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Transforming entrepreneurial posture into a superior first product market position via dynamic capabilities and TMT prior start-up experience

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ABSTRACT

First product commercialization is the first entrepreneurial act of new technology ventures. However, little is known about mechanisms that transform these firms' entrepreneurial posture into first product advantage. Building on the dynamic capability view of the firm, this study examines the role of capabilities exploitation (i.e., in the form of complementarity), top management team start-up experience, cross-functional collaboration and information and communication technology assets in driving entrepreneurial posture toward first product advantage. A multi-informant study of 137 B2B new technology ventures was undertaken. The results show that entrepreneurial posture can contribute to first product advantage indirectly by fostering R & D-marketing capability complementarity. Furthermore, our results indicate that the entrepreneurial posture - capabilities complementarity relationship is augmented when top management team possess prior start-up experience. Finally, our findings indicate that the benefits of R & D-marketing capability complementarity for first product advantage are contingent on the exploitation of cross-functional collaboration and ICT capabilities.

1. Introduction

New technology ventures (NTVs) suffer from high failure rates (Zane & DeCarolis, 2016), especially in transitioning economies (Bruton, Su, & Filatotchev, 2016). Their survival is contingent on the success of their very first product (Song, Di Benedetto, & Song, 2010; Zhao, Libaers, & Song, 2015). For NTVs this is their very first entrepreneurial act and is accompanied by risk and delayed financial returns (Song, Song, & Di Benedetto, 2011). However, in the face of challenges impacting NTVs, research has remained largely silent on the factors that bolster first product success (Song et al., 2010; Song et al., 2011; Zhao et al., 2015).

One crucial factor in understanding new product development (NPD) may be the strategic postures they adopt (see Matsuno, Zhu, & Rice, 2014; Mu, Thomas, Peng, & Di Benedetto, 2016). Of particular relevance is the role of the entrepreneurial posture (EP), which denotes a firm-level attribute that reflects the disposition to respond to situations through taking calculated risks, being innovative, and demonstrating strategic proactiveness (Covin & Lumpkin, 2011; Covin & Slevin, 1989; Matsuno, Mentzer, & Özsomer, 2002). Research focusing on EP has labeled it variously as "entrepreneurial orientation" (Covin & Slevin, 1991), "entrepreneurial proclivity" (Covin & Slevin, 1989; Matsuno et al., 2002; Matsuno et al., 2014), and "entrepreneurial strategic posture" (Covin, Slevin, & Schultz, 1994).

While new firms are faced with resource limitations, they are often good at product innovations (Rosenbusch, Brinckmann, & Bausch, 2011). Their small size and evolving structures (Delmar & Shane, 2006), along with a pronounced EP can expedite their product innovation activities (Vossen, 1998). Although attention has been paid to the EP-performance relationship in new ventures, efforts to explain EP's impact have to-date failed to demonstrate how it is translated into an advantageous market position for NTVs' first product (Ahmadi & O'Cass, 2016). Recognizing that there are underlying requirements to maximize EP's potential benefits (Mu et al., 2016), many argue that it is essential to explore mechanisms that translate EP into market advantages (e.g., Covin, Green, & Slevin, 2006; Rauch, Wiklund, Lumpkin, & Frese, 2009). In this regard, the importance of contingencies among EP and other constructs has been emphasized (Mu et al., 2016; Rauch et al., 2009).

Our research model (Fig. 1) focuses on the dynamic nature of product-focused capabilities in the commercialization of NTV's first product. We conceptualize EP as a firm-level disposition which drives capability exploitation (at the operational level in the form of complementarity). Furthermore, we examine the role of three key contingency assets that influence the translation of EP into first product outcomes.

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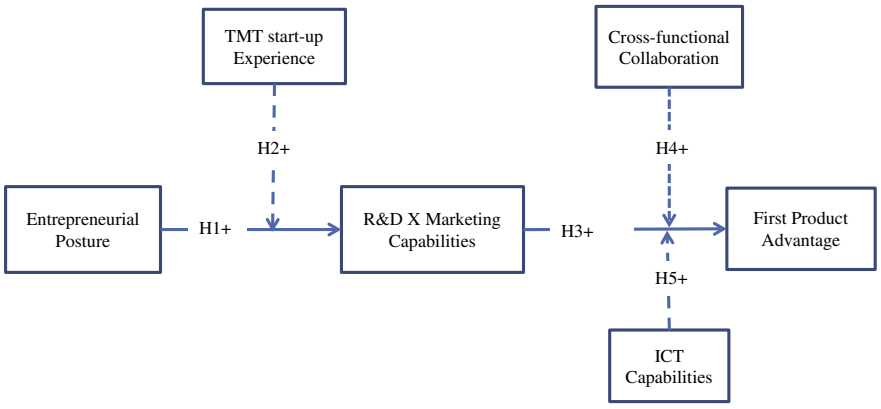

Fig. 1. Conceptual framework.

Our contribution to the literature is two-fold. First, researchers have called for examination of the dynamic capability theory (DC) as a lens to explain EP's impact on different aspects of firm performance (Covin & Miller, 2014). DC theory focuses on a firm's behaviors regarding the continuous reconfiguration, renewal, and exploitation of assets to effectively respond to the changing environment to attain an advantageous position (Teece, Pisano, & Shuen, 1997). As an important component embedded in configuration and exploitation behaviors, DC theorists highlight the influence of knowledge management on these behaviors (Cepeda & Vera, 2007; Wu, 2007). On the other hand, EP has been recognized as an enabler of market-learning behaviors within firms. Building on this view, DC may be a helpful lens to understand EP's role in asset configuration through knowledge acquisition and generation in first product commercialization.

DC theory has also been seen as suitable when researchers aim to develop a holistic model for entrepreneurial and innovation processes within organizations (Lawson & Samson, 2001). Therefore, different product-focused capabilities deployed for first product commercialization can be scrutinized simultaneously. Given the role of EP in exploring firms market opportunities (Miller, 2011), DC may be a key means for linking EP to NTVs' opportunity exploitation (successful launch of the first product) and the subsequent market position gained (see Covin & Miller, 2014). DC theorists have also identified the importance of deploying product-level capabilities in the form of complementary combinations (Feng, Morgan, & Rego, 2017; Morgan, Slotegraaf, & Vorhies, 2009) to achieve product advantage and superior product performance.

We position EP as an initial disposition providing a specific strategic direction for NTVs' first product commercialization. We contend that EP's influence on NTVs first product advantage is working through and fostering the level of R & D – marketing capability complementarity. We theorize that NTVs can achieve first product performance benefits because EP acts as a transformational driver to configure R & D and marketing capabilities to maximize their complementarity.

Second, we argue that the occurrence of the transformational process through R & D – marketing capability complementarity is contingent upon specific factors that facilitate putting EP into action. By extending DC's view on knowledge generation and integration in the new product commercialization process (e.g., Cepeda & Vera, 2007), we address the role of three contingency assets including top management team (TMT) prior start-up experience, cross-functional collaboration (CFC) and information and communication technology (ICT) capabilities, as contributors to the configuration and exploitation of marketing-R & D complementarity in NTVs first product commercialization.

TMT characteristics have been shown to influence the formation of organizational attributes (Auh & Menguc, 2005). Management experience has been recognized as a key aspect of DC (Bendig, Strese, Flatten, da Costa, & Brettel, 2017) - representing an essential “integrating and aligning mechanism in successful strategy implementation” (Panagopoulos & Avlonitis, 2010, p. 54). It has been argued that the TMT possesses much of the managerial experience in new ventures (De Clercq, Dimov, & Thongpapanl, 2015) helping to manage the organization's strategic posture (Rosenbusch et al., 2011) and exploit product-focused assets (Alvarez & Busenitz, 2001; Song et al., 2010). Research has shown the moderating role of prior experience (Farmer, Yao, & Kung-Mcintyre, 2011; Tsinopoulos, Lages, & Sousa, 2014) in augmenting the association between an organization's propensity to act in a specific manner (e.g. strategic postures) and its actual behaviors (e.g., capabilities to undertake an activity) (cf Ozer, 2011). Building on this work and setting it within the DC lens we show that an NTV's TMTs' prior start-up experience enhances the relationship between the level of EP and the complementary capabilities directed to commercialize the first product.

From a DC perspective, knowledge integration and sharing are important factors impacting capability deployment and renewal (Verona & Ravasi, 2003). CFC has been identified as a dynamic capability that supports asset exploitation (Allred, Fawcett, Wallin, & Magnan, 2011). Building on the knowledge management aspect of DC, we argue that CFC is an essential asset directed to the exploitation of complementary product-focused capabilities. The development and spread of knowledge within first product commercialization teams may be challenging (cf Szulanski, 2000) and in reality, the exploitation of product level assets cannot be considered in isolation from the knowledge sharing capacities of CFC (Wales, Monsen, & McKelvie, 2011). Through the exchange of technical and market knowledge in the first product project, NTVs may be more capable of exploiting a market opportunity (cf Tafti, Mithas, & Krishnan, 2013). Hence, we theorize that CFC enhances the relationship between R & D - marketing capabilities complementarity and first product advantage in NTVs' first product commercialization.

Further, ICT capabilities are key assets providing the infrastructure for access and exchange of knowledge (Froehle, Roth, Chase, & Voss, 2000) to support the exploitation of R & D-marketing capabilities complementarity (Vilaseca-Requena, Torrent-Sellens, & Jiménez-Zarco, 2007). In NPD research, CFCs' role has been considered in isolation, yet ICT is essential in facilitating knowledge-based collaboration. Research identifies the indirect role of ICT in enhancing the function of product-related capabilities through the implementation of knowledge management mechanisms (DeSarbo, Benedetto, Jedidi, & Song, 2006; Sher & Lee, 2004). Given the increasing contribution of ICT to new ventures' efficiency (Parida & Örtqvist, 2015), we see ICT capabilities as beneficial when they are used as facilitators to exploit R & D-marketing complementarity in NTVs. Hence, we position ICT as a facilitator of first product advantage and a supportive competency in translating capability complementarity (configured by EP) into first product advantage. Hence, we argue that ICT capabilities enhance the relationship between R & D-marketing capabilities complementarity and first product advantage in NTVs'.

2. Theory development

2.1. EP and asset exploitation

Both R & D and marketing play a significant role in the commercialization of NTV's first product (Song et al., 2010). However, because of NTVs' small size (Gruber, 2004), founder TMTs are likely to have primary inputs through their skills and strategic postures (Lumpkin & Dess, 1996) in first product commercialization (Zhao et al., 2015). EP facilitates the identification and exploitation of opportunities (Alvarez & Busenitz, 2001; Rosenbusch et al., 2011). EP has been identified as a factor in how a new firm is organized and manages its limited assets (Wiklund & Shepherd, 2003). In these firms, EP has also been linked to different aspects of performance, including new product performance (Martin & Javalgi, 2016). Furthermore, EP in new ventures has been portrayed as an enabler of product launch effectiveness (Zahra, 1993) and marketing strength (Matsuno et al., 2014), leading to higher performance. There has been a shift toward identifying the relationship between EP and individual product-related capabilities (Martin & Javalgi, 2016; Matsuno et al., 2014) and how EP leads to the deployment of groups of capabilities (Ahmadi & O'Cass, 2016). As a result, a positive impact of EP in augmenting the value of a firm's marketing and R & D has been reported (Matsuno et al., 2014).

Further, the role of behavioral mechanisms (i.e., product-related capabilities) and their function as intervening factors (Weerawardena & O'Cass, 2004) in the EP-new product performance relationship (Matsuno et al., 2014) has been highlighted. In this sense, EP is seen to drive the deployment of existing capabilities in the commercialization process (Alvarez & Busenitz, 2001; Matsuno et al., 2014). In picking up on these issues and related research, DC research views knowledge as an important component embedded in both marketing and R & D (Easterby-Smith & Prieto, 2008). The knowledge embedded in capabilities may allow product-focused functional areas to formulate actions to cater to changes in the market (Morgan et al., 2009). Through conceptualizing capabilities as dynamic knowledge-based assets the effect of the level of complementarity between marketing and R & D (Feng et al., 2017) and how it is driven by a strategic posture toward innovation performance has been explored (e.g., Morgan et al., 2009; Ngo & O'Cass, 2012).

DC research emphasizes that the ability (i.e., capability) to exploit product level resources is a more significant source of advantage than absolute resource levels (Orr, Bush, & Vorhies, 2011; Teece et al., 1997). In reality, different product-related capabilities coexist inside a firm and are intertwined (Morgan et al., 2009). In this setting, the notion of complementarity has developed as an explanation for how capabilities generate superior outcomes (Feng et al., 2017; Orr et al., 2011). Complementarity refers to mutually supportive relations between two elements such as R & D and marketing capabilities to produce a particular outcome such as first product advantage (Ahmadi, O'Cass, & Miles, 2014). Building on the complementarity aspect of DC, some argue that capabilities should not be considered in isolation (Feng et al., 2017). They should be deployed as complementary assets to enhance new product commercialization (Moorman & Slotegraaf, 1999; Orr et al., 2011). We define product focused capabilities as skills, processes, and knowledge used to undertake activities directed toward new product commercialization (DeSarbo et al., 2006; Moorman & Slotegraaf, 1999).

Our model (Fig. 1) delineates the link between the tendency (i.e., EP), actual behavior (i.e., R & D-marketing capability complementarity) and the output (i.e., market position obtained) (cf Matsuno et al., 2014). The literature postulates that differentiation and cost-efficiency are the results of the deployment of assets directed to new product commercialization (Ahmadi et al., 2014). First product advantage concerns the traits that present unique value embedded within the first product (Song et al., 2010). This value may comprise design, features, functions, reliability, technical performance, lower cost, higher quality, and affordability of the first product compared to competitors (Kim & Atuahene-Gima, 2010).

2.2. Contingency factors affecting EP's transformation

Given NTV's unique characteristics, the human capital embedded in the TMT is likely to have a pivotal role (Shane, 2003), especially in terms of the firm's EP (De Clercq et al., 2015), first product commercialization (Zhao et al., 2015) and the deployment of capabilities (Weerawardena & O'Cass, 2004). DC theorists have recently noted that any firms' knowledge-based capital - which is the foundation for internal firm capabilities - is highly influenced by the characteristics of the TMT (Bendig et al., 2017). Founder TMTs are likely to have procedural knowledge which denotes knowing how to do things (Wiklund & Shepherd, 2003) because of their prior experience or familiarity in similar circumstances (Gupta & Govindarajan, 2000). One such factor that is important in realizing entrepreneurial and innovation processes is start-up experience (Farmer et al., 2011). The positive relationship between TMT start-up experience and progress in exploiting market opportunities has been noted (Davidsson & Honig, 2003; Ucbasaran, Westhead, & Wright, 2009). In this area, the literature identifies previous experience as facilitating the transformation of intentions into actual behaviors (Ozer, 2011). For example, start-up experience has been identified as a moderator of the link between entrepreneurial aspiration and entrepreneurial behaviors (Farmer et al., 2011) and entrepreneurial career motives and entrepreneurial decision-making (Politis & Gabrielsson, 2009).

Based on the view that start-up experience can be the source of business-related knowledge and role familiarity helping to turn a disposition (EP) into action, we contend that start-up experience acts as a contingency that helps unpack the effect of EP on superior capability complementarity.

While the complementarity between R & D and marketing capabilities should be driven through EP, exploiting their complementarity via appropriate support mechanisms is also crucial. One procedure that might enhance the benefits of complementarity between product-focused capabilities across different functional areas is facilitating their communication and information exchange (Schleimer & Faems, 2016). During the exploitation of R & D-marketing capability complementarily, the strategic inter-relationship between functional areas may determine the integration mechanisms applied for knowledge sharing and communication in first product commercialization. From DC view, information and knowledge-sharing between product-related functional areas that comprise different knowledge fields (Sher & Lee, 2004) may determine how an NTV advances its current product-focused activities. Knowledge sharing may lead to the generation of new knowledge (Smith, Collins, & Clark, 2005) which bolsters the novelty of the final product regarding features, functions, and affordability (Roper & Hewitt-Dundas, 2015).

As product-focused activities are associated with a firm's aptitude to move into new areas of knowledge (De Clercq et al., 2015), knowledge exchange between marketing and R & D is a vital fuel (Song & Song, 2010). Therefore, to maximize the ability of R & D- marketing complementarity, to achieve first product advantage, there needs to be an effective knowledge-sharing infrastructure. To this end, CFC provides the infrastructure to generate specialized knowledge that can be exploited.

In this sense, CFC as a dynamic capability denotes a reciprocally shared process where two product-focused departments work together on the same project (i.e., first product commercialization), possess mutual understanding, share knowledge, and achieve common goals (Luca & Atuahene-Gima, 2007). To facilitate collaboration NTVs require capabilities that enhance the level of integration. One recommended asset which is often identified as an indirect source of product advantage is ICT capabilities (Paulraj & Chen, 2007). ICT capabilities refer to bundles of knowledge and skills possessed by firms in adopting ICT

solution to new product commercialization processes (DeSarbo et al., 2006). Research identifies the facilitating role of ICT capabilities (as a moderator) in integration mechanisms in supply chain management (Zhang, Van Donk, & van der Vaart, 2016) and buyer-supplier relationships (Paulraj & Chen, 2007). Further, it has been shown that ICT capabilities can decrease coordination costs among NPD functional areas (Reddy, 2006). ICT capabilities are likely to support collaboration through ICT-based knowledge exchange and cross-functional communication (Vickery, Jayaram, Droge, & Calantone, 2003). As such, building on DC view, we argue that ICT capabilities play a key role in NTV's first product commercialization by enhancing the benefits gained from exploiting R & D-marketing complementarity toward first product advantage.

2.3. Hypotheses

2.3.1. EP and resource-capability complementarity

Entrepreneurial projects such as the first product's commercialization are often initiated by strategic dispositions that reflect the level of NTVs' propensity toward innovative and risk-taking behaviors. In competitive technology-based markets there is a need for higher tendency toward entrepreneurial acts from inception to initiate and expedite the first product project. EP is regarded as a disposition that provides guidelines about how new entry should be undertaken (Matsuno et al., 2002). However, EP - as an organizational propensity, is necessary but not a sufficient condition to add value in product commercialization (Matsuno et al., 2014). In other words, possessing EP is important, but not a sufficient condition to generate superior first product outcomes. An NTV may need to take appropriate strategic actions to capitalize on EP to obtain desirable first product outcomes. Product-level capabilities consist of a set of behaviors directed toward opportunity exploitation (Martin & Javalgi, 2016; Morgan et al., 2009) and are configured to unpack variations in first product performance rather than heterogeneity in existing product level resources.

NTVs with a greater level of EP are more attuned to the importance of the development of knowledge used in their first product decision-making. DC research views market and technical knowledge as crucial inputs to new product projects (Bruni & Verona, 2009). These inputs assist firms (such as NTVs) in capability development, renewal, and configuration to meet market conditions (Wilden & Gudergan, 2015). EP activates market-based learning efforts in acquiring and disseminating market and technical knowledge (De Clercq & Zhou, 2014). EP's encourages the continuous tracking of market-based and technological trends in the business environment which provides insights about opportunities in the market (Griffith, Noble, & Chen, 2006).

Through knowledge acquisition, NTVs will make better decisions regarding their asset configuration and distinguish themselves from competitors, therefore, they will handle the risks more properly (Matsuno et al., 2002). Market learning as an outside-in process stimulates the collective efforts of marketing and R & D to respond to the market (Ngo & O'Cass, 2012). This is in line with DC theory which proposes that firms require a high level of engagement in market-based learning to reconfigure their assets and enhance their product-focused capabilities in ways that reflect the competitive market (Morgan, Katsikeas, & Vorhies, 2012).

As the outcome of the interplay between EP and product-related capabilities, R & D and marketing may acquire a deep appreciation of the market to adapt their processes. Hence, marketing will be able to plan communication strategies that effectively fit the first product concept created by R & D. The interconnectedness between R & D and marketing is likely to lead to a more efficient and effective commercialization of the first product. We argue EP's inherent role when it comes to the first product project is to support marketing and R & D simultaneously and drive their configuration. Therefore,

H1. EP has a positive relationship with marketing - R & D capability complementarity.

2.3.2. TMT – managers' prior start-up experience augmenting EP's influence

At the start-up stage, the role of TMT members is critical in developing and fostering an effective strategic dispositions (Sciascia, Mazzola, & Chirico, 2013). In particular, the emergence of a strategic posture appears to involve a high level of TMT members' intellectual engagement (Cho & Hambrick, 2006). Likewise, research highlights TMT's knowledge and experience as critical to the entrepreneurial processes (Sarasvathy & Dew, 2008). Further, a recent meta-analysis shows that human capital experience (i.e., prior start-up experience) is likely to be a key factor determining new venture success (Marvel, Davis, & Sproul, 2014). Start-up experience supports entrepreneurial processes and innovation activities in new ventures andinfluences the decisions related to NPD (Farmer et al., 2011; Rosenbusch et al., 2011).

While the role of human capital in the TMT in enhancing the relationship between EP and new ventures' overall performance has been identified (e.g., Engelen, Gupta, Strenger, & Brettel, 2015), we take the view that TMT human capital in the form of previous start-up experience is a key contingency that augments the impact of EP on R & D-marketing complementarity in NTVs first product commercialization. Building on Engelen et al. (2015) and Farmer et al. (2011), we argue the TMT's past start-up experience enhances the impact of EP on the complementarity between R & D and marketing in first product commercialization. Research suggests that entrepreneurs learn through engaging in task-related activities (Shreeve, Wareing, & Drew, 2008). Experience in start-up processes reflects familiarity with the challenges in the resource-scarce environments of NTVs. It is likely that experienced TMTs' possess skills in assembling and deploying available product-level competencies. EP is identified as an asset-intensive posture (Miller, 2011), and start-up experience provides the TMT with knowledge of how to acquire and configure assets because they have been in this position previously (Wiklund & Shepherd, 2003).

TMTs with past start-up experience possess task-related human capital, acquired from previous successes, errors, and mistakes. They may have a better idea of what needs to be done to enact EP and encourage the collective efforts of R & D and marketing teams. Previous start-up experience appears to augment the proactive disposition of NTVs in identifying and creating profitable opportunities (Bhide, 2003). TMT's familiarity with the nature of start-up business may facilitate market-based learning as they are likely to have pre-established networks which may ease the generation of technological and market knowledge that can be disseminated within the NTV. As a consequence, in NTVs where the TMT have prior start-up experience the potential for achieving optimal capability complementarity from EP in first product commercialization will be greater. Therefore,

H2. The relationship between EP and R & D-marketing complementarity is moderated by TMT prior start-up experience.

2.3.3. R & D-marketing complementarity's influence on first product advantage

From the DC perspective complementarity represents a higher level of interdependence between marketing and R & D and their collective (i.e., complementary) effects (Feng et al., 2017) in first product commercialization. Complementarity between capabilities in NTVs implies that a weak (strong) capability in one area can affect the function or performance outcomes of another capability (Zott & Amit, 2008). For example, if an NTV develops an innovative first product, but markets it poorly, the customer will not capture the proposed value (see Dierickx & Cool, 1989). Likewise, if the product lacks the features or design sought by the market or is observed to be similar to other products in the market, even superior marketing can only generate short-term gains, raising the risk of product failure (O'Cass, Ngo, & Siahtiri, 2015). While in NTVs, R & D capabilities are oriented toward the development of a novel first product with a competitive price, marketing capabilities support R & D capabilities by orienting actions toward informing the market about the value of a first product and making it

available to customers and encouraging product trial and early sales.

R & D focuses on employing research and technological know-how and converts inputs into physical outputs (i.e., final product) (Danneels, 2007). R & D is associated with the early stages of the firm's product delivery. R & D assets are often combined with other assets to create new products (O'Cass & Sok, 2012); however, by themselves, they are not sufficient for superior market success. To effectively leverage their R & D capabilities, NTVs require complementary marketing capacities to link the first product to the market. Through their marketing, they will be able to establish relationships with the customers (Morgan et al., 2009) to generate first product advantage. Hence, these two key capabilities in first product commercialization (i.e., R & D and marketing) are expected to have a complementary performance effect. Therefore,

H3. There is a positive relationship between R & D-marketing complementarity and first product advantage.

2.3.4. Moderating role of CFC

At present little consideration has been given to boundary conditions in first product commercialization, especially their role in maximizing the effect of capabilities on performance. Factors such as separation between R & D and marketing, and the differences in their goals, values, and backgrounds may hinder new product commercialization (Song & Song, 2010). Maximizing the effect of DCs requires higher levels of internal integration achieved through CFC. In first product commercialization, CFC can support the efficiency and effectiveness of the commercialization process (Marion, Friar, & Timothy, 2012). DC research emphasizes the importance of collective learning and the capabilities that can coordinate different product skills and integrate different technologies (Allred et al., 2011). CFC in product commercialization signifies informal, cooperative relationships between R & D and marketing (Luca & Atuahene-Gima, 2007). It builds a shared vision and greater understanding of the new product project among the departments (Robbins, 2001).

In first product commercialization, achieving an optimal level of complementarity is not easy unless CFC allows cross-fertilization between expertise held in marketing and R & D (Lin, Wang, & Kung, 2015). CFC is likely to lessen counterproductive behaviors by encouraging goal alignment between R & D and marketing (Luca & Atuahene-Gima, 2007). CFC is vital in facilitating knowledge transfer and maximizing the contribution of each functional area to the performance of the others. CFC may provide advantages for the commercialization of the first product by increasing the information flow between marketing and R & D. This leads to the creation of an internal network to pursue efficiency and effectiveness in the first product commercialization. Therefore, marketing and R & D share their expertise and knowledge to gain an understanding of each other's functions, goals, and values, which may lead to the creation of new knowledge leading to breakthrough and affordable products (Calantone & Rubera, 2012).

CFC develops a common understanding of the first product and enhances the uniformity of the decisions made regarding its commercialization. Also, it is likely that CFC can help in reducing the number of redesigns, as well as the cost and time of new product commercialization while supporting an enhancement of the new product outcomes (Song & Parry, 1997). As a result, CFC facilitates the exploitation of assets by providing flexibility and improvements in the use of those assets toward an advantageous position. As outlined in Fig. 1, first product capabilities yield greater benefits from their complementarity when CFC supports them during the first product commercialization process. Therefore,

H4. The relationship between R & D-marketing capabilities complementarity and first product advantage is positively moderated by CFC.

2.3.5. Moderating role of ICT

ICT capabilities include an array of media and devices that link people and information systems through e-mail, voice and video conferencing, voice-mail, databases, file sharing portals, and so on (Andolsen, 1999). They enable employees both within and between teams, departments or divisions to be connected (Dewett & Jones, 2001). Advancements in ICT have shifted small firms (e.g., NTVs) to more advantageous positions in terms of efficiency, effectiveness, and improving organizational flexibility in their NPD processes (Jones, Simmons, Packham, Beynon-Davies, & Pickernell, 2014). ICT capabilities have been identified as important factors in facilitating cross-functional communication in NPD and contributors to the efficiency and effectiveness of new product commercialization processes (Song & Song, 2010). They facilitate information sharing and cooperation between functional areas (DeSarbo et al., 2006; Song, Berends, Van der Bij, & Weggeman, 2007).

Research in NPD and supply chain processes suggests ICT capabilities act as contingencies (Zhang et al., 2016). ICT capabilities consolidate the relationship between NPD assets and different aspects of the performance (Jeffers, Muhanna, & Nault, 2008). In this regard, ICT capabilities alone are not often regarded as sources of advantage unless they support other product focused capabilities in new product operations (Gibbons & O'Connor, 2003). DC research recommends that the effect of ICT capabilities is likely to be contingent on their interrelationships with other product-related assets (Beheregarai Finger, Flynn, & Laureanos Paiva, 2014). We argue that because of the identified weaknesses in NTVs, one avenue that may be pursued to bolster the performance-enhancing effects of asset complementarity is through the use of ICT. From the DC point of view, NTVs also need advanced knowledge of the external environment to be able to make decisions about “from where and from whom” to acquire knowledge to more effectively exploit their capabilities. In this sense, ICT capabilities have been found to bolster the exploitation of product-level capabilities by linking firms' product focused functional areas to external and internal sources of knowledge (Makkonen, Pohjola, Olkkonen, & Koponen, 2014). ICT applications ease the circulation of information and communication by providing platforms and databases for sharing technical and market data among those functional areas engaged in product commercialization (Durmuşoğlu & Barczak, 2011). ICT is used to store information in a systematic and meaningful way so that both marketing and R & D can utilize them during the first product project.

ICT operates as an expediter of knowledge management during new product commercialization (Grover & Kohli, 2012) and can help R & D employees to effectively share the new product concept through simulations so that marketing gets a clearer picture of the final product and to analyze its potential in the market. On the other hand, marketing may use customer feedback applications and share the feedback received from potential customers using the product concept and prototypes. Then R & D can identify the needed product modifications. Therefore, sharing product-related data can help the functional areas working on the first product become familiar with customer taste, which then leads to the development of a more appealing first product. Therefore, the effective exploitation of ICT capabilities facilitates communication between R & D and marketing, keeps the project information updated, and ultimately leads to reduced errors and costs in commercialization (Bharadwaj, 2000). Therefore,

H5. The relationship between R & D-marketing capabilities complementarity and first product advantage is positively moderated by ICT.

3. Research method

3.1. Data collection

A list of NTVs was acquired through accessing a directory of firms

from a government department in India. The list consisted of 3600 technology-based manufacturing firms categorized by the type of industry across five industrial districts including Mumbai-Pune, Gujarat, Chotanagpur, Gurgaon-Delhi-Meerut, and Hugli industrial regions. India was chosen as the context of this research for two reasons. First, India is a member of the group of BRICS economies and is anticipated to become one of the most powerful economies in the world. India is experiencing economic development with a high pace and is moving toward implementing free-market philosophies. Second, manufacturing sectors have grown substantially in India and now contribute highly to the growth of the economy (Chittoor, Sarkar, Ray, & Aulakh, 2009). Hence, focusing on India as the research context may provide interesting insights about the issues related to product commercialization in NTVs not only in India but all the BRICS economies.

A systematic technique was applied to create a list of 650 NTVs by ordering and sorting the firms based on their age, size, and industry. The sampled NTVs had to be 3 to 5 years old (Song, Podoynitsyna, Van Der Bij, & Halman, 2008) and have launched their first product at least one year before data collection (Song et al., 2011). After the preliminary telephone screening, 300 NTVs were found to fit the sampling criterion and consented to participate. The contact information and names of the respondents were received after assessing firms' characteristics against the sampling criterion. We used a multiple informant design and self-administered questionnaires as the means for data collection (following Troilo, De Luca, & Atuahene-Gima, 2014). We collected data from two informants in each NTV (following Slotegraaf & Atuahene-Gima, 2011) to better control for common method bias.

We surveyed CEOs (first informant) and marketing/R & D managers (second informant) in each NTV. All respondents were members of the TMT in their firms because these managers are identified as the most knowledgeable people concerning their firm's assets, and strategies (Li & Zhang, 2007). Furthermore, given the size of the NTVs, the selected informants were expected to represent a reliable source for the required information (Li & Zhang, 2007). The researchers first scheduled appointments with the respondents in each NTV. The researchers personally provided the blank surveys to each informant. When dropping off the survey package, an appointment was scheduled to collect the completed surveys from the respondents. Surveys were collected in sealed envelopes initially provided to the participants. The drop-and-collect technique has been identified as an effective approach, especially for emerging economies because of their collectivist culture, which favors face-to-face communications (O'Cass & Sok, 2012). Also, because of the poor postal infrastructure in emerging economies, researchers have often adopted the drop-and-collect approach. Further, research shows that drop-and-collect technique increases the response rate compared to other survey delivery procedures (O'Cass & Sok, 2012).

CEOs provided the information on start-up experience, EP, and ICT. The second respondents were identified based on the intensity of their involvement in the first product project. The second respondent provided information on marketing capabilities, R & D capabilities, first product advantage, and cross-functional collaboration.

Informants were advised that they would be provided with a summary report upon request. As suggested by Chang, van Witteloostuijn, and Eden (2010), common method bias often occurs in simple theoretical frameworks with less complexity. Our model includes complex relationships; therefore, the testing of the hypotheses would not be expected to be influenced by common method bias. To assure that common method bias is not present, the respondents were informed about the confidentiality (Slotegraaf & Atuahene-Gima, 2011) of their responses and that there were no right or wrong answers to the survey questions (Podsakoff, Lee, & Podsakoff, 2003).

At the conclusion of the data collection, 274 usable surveys were received, representing a response rate of 45%, which was within the acceptable range (Slotegraaf & Atuahene-Gima, 2011). There were 137 NTVs in the final sample; each NTV provided two matched surveys leading to a total number of 274 respondents. NTVs were distributed across three industries including telecommunication (31.8%), electronics (15.6%) and information technology (52.6%). More than 75% of the second respondents were marketing managers, and the remainders were R & D managers. The first respondents (CEOs) had an average of 4.5 years of industry experience. Marketing managers possessed an average of 5.2 and R & D managers an average of 3.8 years of industry experience.

To check for the accuracy of the data, we contacted each respondent after the collection of the survey to confirm that the right person had completed the survey. To test for non-response bias, we gauged differences between late and early responses and found no significant differences. We compared the responses to the marketing capabilities, R & D capabilities, and first product advantage measures based on the timing. We conducted a MANOVA on the variables, and none of the tests showed significant differences in dependent variables' measures (Matsuno et al., 2014).

3.2. Measures

We used existing measure drawn from the literature. All multi-item measures relied on a seven-point Likert scale. First product advantage was a higher-order construct, whereas marketing capabilities, EP, CFC, ICT capabilities, and R & D capabilities were measured as first-order constructs. For marketing capabilities, we relied on the scales adapted from Vorhies, Orr, and Bush (2011). The items were modified to fit the first product domain, including NTVs' abilities in planning, selling, pricing, promotion, product launch, and channel members relationship management - all essential for first product marketing. In adapting Vorhies et al.'s (2011) method, we measured marketing capabilities with reference to the major competitors of the NTVs and asked the respondents to compare their capabilities against those of their major competitors. We measured R & D capabilities with six items from DeSarbo et al. (2006). Items capture NTVs' levels of skill and processes in product development, technology development, and manufacturing areas.

Similar to the approach employed for marketing capabilities, the respondents were asked to compare their R & D capabilities with major competitors. Comparative measures have been extensively applied in studying capabilities (i.e., R & D and marketing) in NPD, marketing and entrepreneurship research (e.g., Kemper, Schilke, & Brettel, 2013; Liozu & Hinterhuber, 2013; Martin, Javalgi, & Cavusgil, 2016). The items measuring CFC were adopted from Luca and Atuahene-Gima (2007). Respondents were asked to determine the extent to which marketing and R & D members of cross-functional teams cooperated on the first product project.

This study adopted five items from DeSarbo et al. (2006) to measure ICT capabilities. The items captured the level of NTVs' abilities in adopting and integrating ICT (DeSarbo et al., 2006). Respondents were asked to compare their competencies in using ICT solutions in first product commercialization compared to key competitors in the industry.

First product advantage was measured by items measuring two key components (four for cost-efficiency and five for differentiation) adopted from Song et al. (2010) and Kim and Atuahene-Gima (2010). For EP, we utilized nine items from Covin and Slevin (1989). To measure TMT members' start-up experience, we asked about the number of years the TMT members of each NTV have spent in start-up businesses (Zhao et al., 2015). We measured firm size and age as the key control variables. Size was measured in terms of the logarithm of the number of full-time employees.

Further, before the administration of the surveys, we pre-tested the surveys using expert judges including marketing and innovation scholars who also had previous experience as managers in manufacturing industries to check for readability, flow and conceptual clarity of the

instrument (surveys) (O'Cass et al., 2015). The results of the pre-test led to some minor modification of the items and survey structure.

4. Results

Our study is a predictive research, exploring the success factors of the first product commercialized by NTVs. The theoretical model is in its initial stages of development and is a complex model, including both formative (EP) and reflective constructs. Our initial investigation indicated that some constructs had non-normal distributions. Taking account of these points, we adopted PLS-SEM to conduct the analysis. PLS-SEM has been previously employed by scholars studying NPD, marketing, and entrepreneurship and argued to be appropriate when addressing similar issues raised here (e.g., Heirati, O'Cass, Schoefer, & Siahtiri, 2016; Reinartz, Haenlein, & Henseler, 2009; Slotegraaf & Atuahene-Gima, 2011; Wilden & Gudergan, 2015).

4.1. Reliability and validity

We checked item loadings with their relative constructs, and all exceeded the 0.5 threshold (Hulland, 1999), showing the reliability of individual items. To check for the reliability of each construct, we evaluated the Cronbach's alphas. All the Cronbach's alpha values exceeded the 0.7 threshold, indicating the reliability of the constructs (See Table 1). We checked the AVE values to examine the convergent validity and found that they exceeded the recommended threshold (0.5), ranging from 0.53 to 0.75 indicating acceptable convergent validity (Fornell & Larcker, 1981). To examine discriminant validity, the square roots of each AVE were assessed against respective construct correlations (Fornell & Larcker, 1981) and all square roots of AVEs were higher than the correlations (Table 2).

4.2. Common method variance

We used EFA where all variables are loaded onto a single factor. The newly introduced common latent factor explained 32.8% (< 50% threshold) of the variance, showing that common method bias is not present. Also, following Verhoef and Leeflang (2009), we incorporated one item as the common method marker variable regarding firms` relationships with people and organizations external to it, which was not associated with the constructs in our empirical model. The item was "we maintained good relationships with officials of governmental departments." The correlations between the marker variable and the constructs in our empirical model, ranging from 0.05 to 0.08, were not significant. This result highlights that no evidence exists regarding common method bias.

Furthermore, correlations between constructs measured through the same respondent/survey were not significantly different from the correlations between the constructs measured via different respondents/surveys. In fact, the average monomethod-heterotrait (MH) correlation was not considerably greater than average heteromethod-heterotriat (HH) correlation (Millsap, 1990).

4.3. Inner model

Before testing the hypotheses, we computed the complementarity between R & D and marketing capabilities using the product term (interaction between the two constructs) by multiplying their standardized means. To test the hypotheses, we performed a bootstrapping resampling technique with 500 samples (Bstieler & Hemmert, 2015). As a result, we generated t-values to examine the significance levels of the beta coefficients. One-tailed significance levels have been applied as researchers have reported the PLS-SEM tendency toward underestimating the strength of paths (Reinartz et al., 2009).

According to the path coefficients and t-values (critical ratios) reported in Table 3, EP is positively related to R & D-marketing complementarity [$\beta = 0.21$ ($t = 2.25$), $p < 0.01$]. This indicates that H1 is supported. Additionally, TMT's previous start-up experience moderates the relationship between EP and R & D-marketing capability complementarity [$\beta = 0.23$ ($t = 2.12$), $p < 0.05$], which provides support for H2. Further, H3 is supported with R & D-marketing capability complementarity being positively related to first product advantage [$\beta = 0.31$ ($t = 3.13$), $p < 0.01$]. Also, CFC moderates the relationship between R & D-marketing capabilities complementarity and first product advantage [$\beta = 0.22$ ($t = 2.09$), $p < 0.01$] supporting H4. Finally, ICT moderates the association between capability complementarity and first product advantage [$\beta = 0.23$ ($t = 2.18$), $p < 0.01$] supporting H5. Furthermore, the results indicate that none of the control variables were significantly related to first product advantage.We also assessed the goodness of fit (GoF). To identify the GoF value, we calculated the square root of the product of the average communality of all constructs and the average R2 value of the endogenous constructs. Criteria for small, medium and large effect sizes are 0.1, 0.25 and 0.36 according to O'Cass and Ngo (2012). GoF values were 0.44 and 0.38 for the basic and interaction models, showing a satisfactory GoF.

5. Discussion

While the literature has explored the relationship between EP and different aspects of performance (Matsuno et al., 2014; Mu et al., 2016; Rauch et al., 2009), there has been little research unpacking the role of this strategic posture in NTVs first product advantage. Our work effectively responds to calls in the literature asking for attention to be given to the mechanisms which help to put this organizational disposition into action to generate superior performance (e.g., Matsuno et al., 2014; Mu et al., 2016; Rauch et al., 2009). Our model is among the few to examine the contribution of NTVs EP in first product commercialization, a crucial entrepreneurial act of these firms (Song et al., 2010; Song et al., 2011; Zhao et al., 2015). Our findings shed light on the relevance of DC theory in studying the linkage between EP and first (new) product performance (Covin & Miller, 2014). While EP represents firm level propensities including innovativeness, proactiveness, and risk-taking our research identifies the behavioral mechanisms (i.e., capabilities) and the effect their exploitation has in creating a first product advantage. Overall our findings imply that the association between EP and NPD process- and in particular NTV's first product- is more complex than the direct relationship addressed in current studies (Matsuno et al., 2014; Rauch et al., 2009).

Our findings confirm the added value of adopting the DC theory in the context of first product commercialization. While much research has directly linked EP to aspects of performance without introducing an underpinning theoretical basis, our model used the knowledge management aspect of the DC view to unpack the value of EP for NTVs' first product commercialization. DC provided us with a solid platform to examine the value of exploitation mechanisms (complementarity), TMT's experiential knowledge and knowledge exchange and communication capabilities (ICT and CFC) in a holistic model. As the outcome, our model is one of the few to depict the process of EP transformation into first product outcomes through two key phases; configuration of asset and exploitation of assets. In fact, our findings underline the importance of contingencies impacting the relationship between EP, organizational assets, and performance (see, e.g., Mu et al., 2016; Rauch et al., 2009; Matsuno et al., 2002; Wiklund & Shepherd, 2005). Emphasizing the critical role of knowledge acquisition, sharing and communication (Sher & Lee, 2004) in the first product commercialization we advance the knowledge management and complementary aspects of DC theory.

The findings regarding the relationship between EP and R & D-marketing complementarity adds greater depth to our understanding of this area which has mostly focused on the link between EP and individual product level capabilities (Matsuno et al., 2014;

Table 1
Measurement model results.

Dimensions and manifest variables	Loadings
Marketing capabilities (*AVE = 0.68, α = 0.79*) - *Much Worse-Much Better*	
Comparing your firm to your major competitors, rate your firm in the following areas in relation to your first product project. In…	
…marketing planning, we are	0.79
…pricing accurately, we are	0.82
…developing advertising and promotion programs, we are	0.57
…sales management skills, we are	0.69
…ensuring that product-related efforts are responsive to customer needs, we are	0.54
…adding value to our channel members (e.g., distributors, retailers and wholesalers) businesses, we are	0.63
…attracting and retaining the channel members in the market, we are	0.66
R & D capabilities (AVE = 0.59 *α = 0.81*) - *Much Worse-Much Better*	
In relation to your firm's first product launch project and comparing your firm to your major competitors, rate your firm in the following areas. In…	
…new product (or service, if applicable) development capabilities, we are	0.80
…new technology development capabilities, we are	0.71
…manufacturing processes, we are	0.73
…predicting technological changes and trends, we are	0.69
…quality control skills, we are	0.70
…adopting new technologies to current processes, we are	0.81
First product advantage - *Strongly Agree-Strongly Disagree*	
Differentiation (AVE = 0.53, *α = 0.78*)	
Our first product …	
… compared to competitive products, has offered some unique features and attributes to the customer	0.55
… has been clearly superior to competing products in terms of meeting customers' ` needs	0.61
… has been of higher quality than competing products — tighter specification, stronger, lasted longer, or more reliable	0.56
…has provided a superior benefit to cost ratio than competing products	0.58
…has had superior technical performance than competing products	0.62
Cost-efficiency (AVE = 0.68, *α = 0.77*) - *Strongly Agree-Strongly Disagree*	
Compared with other competing products in our industry, the first product we introduced was developed to incorporate, …	
…operating efficiencies (e.g., manufacturing modernization, adopting new technologies).	0.68
…benefits from economies of scale	0.74
… minimum manufacturing and delivery costs	0.75
…cost advantages in raw material procurement	0.76
ICT capabilities (AVE = 0.67, *α = 0.84*) - *Much Worse-Much Better*	
In relation to your firm's first product launch project and comparing your firm to your major competitors, rate your firm's abilities in the following areas. In…	
ICT systems for new product projects (or services, if applicable) has been	0.73
ICT systems for facilitating cross-functional integration has been	0.73
ICT systems for facilitating market knowledge creation has been	0.79
ICT systems for facilitating technological knowledge creation has been	0.79
ICT systems for external communication with customers, suppliers and channel members has been	0.72
CFC (AVE = 0.75, *α = 0.76*) - *Strongly Agree-Strongly Disagree*	
In our first product project, marketing and R & D functional areas…	
co-operated fully in generating and screening new ideas for new products.	0.77
fully cooperated in establishing goals and priorities for our strategies.	0.75
were adequately represented on project teams and other strategic activities.	0.74
EP (AVE = 0.62, *α = 0.74*) - *Strongly Agree-Strongly Disagree*	
…had a strong emphasis on R & D, technological leadership and innovations	0.62
…marketed several new lines of products (or services, if applicable)	0.66
…actively introduced improvements and innovations in the business	0.68
…had a tendency to initiate actions for competitors to respond to	0.70
…had the tendency to be a market leader, to be the first in introducing new products, technologies (or services, if applicable)	0.69
…had a tendency to adopt a competitive “undo-the-competitors” posture approach	0.68
…had a tendency for high-risk new product (or service, if applicable) projects	0.74
…considered the term “risk taker” a positive attribute for our staff	0.73
…emphasized both exploration and experimentation to create opportunities	0.77

Note: all loadings are significant at < 0.05.

Table 2
Correlation matrix.

Variables	Mean	SD	1	2	3	4	5	6
1 - Marketing capabilities	5.32	0.67	1.00					
2 - R & D capabilities	5.49	0.77	0.26	1.00				
3 - First product advantage	5.67	0.76	0.43	0.41	1.00			
4 - EP	5.33	0.75	0.41	0.37	0.51	1.00		
5 - CFC	5.12	0.68	0.23	0.41	0.43	0.51	1.00	
6 - ICT capabilities	5.19	0.77	0.12	0.22	0.23	0.33	0.34	1.00
7 - TMT start-up experience	6.50	0.65	0.14	0.12	0.21	0.07	0.05	0.13

Weerawardena & O'Cass, 2004). Our research, offers new insight into DC theory and its application in the area of EP research, particularly the central nature of complementarity embedded within DCs (Morgan et al., 2009; Orr et al., 2011), by identifying EP as an effective facilitator of asset configurations in the setting of first product commercialization. As a result, our research shows the efficacy of EP in driving a balanced managerial view toward maximizing the complementarity between R & D and marketing in NTVs' first product commercialization.

Our results imply that while EP is critical in generating R & D and marketing complementarity, it can be maximally beneficial when the TMT has significant start-up experience to govern the activities emanating from EP. While previous research has explored the moderating role of environmental factors, networking capabilities, and networking abilities, etc., our findings show that in the context of NTV's first product, entrepreneurial leaders' experience in a start-up business is crucial in improving the value of EP in managing entrepreneurial processes and specifically enhancing R & D-marketing interdependence. As a result, our research extends NPD literature (e.g., Ozer, 2011) and provides

Table 3
PLS-SEM path coefficients.

Dependent variables	R & D-marketing complementarity (R2 = 0.56)	First product advantage (R2 = 0.26)
Direct effects		
EP	0.21**(2.25) (H1)	
R & D-marketing capability complementarity		0.31**(3.13) (H3)
R & D capabilities		0.43**(5.45)
Marketing capabilities		0.53**(7.32)
Moderating effects		
EP × TMT start-up experience	0.23*(2.12) (H2)	
CFC × R & D-marketing complementarity		0.22**(2.09) (H4)
ICT × R & D-marketing complementarity		0.23**(2.18) (H5)

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ (one tailed); β coefficients (t values); $n = 137$.

empirical evidence of the importance of previous experience from DC perspective in bolstering the relationship between EP as a propensity and the actual behaviors (first product capabilities) in the setting of first product commercialization.

There is a significant amount of research focusing on the relationship between asset complementarity and performance in NPD (Feng et al., 2017; Orr et al., 2011). However, no research has considered the factors that facilitate the exploitation of R & D-marketing complementarity in the context of the EP-performance relationship and NTV's first product. Our findings clarify the role of two contingency assets in improving the exploitation of capability complementarity emanating from EP in the setting of DC view. The findings indicate that the achievement of cost and innovation-related market positions through EP and exploiting R & D-marketing complementarity is contingent on the exploitation of CFC and ICT support. In fact, we show that the achievement of first product advantage is attributable to the moderating effect of ICT capabilities and CFC in NTVs. Our findings we imply that applying a balanced view toward marketing and R & D through complementarity and a strong EP can be beneficial only if capabilities supporting knowledge-sharing are deployed concurrently in first product commercialization. In fact, our research extends DC's application in EP-performance research and the emerging streams of work introducing CFC and ICT capabilities as contingency factors supporting the deployment of product-focused capabilities.

This study informs practitioners about the important characteristics needed in TMTs at the start-up stage for first product development. While EP may be possessed as a default pre-deposition, NTV TMTs must benefit from start-up experience to avoid unsuccessful strategies. A TMT member's start-up experience can facilitate the management of assets and formation of expert product teams. At the early stages of new ventures' development, TMTs need to seek advice from either external mentors who possess start-up experience within the same industry or add members to management board who have been intensely involved in entrepreneurial processes in relevant industries. People with such backgrounds perform a key role when key decisions have to be made about the first product project and assets configuration. At the same time, while EP reflects high-level of risk-taking without considering the consequences for NTVs, people with start-up experience may help in controlling the risk associated with superior EPs within NTVs.

This study provides managers with insights about the significance of utilizing systems to facilitate integration between product-focused functional areas to exchange information and maintain on-going communication during the first product commercialization. The findings shed light on the importance of achieving CFC and adopting appropriate ICT infrastructure by recruiting experts in ICT management to integrate ICT-based solutions into the first product commercialization. Due to the lack of clear structure in first product projects (Marion et al., 2012), possessing strengths in IT management can assist NTVs to organize themselves more effectively and coordinate activities across product commercialization functional areas.

The findings confirm that while effective complementarity among product focused groups is critical to achieving first product positional advantage, CFC and ICT proficiency underpins commercialization processes. Acquiring competencies in ICT will improve the communication portals for information and resource exchange between product-focused functional areas in first product commercialization. One of the key priorities for the first product project would be setting procedures and guidelines that facilitate effective communication and exchange of knowledge. This can be the first step toward formalizing some of the key processes within NTVs. Early investment on advancing ICT capacities is likely to be crucial as small NPD teams within NTVs need a guiding system to manage the exchange of information and contribute to the performance of other product-related departments. NTVs are vulnerable, operating in highly competitive technology-oriented markets, and knowledge is the most important asset in expediting their responsiveness. At the start-up stage, learning about and investments in knowledge-sharing mechanisms and forming cross-functional teams with the support of ICT can not be downplayed. Early adoption of such capabilities may create a cooperative environment for first product commercialization that may lead to outstanding first product outcomes.

6. Limitations and future research

While this study was designed using well-established procedures, it has limitations that must be acknowledged. First, the study focused on NTVs' first products in an emerging system (India). Due to the differences in economic systems, institutional settings, and the business environment, these findings cannot be easily generalized. Future research may consider selecting other emerging contexts to explore different patterns about first product commercialization. Also, studying developed economies may provide insights into the differences in first product commercialization and help to extend the implications of this study. Future studies can be designed to compare data gathered from both developed and developing economies to explore first product commercialization across stages of economic development.

Second, this study only focused on one characteristic of NTVs, founders and TMT members, but exploring the role of industry experience, R & D experience, and marketing background of the TMT members may also be beneficial in future research to help identify the extent to which this broader array of TMT experience impacts the applicability of having a strong EP in first product commercialization.

Third, this study only addressed the role of ICT capabilities and CFC as contingency factors affecting the linkage between first product assets complementarity and first product advantage. As the literature suggests, however, the involvement of factors such as environmental dynamism and environmental complexity may be beneficial in exploring the optimal conditions that can affect the way a balanced managerial view toward marketing and R & D can create a first product advantage. Hence, future research may focus on theoretical models that involve the impact of these environmental conditions on the first product commercialization process. This is an important issue that must be addressed, as NTVs face numerous challenges stemming from environmental conditions that can substantially impact the commercialization of first products.

Fourth, our sample included a large portion of NTVs operating in the IT sector. To better understand if this impacts our findings regarding the influence of ICT capabilities used in NPD processes, it is suggested that future research focuses on sectors which are not within IT sectors.

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