition to customers. Secondly, a firm with high marketing capability must be both customer oriented and competitor oriented (Day, 1994). Responding to competitor moves and customer needs requires information and knowledge that can be accessed at short notice. Competitor surveillance can be obtained not only through different sources of market research and market intelligence, but also through well informed and interested customers, often called lead customers (von Hippel, 1998). Such information can be used to match the moves of competitors. Compared to traditional market research, close customer interactions represent a high-bandwidth mode of communication that facilitates the transfer of complex, ambiguous and novel information (Salomo, Steinhoff, & Trommsdorff, 2003). Such specialized, fine-grained information and knowledge from customers can be particularly valuable in order to secure that the firm deliver values in line with customer preferences better than competitors (Svendsen, Haugland,

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Grønhaug, & Hammervoll, 2011). Thirdly, customers' perception of value depends heavily on the firms' marketing of the value offering. Especially in the B2B context, seller's good communication, such as visit of sales and technical people, can greatly help organizational buyers form better customer value expectations, which will in turn improve customer's willingness and confidence to cooperate and participate in value co-creation activities (Salomonson, Åberg, & Allwood, 2012).

Given the preceding discussions, this study argues that:

H5. Firm's marketing capability positively impacts value co-creation.

Networking capability, which includes the adoption of a long-term relationship, fostering of collaborative communication, design and use of cross-functional teams, and involvement of supply-chain partners, also plays a vital role in co-creating value with customers (e.g., Kahn, Maltz, & Mentzer, 2006). Networking capability can help to develop collaborative business relationships (Walter, Ritter, & Gemünden, 2001), in which the resources of customer and supplier firms are integrated and activated through interaction or cooperation with each other and thereby co-create value. Mitrega et al. (2012) suggest that co-creation of value needs mutual investments and bonding as well as mutual learning and/or unlearning in order to be able to develop and exploit mutual resource constellations in the focal dyad. When industrial companies adopt a long-term relationship approach, they are more likely to focus on knowledge development and exchange, and increase investment in "relationship-specific assets" (Madhok & Tallman, 1998). In addition to long-term relationship, "collaborative communication" (Mohr, Fisher, & Nevin, 1996) enables supply-chain partners to exchange information and knowledge, and facilitates joint problem solving. It also fosters inter-organizational learning that is the key to competitive success (Powell, Koput, & Smith-Doerr, 1996). Additionally, frequent exchange of information on strategic and operational matters helps to build trust and cooperation among supplier and customer (Lengnick-Hall, 1996). All these factors including relationship-specific investment, joint problem solving, inter-firm learning and mutual trust are the basis for resource integration in value co-creation activities (Baumann & Le Meunier-FitzHugh, 2011).

What's more, nowadays industrial companies have gone from offering products/services to offering solutions. Accordingly, the approach to co-create value in customer networks is based on a switch from customer value proposition to customer network value proposition (Cova & Salle, 2008). In other words, co-creation of value can range from the value created within the supplier–customer dyad to the value sought through the network relationships of the supplier and the customer (Ulaga & Eggert, 2006). Walter, Müller, Helfer, and Ritter (2003) have identified a number of these network functions including access to new resources (such as technological knowledge and systems, distribution systems) and access to new organizations. Apparently, networking capability can help firms to be more competent in establishing network relationship and creating superior network value proposition.

Based on the above arguments, we propose that:

H6. Firm's networking capability positively impacts value co-creation.

According to SDL (Vargo & Lusch, 2004), suppliers, customers and network partners co-create value by integrating resources and combining capabilities in their collaborations (Lusch, Vargo, & Tanniru, 2010). For example, customers who actively interact with firms are more likely to create customized offerings with a set of unique features for themselves (Firat, Dholakia, & Venkatesh, 1995). The productivity can be enhanced by using customers' talents to deliver offerings (Lovelock & Young, 1979). Value co-creation can lower costs for firms and in turn customers can expect a reduction in price (Auh, Bell, McLeod, & Shih, 2007). Aarikka-Stenroos and Jaakkola (2012) find that collaborative activities in value co-creation process in the context of knowledge intensive business services can greatly improve customers' perceived value-in-use, including direct monetary benefits, indirect monetary benefits, and non-monetary benefits.

Therefore, we propose that:

H7. Value co-creation positively impacts customer perceived value.

Brand equity is identified as a multidimensional construct consisting of brand awareness, perceived quality, brand association and brand loyalty (Aaker, 1991). Customers who perceive superior benefits and value delivered by suppliers will be more satisfied. Satisfied customers have higher willingness to communicate favorable word of mouth to others and stay loyal to the suppliers, which will improve the brand awareness, brand image and brand loyalty among business buyers. Anderson and Srinivasan (2003) state that when the perceived value decrease, customers tend to buy competitive products in order to increase their perceived value, which means that the less the perceived customer value, the less the brand loyalty. Lam et al. (2004) find positive relationship between perceived customer value and loyalty in a B2B context. Another empirical study by Han and Sung (2008) shows that in industrial markets, purchasing value positively influences brand trust and loyalty.

Therefore, we propose:

H8. Customer perceived value positively impacts brand equity.

4. Research methodology

4.1. Data collection

To test the research hypotheses, we examined industrial firms in Wuhan city. As the largest city in central China with a population close to 10 million, Wuhan has a large number of firms in iron and steel, automobile, electronics, chemicals, metallurgy, textile, shipbuilding, pharmaceutical and other industries.

A questionnaire was developed and administered on-site to respondents by trained interviewers to collect data. With the consideration of feasibility, convenience and economical efficiency in the research, we got a list of 1000 B2B companies as well as their background information from Wuhan Administrator for Industry and Commerce, and then selected 459 firms that meet the following two qualifications. Firstly, it should be in operation for at least three years, because a newly-founded company may not be in a relatively stable development stage and the causal link among the constructs in question cannot be fully manifested. Secondly, it should have autonomy in decision making of branding, innovation and marketing. Besides, we also considered variations in firms across the manufacturing and service sector as a suitable environment to test the theory, and followed the advice from Administrator staff for they are more familiar with those firms.

For each firm, a senior manager, who was supposed to be highly familiar with corporate strategy and policies of the firm, was chosen as the key informant and contacted by telephone to solicit his/her cooperation. The potential respondents were informed of the confidentiality of their responses and the academic purpose of this project. They were also promised a summary report of the survey. Oral agreements to participate were obtained from 337 firms, and successful interviews were conducted onsite with managers from 256 firms for the reasons that some managers were not available for unexpected incidents or our field interviews revealed that they were not qualified for the survey.

After eliminating surveys with excessive missing data or contradictory answers, we were left with 212 complete responses, representing a response rate of 46.2%. The profile of sampled companies is shown in the Table 1. The sample covers companies of different size, history, and ownership type, as well as a wide range of industries including chemical and miscellaneous products, electronic and electric equipments, telecommunication equipments, transportation and vehicle

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Table 1
Profile of sampled companies and non-response bias test.

Characteristics		Percentage	Characteristics		Percentage
Number of employees	<100	25.5%	Age	<10 years	46.2%
	100–500	26.9%		10–20 years	23.6%
	>500	47.6%		>20 years	30.2%
Mean difference test between respondent and non-respondent firms		$t = -0.350$	Mean difference test between respondent and non-respondent firms		$t = 0.139$
Main business scope	Manufacturing	31.6%	Ownership	SOEs	36.8%
	Services	32.1%		Private companies	42.9%
	Both	36.3%		Foreign investment companies	18.3%
				Others	2.0%
Percentage difference test between respondent and non-respondent firms		$\chi^2 = 4.306$	Percentage difference test between respondent and non-respondent firms		$\chi^2 = 2.867$

manufacturing, shipbuilding, steel and iron manufacturing, logistics services, financial services, information and IT solutions, which can help us to generalize the research results. A comparison between the respondent and non-respondent firms indicates that there are no significant differences in terms of demographic characteristics (ownership, size, age, business scope), so non-response bias is not a likely threat for our hypotheses analyses.

4.2. Measurement scales

To operationalize the research constructs, scale development procedures were guided by extant scaling literature (e.g., Churchill, 1979). An initial pool of measurement items was generated from a review of previous literature and exploratory in-depth interviews, and then the scales were purified (selecting items which are most suitable to operationalize constructs) through panel review, exploratory factor analysis by using data from pilot study, and confirmatory factor analysis by using 212 final survey data. All purified measures are seven-point Likert scales anchored by "strongly disagree" and "strongly agree". The sources and descriptions of all measures are explained as follows.

Innovation capability is measured by scale developed by Wang and Ahmed (2004), which captures firm's capabilities in both technical and non-technical innovations. The scale consists of 7 items, and 4 items are retained after purification.

Marketing capability is measured by an adapted version of scales used by O'Cass and Ngo (2012) and Morgan, Vorhies, and Mason (2009) capturing firm's capabilities in designing and implementing marketing mix programs. The scale consists of 6 items, and 4 items are retained after purification.

Networking capability is measured by an adapted version of scale developed by Walter et al. (2006) capturing three aspects: coordination, relational skills and partner knowledge. The scale consists of 9 items, and 5 items are retained after purification.

Value co-creation is measured by an adapted version of collaboration scale used by Claro and Claro (2010) capturing three aspects: joint planning, joint problem solving and flexibility to make adjustments. The scale consists of 9 items, and 6 items are retained after purification.

Customer value is measured by an adapted version of scale used by Blocker (2011) consisting of 4 items. All these 4 items are retained after purification.

Brand equity is measured by an adapted version of scales used by Davis et al. (2008), Han and Sung (2008), Baumgarth and Schmidt (2010), and Baumgarth and Binckebanck (2011), which captures four aspects of brand equity (brand awareness, perceived quality, brand association, brand loyalty) on corporate level, because studies in business markets indicate that corporate branding has greater impact on brand loyalty than product branding (Bendixen et al., 2004; van Riel et al., 2005). The scale consists of 10 items, and 9 items are retained after purification.

Brand equity and customer value are measured among B2B sellers instead of customers primarily due to lack of research resources. Still, this measurement approach is also justifiable. Nowadays firms have sufficient market intelligence to track customers' perceptions and evaluations via various ways including direct customer–employee interactions, customer satisfaction survey, CRM database, feedback and complaints from customers, monitoring of customer purchase behavior such as repeat buying and positive referral. It could be inferred that customers' perceptions and firm's evaluations are highly correlated. For this reason, this approach of measuring brand equity and customer value among sellers is widely adopted in marketing literature (e.g., Baumgarth & Schmidt, 2010; Coleman, de Chernatony, & Christodoulides, 2011; Davis et al., 2008; Leek & Christodoulides, 2012; O'Cass & Ngo, 2012). The study by Davis et al. (2009) presents a test of scales that measure B2B service brand equity and finds the scales are reliable and valid for both logistics service providers and customers. What's more, the research constructs in our model are not limited to a particular client–company dyad. Since brand equity and customer value capture the average level of all customers' evaluations toward the brand and value, sellers are supposed to be in a better position to provide relevant information about overall customer evaluations.

5. Results

5.1. Scale reliabilities, validities and common method bias

We assess the construct reliability and validity of all measures through confirmatory factor analysis (CFA). Table 2 shows the means, standard deviations, correlations, reliability estimates such as Cronbach's α, composite reliabilities (CR), average variances extracted (AVE), as well as discriminant validity estimates of all six constructs. Table 3 reports the results of CFA including loadings and fit indices for all the measurements.

Firstly, as shown in Table 2, all the constructs' Cronbach's alpha coefficients (ranging from 0.858 to 0.955) and the composite reliabilities (CRs) (ranging from 0.837 to 0.956) indicate that each exceeds the accepted reliability threshold of 0.70. In addition, all the average

Table 2
Descriptive analysis, correlations, reliabilities and discriminant validities of measurements.

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Innovation capability	**0.778**[a]					
(2) Marketing capability	0.632**,[b]	**0.751**				
(3) Networking capability	0.608**	0.518**	**0.785**			
(4) Value co-creation	0.562**	0.476**	0.435**	**0.787**		
(5) Customer value	0.608**	0.490**	0.547**	0.547**	**0.831**	
(6) Brand equity	0.512**	0.425**	0.426**	0.477**	0.539**	**0.840**
mean	5.236	5.076	5.169	5.182	5.478	5.363
S.D.	1.467	1.514	1.505	1.379	1.291	1.189
Cronbach's α	0.860	0.858	0.890	0.920	0.895	0.955
CR	0.860	0.837	0.865	0.907	0.899	0.956
AVE	0.606	0.564	0.617	0.619	0.691	0.705

[a] Diagonal elements (in bold) represent the square root of the AVE.
[b] Off-diagonal elements (included in the lower triangle of the matrix) represent the standardized correlations among constructs.
** Correlations are significant at the 0.01 level (2-tailed).

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Table 3
Measurement scale items and CFA results.

Latent variables	Observed variables	Standardized loading coefficient (t-value)
Innovation capability (Wang & Ahmed, 2004)	1. During the past five years, our firm has developed many new management approaches for our customers.	0.83 (–)
	2. Key executives of our firm are willing to take risks to seize and explore "chancy" growth opportunities in market.	0.77 (12.35)
	3. Our firm's R&D or product development resources are adequate to handle the development needs of new products and services.	0.73 (11.48)
	4. Our firm is willing to try new ways of doing things and seek unusual, novel solutions for our customers.	0.78 (12.61)
Marketing capability (Morgan et al., 2009; O'Cass & Ngo, 2012)	1. Our firm's incorporation of customer needs into marketing of products and services has been better than competitors.	0.71 (–)
	2. Our firm's implementation of marketing activities has been better than competitors.	0.76 (10.26)
	3. Our firm's advertising management and creative skills are better in comparison with our competitors.	0.81 (10.91)
	4. Our firm has stronger public relation skills than our competitors.	0.72 (9.79)
Networking capability (Walter et al., 2006)	1. We match the use of resources (e.g., personnel, finances) to the business relationship.	0.78 (–)
	2. We appoint coordinators who are responsible for the relationships with our partners.	0.78 (12.00)
	3. We have the ability to build good personal relationships with business partners.	0.82 (12.68)
	4. We can put ourselves in our partners' position.	0.76 (11.55)
	5. We know our partners' products/procedures/services.	0.80 (12.31)
Value co-creation (Claro & Claro, 2010)	1. Customers actively participate in the process of new product development of our company.	0.72 (–)
	2. Our company shares long-term plans of our products with customers.	0.71 (10.15)
	3. Customers and our company deal with problems that arise in the course of the relationship together.	0.79 (11.29)
	4. In most aspects of the relationship with the buyers, the responsibility for getting things done is shared.	0.81 (11.52)
	5. Our company is flexible in response to changes in the relationship with our customers.	0.86 (12.27)
	6. When some unexpected situation arises, customers and our company can work out a new deal.	0.82 (11.74)
Customer value (Blocker, 2011)	1. We create superior value for customers when comparing all the costs versus benefits in the relationship.	0.82 (–)
	2. Considering the costs of doing business with us, our customers gain a lot in overall relationship with us.	0.90 (15.73)
	3. The benefits our customers gain in their relationship with us far outweigh the costs.	0.80 (13.40)
	4. Our customers get significant customer value from their relationship with us.	0.80 (13.35)
Brand equity (Baumgarth & Binckebanck, 2011; Baumgarth & Schmidt, 2010; Davis et al., 2008; Han & Sung, 2008)	1. Our corporate brand is better known than our most important competitors.	0.77 (–)
	2. The quality of our brand as perceived by our customers is higher than our competitors.	0.83 (13.31)
	3. In comparison to other firms in this industry, we are known to consistently deliver very high quality.	0.80 (12.82)
	4. In comparison to other firms in this industry, we are highly respected.	0.85 (13.84)
	5. Our clients are willing to pay more in order to do business with us.	0.86 (14.00)
	6. Our company's name gives us an advantage over other competitors.	0.88 (14.47)
	7. Most clients intend to keep buying our brand.	0.85 (13.88)
	8. Our clients would recommend our brand to someone who cannot decide which brand to buy in this product/service class.	0.85 (13.71)
	9. Our clients expect to continue the business relationship with us for a long time.	0.86 (13.90)

$X^2 = 1114.56$, df = 449, X^2/df = 2.48, NNFI = 0.97, CFI = 0.98, IFI = 0.98, RFI = 0.96, GFI = 0.82, RMSEA = 0.084.

variances extracted (AVE) are greater than 0.50 cutoff (ranging from 0.564 to 0.705). Thus, all the measures demonstrate adequate reliabilities.

Secondly, existing measures in extant literature are used or adapted to suit the purposes of this study, and then subject to an expert panel review (Churchill, 1979). The panel consists of three branding academics and three branding managers working for B2B firms. They were asked to rate the extent they thought each item 'represented' the domain of research constructs. After this review, some items were dropped due to low average rating scores. Therefore, the content validities of all scales can be guaranteed.

Thirdly, CFA yields a model that fits the data well with NNFI, CFI, IFI and RFI all exceeding 0.90 and RMSEA not exceeding 0.100 (X^2/df = 2.48, NNFI = 0.97, CFI = 0.98, IFI = 0.98, RFI = 0.96, GFI = 0.82, RMSEA = 0.084). All item loadings ranging from 0.71 to 0.90 are significant at the one-percent level (as shown in Table 3), which indicates that convergent validities of all the measures are acceptable.

Fourthly, according to Table 3, all diagonal elements representing the square root of the AVE are larger than any other corresponding row or column entry, which means that each construct sufficiently differs from other constructs and, therefore, the discriminant validities of all measures are established.

Besides, no two-way correlations (the highest correlation being 0.632) are above the 0.65 threshold (Tabachnick & Fidell, 1996, p. 86; Cao, Gedajlovic, & Zhang, 2009, p.789), and the Herman-one-factor test, which is performed by loading all the measurement items into an exploratory factor analysis (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), shows only a slight syndrome of common method since the highest factor explains 19.922% of the variance among all measures. Thus, common method bias is unlikely to be a serious concern in this study.

5.2. Test of research hypotheses

The structural equation modeling (SEM) technique in LISREL version 8.7 is used to test the validity of our conceptual model and research hypotheses. The results are indicated in Fig. 2.

Firstly, the proposed model has acceptable goodness of fit (X^2/df = 2.52, NNFI = 0.97, CFI = 0.97, IFI = 0.97, RFI = 0.95, GFI = 0.82, RMSEA = 0.085), and three endogenous variables, value co-creation, customer value and brand equity are explained 67%, 68% and 73% by the model respectively, indicating that the model is valid in discovering the impact mechanism of firm's capabilities upon brand equity.

Secondly, the strengths and significances of individual paths are computed, providing results for the tests of the hypotheses. The standardized path coefficients and t-values (in the brackets) are reported in Fig. 2. T-value is the ratio between estimate and standard errors, and the critical values greater than 1.96 are statistically significant at 0.05 level. In H_1, H_2 and H_3, the three kinds of capabilities are predicted to positively impact brand equity. The results support H_2 ($\beta = 0.34$, t = 3.30) and H_3 ($\beta = 0.18$, t = 2.41) at 0.05 level, while H_1 is not supported ($\beta = 0.07$, t = 0.47), indicating that impacts of marketing capability and networking capability upon brand equity are significantly positive, while innovation capability has no direct effect on brand equity. The results also support H_4 ($\beta = 0.31$, t = 3.46), H_5 ($\beta = 0.34$, t = 3.52) and H_6 ($\beta = 0.30$, t = 3.42) at the 0.05 level, indicating that all three kinds of capabilities can play positive roles in improving value co-creation activities. Finally, the path coefficients from value co-creation to customer value ($\beta = 0.83$, t = 9.94) and from customer value to brand equity ($\beta = 0.37$, t = 5.24) are both significant at 0.05 level, therefore H_7 and H_8 are supported. Overall, all hypotheses (except H_1) are fully supported on the basis of the indices. It seems that in B2B context, both marketing capability and networking capability help to build

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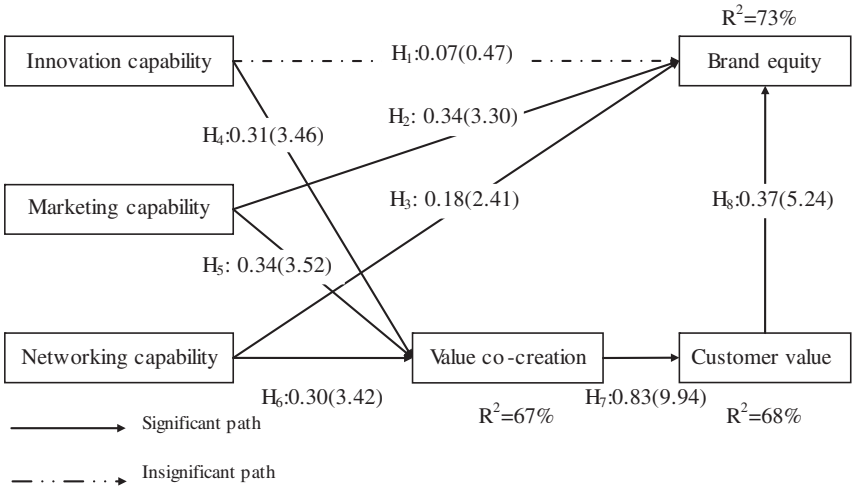

X²=1142.84, df=453, X²/df=2.52, NNFI=0.97, CFI=0.97, IFI=0.97, RFI=0.95, GFI=0.82, RMSEA=0.085

Fig. 2. Structural model and parameter estimates.

up brand equity both directly and indirectly via value co-creation and customer value, while innovation capability exerts positive role in developing brand equity only indirectly by facilitating value co-creation and improving customer value.

Thirdly, we also examine direct, indirect and total effects of three kinds of capabilities upon brand equity. The indirect effect is determined by calculating the product of a particular variable on a second variable through its effect on intervening or mediating variables (Alwin & Hauser, 1975). Furthermore, the sum of direct and indirect effect reflects the total effect of the variable on the endogenous variable. SEM analysis output also displays these three kinds of effects readily. The results, as shown in Table 4, indicate that the total impacts of marketing capability ($\beta = 0.44$, $t = 5.39$) and networking capability ($\beta = 0.27$, $t = 3.26$) on the brand equity are higher than that of innovation capability ($\beta = 0.15$, $t = 1.98$).

6. Conclusions

6.1. Research results

Research on industrial branding offers little guidance on how to leverage firm's capabilities to develop brand equity by improving value co-creation and delivering superior customer value. Indeed, the literature review reveals an absence from the organizational capability literature and branding literature of any focus on the examination of capabilities–branding link. This finding is particularly anomalous, given that the extant literature recognizes the important role capabilities play in generating better performance.

Under this background, this paper examines how firm's capabilities impact value co-creation, customer value and brand equity in B2B settings. Based on questionnaire survey, we find that marketing capability and networking capability can build up brand equity both directly and indirectly via value co-creation and customer value, while innovation capability positively impacts brand equity only indirectly by facilitating value co-creation and improving customer value. Furthermore, the total effects of marketing capability and networking capability on the brand equity are greater than that of innovation capability.

This paper contributes to the literature of both industrial branding and value co-creation. On the one hand, it makes a pioneering effort to explore brand equity from a capability perspective in the context of B2B markets. On the other hand, although customer value is a very common topic in the literature, very few studies address the need to analyze the organizational capabilities that a firm requires to create customer value (Martelo, Barroso, & Cepeda, 2013). Particularly, according to Mocciaro and Battista (2005), although SDL emphasizes the collaborative nature of value creation, still empirical research investigating the determinants and consequences of those joint activities remains absent (Grönroos, 2011; Payne et al., 2008; Vargo et al., 2008). This paper addresses these gaps by probing into the capability antecedents and branding performance consequences of value co-creation activities and customer value improvement and, in doing so, contributes to SDL and value co-creation literature greatly.

Importantly, this study's findings show different roles of inside-out and outside-in capabilities in enhancing business performance (branding performance in this paper) (Day, 1994; Ngo, & O'Cass, 2013). On the one hand, both inside-out capabilities (such as innovation capability) and outside-in capabilities (such as marketing capability and networking capability) are essential determinants in improving customer and brand performance via key organizational activities (value co-creation), which is consistent with SDL, RBV and Value Creation Process Model presented by Beverland (2012). On the other hand, outside-in capabilities, with the focal point almost exclusively outside the organization, aim at enabling the business to compete by satisfying market requirements ahead of competitors and creating durable relationships with other stakeholders including customers, channel members and suppliers (Day, 1994). Firms with higher outside-in capabilities are more willing and competent to instill brand knowledge and build up brand equity through excellent marketing programs, and efficient interactions with organizational buyers. In other words, these two kinds of outside-in capabilities can also support firms to develop brand equity directly by implementing marketing activities and interactive communications. Amongst, marketing capability is especially influential in shaping customer's brand knowledge and loyalty, just as the classical Brand Value Chain framework argues (Keller & Lehmann, 2003) and numerous empirical branding studies indicate (e.g., Kim & Hyun, 2011; Madhavaram et al., 2005; O'Cass & Weerawardena, 2010; van Riel et al., 2005). However, merely possessing inside-out capability in term of innovation itself can not contribute to branding. Instead, it has to be used in co-creation activities on the company–customer interface

Table 4
Direct, indirect and total effects of capabilities upon brand equity.

Independent variables	Direct effects	Indirect effects	Total effects
Innovation capability	0.07 (0.47)[a]	0.08 (0.79)	0.15 (1.98)
Marketing capability	0.34 (3.30)	0.10 (0.90)	0.44 (5.39)
Networking capability	0.18 (2.41)	0.09 (0.83)	0.27 (3.26)

[a] Standardized effect coefficients (t-value).

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before it can help to develop brand. The argument above can also explain why total effects of marketing and networking capabilities upon branding are higher than that of innovation capability. The reason is that the two kinds of outside-in capabilities can exert direct influences upon brand equity, besides the nearly equal indirect contributions to branding though value co-creation, compared with inside-out capability in terms of innovation.

6.2. Managerial implications

The study also provides practical implications for industrial firms as to how to develop brand equity by leveraging firm's capabilities and co-creating value with customers.

Firstly, branding has become a great strategic concern for industrial companies. According to the framework of Brand Value Chain, brand equity can be cultivated via making marketing efforts and instilling branding knowledge into customers' minds. However, general strategy management literature argues that developing appropriate capabilities may help firms establish sustainable competitive advantage and maximize their growth and performance (including brand performance) (Amit & Schoemaker, 1993). Our research explores potential contributions of firm's capabilities to industrial branding and finds that innovation capability, marketing capability and networking capability are all essential capabilities that companies need to acquire in order to develop a strong brand in industrial markets. Therefore, B2B firms should try to develop these three kinds of capabilities as critical parts of their branding strategy. Besides, while all three kinds of capabilities are important determinants in developing brand equity, this study offers the new insight that outside-in capabilities in terms of marketing and networking are more valuable in achieving superiority in branding. Therefore, in the case that possessing high levels of all three capabilities simultaneously is difficult for firms especially for SMEs, priority should be placed upon marketing and networking capabilities, for they can exert greater and direct impacts upon brand equity compared with innovation capability.

Secondly, the research results show that customer value improvement plays mediating role in the capability–branding link. For this reason, B2B organization that endeavors to build a strong brand and deliver relevant benefits to its customers should ensure that it has sufficient understanding of its customers and utilizes various resources of the organization to deliver superior values to its existing and prospective buyers. As a matter of fact, creating superior customer value is believed by marketing literature to be the base of a company's competitive advantage, and our research findings further echoes this argument.

Thirdly, industrial companies should realize that customer value is jointly created by companies and customers, not by one party alone. Encouraging and mobilizing customers to participate in value creation is the next frontier in competitive effectiveness and ultimately a way to gain marketplace advantages over rivals (Bendapudi & Leone, 2003; Normann & Ramirez, 1993). Many firms increasingly focus their business practices toward actively encouraging customers to take on more active roles in delivering the offerings (Auh et al., 2007; Yi, Nataraajan, & Gong, 2011). Our research findings also confirm that joint value creation with customers is a critical mediator enabling the conversion of firm's capabilities into superior outcome in terms of customer value and brand equity. Therefore, firms should adopt the perspective of viewing customers as active participants with firms rather than as passive audience, which is captured in the movement away from business focusing on the philosophy of "what can we do for you?" to a stronger focus on "what can you do with us?" This co-creation situation is accomplished when the provider and customer apply their different competences and skills in the process, or in Vargo and Lusch's (2004) words, apply their "operant resources". The three kinds of provider's capabilities, which can be regarded as essential operant resources, are important enablers in facilitating value co-creation activities. Importantly, this study's findings show that brand performance implication of innovation capability is not directly established. Therefore, merely possessing superior capacity to innovate is not enough for branding, and industrial companies ought to fully use this capability into value co-creation processes before it contributes to customer perceived value and brand equity.

6.3. Limitations and future research directions

There are some theoretical and methodological limitations in this study, which provide meaningful directions for future research.

Foremost among these is the fact that some other capabilities are not examined in our framework. For instance, knowledge management capability and customer relationship management capability (Martelo et al., 2013) are treated as critical dynamic capabilities that contribute to customer value. Firms must also possess superior learning capability which exerts positive effect upon brand performance (O'Cass & Weerawardena, 2010). Therefore, future research can explore the role of other capabilities in co-creating value for customers and in developing strong industrial brands.

Secondly, since we adopt a value co-creation view and interaction perspective, other important stakeholders, such as suppliers, distributors, partners, and even competitors, should also be considered. Therefore, focusing on the roles they play in building brand equity as well as drivers of co-creating value and co-developing brand with them should be a very promising future research area.

Thirdly, this study takes the seller's perspective when looking at value co-creation and its branding performance implications, so future research can examine this topic from customers' perspective to help managers better understand the facilitating factors of customer participation in co-creation. Moreover, the customer's capabilities that contribute to value co-creation could be explored in future studies.

Fourthly, value co-creation and brand development need employee's active engagement, therefore, internal branding and internal marketing, through which the employees can develop internal brand knowledge, internal brand commitment and internal brand involvement (Baumgarth & Schmidt, 2010) and learn how to deal with the increased job stress and perceived workloads arising from co-working with customers (Mustak, Jaakkola, & Halinen, 2013), should also be incorporated into the conceptual model in future work.

Fifth, the performance advantage of resources and capabilities varies with external factors such as market dynamics (Song, Droge, Hanvanich, & Calantone, 2005), competition (Brush & Artz, 1999), technological change, institutional forces (Shou et al., 2014), and organizational factors such as industry, age and firm size. Therefore, probing into these potential moderating variables should be the next promising research direction.

There are also some problems with the research methodology. The constructs of customer value and brand equity capture the perceptions and behavior intentions of buyers. Therefore they should be measured among customers. Other inevitable problems inherent to survey research, such as inability to determine causality, also exist which deserve careful attention when interpreting the findings.

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References

Aaker, D. A. (1991). *Managing brand equity*. New York: The Free Press.

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Aarikka-Stenroos, L., & Jaakkola, E. (2012). Value co-creation in knowledge intensive business services: A dyadic perspective on the joint problem solving process. *Industrial Marketing Management*, *41*(1), 15–26.
Alwin, D. F., & Hauser, R. M. (1975). The decomposition of effects in path analysis. *American Sociological Review*, *40*(1), 37–47.
Amit, R., & Schoemaker, P. J. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, *14*(1), 33–46.
Anderson, R. E., & Srinivasan, S. S. (2003). E-satisfaction and e-loyalty: A contingency framework. *Psychology and Marketing*, *20*(2), 123–138.
Andreu, L., Sánchez, I., & Mele, C. (2010). Value co-creation among retailers and consumers: New insights into the furniture market. *Journal of Retailing and Consumer Services*, *17*(4), 241–250.
Auh, S., Bell, S. J., McLeod, C. S., & Shih, E. (2007). Co-production and customer loyalty in financial services. *Journal of Retailing*, *83*(3), 359–370.
Backhaus, K., Steiner, M., & Lügger, K. (2011). To invest, or not to invest, in brands? Drivers of brand relevance in B2B markets. *Industrial Marketing Management*, *40*(7), 1082–1092.
Ballantyne, D., & Varey, R. J. (2006). Creating value-in-use through marketing interaction: The exchange logic of relating, communicating and knowing. *Marketing Theory*, *6*(3), 335–348.
Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99–120.
Baumann, J., & Le Meunier-FitzHugh, K. (2011). *Conceptualizing the impact of trust on value co-creation in buyer–service provider relationships.* Marketing 2011: Delivering value in turbulent times, 502.
Baumgarth, C., & Binckebanck, L. (2011). Sales force impact on B-to-B brand equity: Conceptual framework and empirical test. *The Journal of Product and Brand Management*, *20*(6), 487–498.
Baumgarth, C., & Schmidt, M. (2010). How strong is the business-to-business brand in the workforce? An empirically-tested model of 'internal brand equity' in a business-to-business setting. *Industrial Marketing Management*, *39*(8), 1250–1260.
Bendapudi, N., & Leone, R. P. (2003). Psychological implications of customer participation in co-production. *Journal of Marketing*, *67*(1), 14–28.
Bendixen, M., Bukasa, K. A., & Abratt, R. (2004). Brand equity in the business-to-business market. *Industrial Marketing Management*, *33*(5), 371–380.
Bengtsson, A., & Servais, P. (2005). Co-branding on industrial markets. *Industrial Marketing Management*, *34*(7), 706–713.
Beverland, M. B. (2012). Unpacking value creation and delivery: Orientation, capabilities, practices, and outcomes. *Industrial Marketing Management*, *41*(1), 8–10.
Beverland, M. B., Napoli, J., & Yakimova, R. (2007). Branding the business marketing offer: Exploring brand attributes in business markets. *The Journal of Business and Industrial Marketing*, *22*(6), 394–399.
Biedenbach, G., Bengtsson, M., & Wincent, J. (2011). Brand equity in the professional service context: Analyzing the impact of employee role behavior and customer–employee rapport. *Industrial Marketing Management*, *40*(7), 1093–1102.
Biedenbach, G., & Marell, A. (2010). The impact of customer experience on brand equity in a business-to-business services setting. *Journal of Brand Management*, *17*(6), 446–458.
Blocker, C. P. (2011). Modeling customer value perceptions in cross-cultural business markets. *Journal of Business Research*, *64*(5), 533–540.
Brown, B. P., Bellenger, D. N., & Johnston, W. J. (2007). The implications of business-to-business and consumer market differences for B2B branding strategy. *Journal of Business Market Management*, *1*(3), 209–229.
Brush, T. H., & Artz, K. W. (1999). Toward a contingent resource-based theory: The impact of information asymmetry on the value of capabilities in veterinary medicine. *Strategic Management Journal*, *20*(3), 223–250.
Calantone, R. J., Cavusgil, S. T., & Zhao, Y. (2002). Learning orientation, firm innovation capability, and firm performance. *Industrial Marketing Management*, *31*(6), 515–524.
Calderon, H., Cervera, A., & Molla, A. (1997). Brand assessment: A key element of marketing strategy. *The Journal of Product and Brand Management*, *6*(5), 293–304.
Cao, Q., Gedajlovic, E., & Zhang, H. (2009). Unpacking organizational ambidexterity: Dimensions, contingencies, and synergistic effects. *Organization Science*, *20*(4), 781–796.
Carbonell, P., & Rodriguez, A. I. (2006). The impact of market characteristics and innovation speed on perceptions of positional advantage and new product performance. *International Journal of Research in Marketing*, *23*(1), 1–12.
Chaudhuri, A., & Holbrook, M. B. (2001). The chain of effects from brand trust and brand affect to brand performance: The role of brand loyalty. *The Journal of Marketing*, *65*(2), 81–93.
Chen, Y. M., & Su, Y. F. (2011). Do country-of-manufacture and country-of-design matter to industrial brand equity? *Journal of Business & Industrial Marketing*, *27*(1), 57–68.
Chen, Y. M., Su, Y. F., & Lin, F. J. (2011). Country-of-origin effects and antecedents of industrial brand equity. *Journal of Business Research*, *64*(11), 1234–1238.
Churchill, G. A., Jr. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, *16*(1), 64–73.
Claro, D. P., & Claro, P. B. O. (2010). Collaborative buyer–supplier relationships and downstream information in marketing channels. *Industrial Marketing Management*, *39*(2), 221–228.
Coleman, D., de Chernatony, L., & Christodoulides, G. (2011). B2B service brand identity: Scale development and validation. *Industrial Marketing Management*, *40*(7), 1063–1071.
Cova, B., & Salle, R. (2008). Marketing solutions in accordance with the SD logic: Co-creating value with customer network actors. *Industrial Marketing Management*, *37*(3), 270–277.
Cretu, A. E., & Brodie, R. J. (2007). The influence of brand image and company reputation where manufacturers market to small firms: A customer value perspective. *Industrial Marketing Management*, *36*(2), 230–240.
Damanpour, F., Walker, R. M., & Avellaneda, C. N. (2009). Combinative effects of innovation types and organizational performance: A longitudinal study of service organizations. *Journal of Management Studies*, *46*(4), 650–675.
Davis, D. F., Golicic, S. L., & Marquardt, A. J. (2008). Branding a B2B service: Does a brand differentiate a logistics service provider? *Industrial Marketing Management*, *37*(2), 218–227.
Davis, D. F., Golicic, S. L., & Marquardt, A. J. (2009). Measuring brand equity for logistics services. *International Journal of Logistics Management*, *20*(2), 201–212.
Day, G. S. (1994). The capabilities of market-driven organizations. *Journal of Marketing*, *58*(4), 37–52.
Day, G. S., & Wensley, R. (1988). Assessing advantage: A framework for diagnosing competitive superiority. *Journal of Marketing*, *52*(2), 1–20.
Doole, I., Grimes, T., & Demack, S. (2006). An exploration of the management practices and processes most closely associated with high levels of export capability in SMEs. *Marketing Intelligence & Planning*, *24*(6), 632–647.
Drucker, P. F. (1954). *The practice of management.* New York: Harper & Row Publishers, Inc.
Duray, R. (2002). Mass customization origins: Mass or custom manufacturing? *International Journal of Operations and Production Management*, *22*(3), 314–328.
Ewing, M., Napoli, J., & Pitt, L. (2001). Managing Southeast Asian brands in the global economy. *Business Horizons*, *44*(3), 52–58.
Firat, A. F., Dholakia, N., & Venkatesh, A. (1995). Marketing in a postmodern world. *European Journal of Marketing*, *29*(1), 40–56.
Gallon, M. R., Stilman, H. M., & Coates, D. (1995). Putting core competence thinking into practice. *Research Technology Management*, *38*(3), 20–28.
Gordon, G. L., Calantone, R. J., & Di Benedetto, C. A. (1993). Brand equity in the business-to-business sector: An exploratory study. *The Journal of Product and Brand Management*, *2*(3), 4–16.
Grönroos, C. (2011). A service perspective on business relationships: The value creation, interaction and marketing interface. *Industrial Marketing Management*, *40*(3), 240–247.
Guenzi, P., & Troilo, G. (2006). Developing marketing capabilities for customer value creation through marketing-sales integration. *Industrial Marketing Management*, *35*(8), 974–988.
Han, J. K., Kim, N., & Srivastava, R. K. (1998). Market orientation and organizational performance: Is innovation a missing link? *The Journal of Marketing*, *62*(4), 30–45.
Han, S. L., & Sung, H. S. (2008). Industrial brand value and relationship performance in business markets—A general structural equation model. *Industrial Marketing Management*, *37*(7), 807–818.
Jensen, M. B., & Klastrup, K. (2008). Towards a B2B customer-based brand equity model. *Journal of Targeting, Measurement and Analysis for Marketing*, *16*(2), 122–128.
Jiménez-Jiménez, D., & Sanz-Valle, R. (2011). Innovation, organizational learning, and performance. *Journal of Business Research*, *64*(4), 408–417.
Kahn, K. B., Maltz, E. N., & Mentzer, J. T. (2006). Demand collaboration: Effects on knowledge creation, relationships, and supply chain performance. *Journal of Business Logistics*, *27*(2), 191–221.
Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. *The Journal of Marketing*, *1–22*.
Keller, K. L. (1998). *Strategic brand management: Building, measuring, and managing brand equity.* Upper Saddle River, NJ: Prentice Hall.
Keller, K. L. (2000). The brand report card. *Harvard Business Review*, *78*(1), 147–158.
Keller, K. L., & Lehmann, D. R. (2003). How do brands create value? *Marketing Management*, *12*(3), 26–31.
Keränen, J., Piirainen, K. A., & Salminen, R. T. (2012). Systematic review on B2B branding: Research issues and avenues for future research. *The Journal of Product and Brand Management*, *21*(6), 404–417.
Kim, J. H., & Hyun, Y. J. (2011). A model to investigate the influence of marketing-mix efforts and corporate image on brand equity in the IT software sector. *Industrial Marketing Management*, *40*(3), 424–438.
Kotler, P., & Pfoertsch, W. (2007). Being known or being one of many: The need for brand management for business-to-business companies. *The Journal of Business and Industrial Marketing*, *22*(6), 357–362.
Krasnikov, A., & Jayachandran, S. (2008). The relative impact of marketing, research-and-development, and operations capabilities on firm performance. *Journal of Marketing*, *72*(4), 1–11.
Kuhn, K. A. L., Alpert, F., & Pope, N. K. L. (2008). An application of Keller's brand equity model in a B2B context. *Qualitative Market Research: An International Journal*, *11*(1), 40–58.
Lai, C. S., Chiu, C. J., Yang, C. F., & Pai, D. C. (2010). The effects of corporate social responsibility on brand performance: The mediating effect of industrial brand equity and corporate reputation. *Journal of Business Ethics*, *95*(3), 457–469.
Lam, S. Y., Shankar, V., Erramilli, M. K., & Murthy, B. (2004). Customer value, satisfaction, loyalty, and switching costs: An illustration from a business-to-business service context. *Journal of the Academy of Marketing Science*, *32*(3), 293–311.
Leek, S., & Christodoulides, G. (2012). A framework of brand value in B2B markets: The contributing role of functional and emotional components. *Industrial Marketing Management*, *41*(1), 106–114.
Lengnick-Hall, C. A. (1996). Customer contributions to quality: A different view of the customer-oriented firm. *Academy of Management Review*, *21*(3), 791–824.
Lin, Y., & Wu, L. Y. (2014). Exploring the role of dynamic capabilities in firm performance under the resource-based view framework. *Journal of Business Research*, *67*(3), 407–413.
Lovelock, C. H., & Young, R. F. (1979). Look to consumers to increase productivity. *Harvard Business Review*, *57*(3), 168–178.
Lusch, R. F., Vargo, S. L., & Tanniru, M. (2010). Service, value networks and learning. *Journal of the Academy of Marketing Science*, *38*(1), 19–31.
Madhavaram, S., Badrinarayanan, V., & McDonald, R. E. (2005). Integrated marketing communication (IMC) and brand identity as critical components of brand equity strategy: A conceptual framework and research propositions. *Journal of Advertising*, *34*(4), 69–80.
Madhok, A., & Tallman, S. B. (1998). Resources, transactions and rents: Managing value through interfirm collaborative relationships. *Organization Science*, *9*(3), 326–339.

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Martelo, S., Barroso, C., & Cepeda, G. (2013). The use of organizational capabilities to increase customer value. *Journal of Business Research*, *66*(10), 2042–2050.

McQuiston, D. (2004). Successful branding of a commodity product: The case of RAEX LASER steel. *Industrial Marketing Management*, *33*(4), 345–354.

Michell, P., King, J., & Reast, J. (2001). Brand values related to industrial products. *Industrial Marketing Management*, *30*(5), 415–425.

Mitrega, M., Forkmann, S., Ramos, C., & Henneberg, S. C. (2012). Networking capability in business relationships—Concept and scale development. *Industrial Marketing Management*, *41*(5), 739–751.

Mocciaro, A., & Battista, G. (2005). The development of the resource-based firm between value appropriation and value creation. *Advances in Strategic Management*, *22*, 153–188.

Mohr, J., Fisher, R. J., & Nevin, J. R. (1996). Collaborative communication in interfirm relationships: Moderating effects of integration and control. *Journal of Marketing*, *60*(3), 103–115.

Morgan, N. A., Vorhies, D. W., & Mason, C. H. (2009). Market orientation, marketing capabilities, and firm performance. *Strategic Management Journal*, *30*(8), 909–920.

Mustak, M., Jaakkola, E., & Halinen, A. (2013). Customer participation and value creation: A systematic review and research implications. *Managing Service Quality*, *23*(4), 341–359.

Ngo, L. V., & O'Cass, A. (2009). Creating value offerings via operant resource-based capabilities. *Industrial Marketing Management*, *38*(1), 45–59.

Ngo, L. V., & O'Cass, A. (2012). In search of innovation and customer-related performance superiority: The role of market orientation, marketing capability, and innovation capability interactions. *Journal of Product Innovation Management*, *29*(5), 861–877.

Ngo, L. V., & O'Cass,, A. (2013). Innovation and business success: The mediating role of customer participation. *Journal of Business Research*, *66*(8), 1134–1142.

Normann, R., & Ramirez, R. (1993). From value chain to value constellation: Designing interactive strategy. *Harvard Business Review*, *71*(4), 65–77.

Nowlis, S. M., & Simonsen, I. (1996). The effect of new product features on brand choice. *Journal of Marketing Research*, *33*(2), 36–46.

O'Cass, A., & Ngo, L. V. (2012). Creating superior customer value for B2B firms through supplier firm capabilities. *Industrial Marketing Management*, *41*(1), 125–135.

O'Cass, A., & Sok, P. (2012). Examining the role of within functional area resource-capability complementarity in achieving customer and product-based performance outcomes. *Journal of Strategic Marketing*, *20*(4), 345–363.

O'Cass, A., & Weerawardena, J. (2010). The effects of perceived industry competitive intensity and marketing-related capabilities: Drivers of superior brand performance. *Industrial Marketing Management*, *39*(4), 571–581.

Ohnemus, L. (2009). B2B branding: A financial burden for shareholders? *Business Horizons*, *52*(2), 159–166.

Payne, A. F., Storbacka, K., & Frow, P. (2008). Managing the co-creation of value. *Journal of the Academy of Marketing Science*, *36*(1), 83–96.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879–903.

Porter, M. (1985). *Competitive advantage-creating and sustaining superior performance.* New York, NY: The Free Press.

Powell, W. W., Koput, K. W., & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, *41*(1), 16–145.

Ritter, T., & Gemunden, H. G. (2003). Network competence: Its impact on innovation success and its antecedents. *Journal of Business Research*, *56*(9), 745–755.

Roberts, J., & Merrilees, B. (2007). Multiple roles of brands in business-to-business services. *The Journal of Business and Industrial Marketing*, *22*(6), 410–417.

Roseira, C., & Brito, C. (2014). Managing value co-creation through interfaces with suppliers. *International Business Research*, *7*(4), 11–30.

Rosenbusch, N., Brinckmann, J., & Bausch, A. (2011). Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs. *Journal of Business Venturing*, *26*(4), 441–457.

Saarijärvi, H. (2012). The mechanisms of value co-creation. *Journal of Strategic Marketing*, *20*(5), 381–391.

Salomo, S., Steinhoff, F., & Trommsdorff, V. (2003). Customer orientation in innovation projects and new product development success—The moderating effect of product innovativeness. *International Journal of Technology Management*, *26*(5), 442–463.

Salomonson, N., Åberg, A., & Allwood, J. (2012). Communicative skills that support value creation: A study of B2B interactions between customers and customer service representatives. *Industrial Marketing Management*, *41*(1), 145–155.

Salunke, S., Weerawardena, J., & McColl-Kennedy, J. R. (2011). Towards a model of dynamic capabilities in innovation-based competitive strategy: Insights from project-oriented service firms. *Industrial Marketing Management*, *40*(8), 1251–1263.

Schultz, D. E., Cole, B., & Bailey, S. (2004). Implementing the 'connect the dots' approach to marketing communication. *International Journal of Advertising*, *23*(4), 455–477.

Shou, Z. G., Chen, J., Zhu, W. T., & Yang, L. H. (2014). Firm capability and performance in China: The moderating role of guanxi and institutional forces in domestic and foreign contexts. *Journal of Business Research*, *67*(2), 77–82.

Sok, P., O'Cass, A., & Sok, K. M. (2013). Achieving superior SME performance: Overarching role of marketing, innovation, and learning capabilities. *Australasian Marketing Journal; AMJ*, *21*(3), 161–167.

Sok, P., & O'Cass, A. (2011). Achieving superior innovation-based performance outcomes in SMEs through innovation resource-capability complementarity. *Industrial Marketing Management*, *40*(8), 1285–1293.

Song, M., Droge, C., Hanvanich, S., & Calantone, R. (2005). Marketing and technology resource complementarity: An analysis of their interaction effect in two environmental contexts. *Strategic Management Journal*, *26*(3), 259–276.

Song, M., Nason, R. W., & Di Benedetto, C. A. (2008). Distinctive marketing and information technology capabilities and strategic types: A cross-national investigation. *Journal of International Marketing*, *16*(1), 4–38.

Svendsen, M. F., Haugland, S. A., Grønhaug, K., & Hammervoll, T. (2011). Marketing strategy and customer involvement in product development. *European Journal of Marketing*, *45*(4), 513–530.

Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics* (3rd ed.). New York: Harper Collins College Publishers.

Torres, A., & Bijmolt, T. H. (2009). Assessing brand image through communalities and asymmetries in brand-to-attribute and attribute-to-brand associations. *European Journal of Operational Research*, *195*(2), 628–640.

Ulaga, W. (2001). Customer value in business markets: An agenda for inquiry. *Industrial Marketing Management*, *30*(4), 315–319.

Ulaga, W., & Eggert, A. (2006). Value-based differentiation in business relationships: Gaining and sustaining key supplier status. *Journal of Marketing*, *70*(1), 119–136.

van Riel, A. C. R., de Mortanges, C. P., & Streukens, S. (2005). Marketing antecedents of industrial brand equity: An empirical investigation in specialty chemicals. *Industrial Marketing Management*, *34*(8), 841–847.

Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, *68*(1), 1–17.

Vargo, S. L., Maglio, P. P., & Akaka, M. A. (2008). On value and value co-creation: A service systems and service logic perspective. *European Management Journal*, *26*(3), 145–152.

von Hippel, E. (1998). Economics of product development by users: The impact of "sticky" local information. *Management Science*, *44*(5), 629–644.

Vorhies, D. W., & Morgan, N. A. (2005). Benchmarking marketing capabilities for sustainable competitive advantage. *Journal of Marketing*, *69*(1), 80–94.

Walter, A., Auer, M., & Ritter, T. (2006). The impact of network capabilities and entrepreneurial orientation on university spin-off performance. *Journal of Business Venturing*, *21*(4), 541–567.

Walter, A., Müller, T. A., Helfer, T. G., & Ritter, T. (2003). Functions of industrial supplier relationships and their impact on relationship quality. *Industrial Marketing Management*, *32*(2), 159–169.

Walter, A., Ritter, T., & Gemünden, H. G. (2001). Value-creation in buyer–seller relationships: Theoretical considerations and empirical results from a supplier's perspective. *Industrial Marketing Management*, *30*(4), 365–377.

Wang, C. L., & Ahmed, P. K. (2004). The development and validation of the organizational innovativeness construct using confirmatory factor analysis. *European Journal of Innovation Management*, *7*(4), 303–313.

Webster, F. E., & Keller, K. L. (2004). A roadmap for branding in industrial markets. *Journal of Brand Management*, *11*(5), 388–402.

Weerawardena, J., O'Cass, A., & Julian, C. (2006). Does industry matter? Examining the role of industry structure and organizational learning in innovation and brand performance. *Journal of Business Research*, *59*(1), 37–45.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, *5*(2), 171–180.

Wise, R., & Zednickova, J. (2009). The rise and rise of the B2B brand. *Journal of Business Strategy*, *30*(1), 4–13.

Wong, H. Y., & Merrilees, B. (2007). Multiple roles for branding in international marketing. *International Marketing Review*, *24*(4), 384–408.

Wong, H. Y., & Merrilees, B. (2008). The performance benefits of being brand-orientated. *The Journal of Product and Brand Management*, *17*(6), 372–383.

Yang, C. C., Marlow, P. B., & Lu, C. S. (2009). Assessing resources, logistics service capabilities, innovation capabilities and the performance of container shipping services in Taiwan. *International Journal of Production Economics*, *122*(1), 4–20.

Yeşil, S., Koska, A., & Büyükbeşe, T. (2013). Knowledge sharing process, innovation capability and innovation performance: An empirical study. *Procedia-Social and Behavioral Sciences*, *75*, 217–225.

Yi, Y., Nataraajan, R., & Gong, T. (2011). Customer participation and citizenship behavioral influences on employee performance, satisfaction, commitment, and turnover intention. *Journal of Business Research*, *64*(1), 87–95.

Zablah, A. R., Brown, B. P., & Donthu, N. (2010). The relative importance of brands in modified rebuy purchase situations. *International Journal of Research in Marketing*, *27*(3), 248–260.

Zhou, K. Z., Yim, C. K., & Tse, D. K. (2005). The effects of strategic orientations on technology and market-based breakthrough innovations. *Journal of Marketing*, *69*(2), 42–60.

Ziggers, G. W., & Henseler, J. (2009). Interfirm network capability: How it affects buyer–supplier performance. *British Food Journal*, *111*(8), 794–810.

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