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Network Innovation versus Innovation through Networks

Muhammad Zafar Yaqub^a, Marijana Srećković^{b,*}, Gerard Cliquet^c, George Hendrikse^d,
Josef Windsperger^{e,*}

^a Department of Business Administration, King Abulaziz University, Jeddah, Kingdom of Saudi Arabia; mzyaquob@kau.edu.sa

^b Institute of Interdisciplinary Construction Process Management, TU Wien, Austria; marijana.sreckovic@tuwien.ac.at

^c Université de Rennes 1, Centre de Recherche en Economie et Management (CREM) Rennes, France; gerard.cliquet@univ-rennes1.fr

^d Erasmus University Rotterdam, Rotterdam, The Netherlands; ghendrikse@rsm.nl

^e Faculty of Business, Economics and Statistics, University of Vienna, Austria; josef.windsperger@univie.ac.at

Abstract

In today's dynamic, complex and interconnected environments, interfirm networks in its various forms (e.g. franchising, retail and service chains, cooperatives, financial networks, joint ventures, strategic alliances, clusters, public-private partnerships, digital platforms) are becoming increasingly important in helping firms improve their competitive position through an enhanced access to innovation, complementary resources and capabilities otherwise not available to them. Driven by increased performance pressures in unpredictable environments, firms embedded in networks are increasingly moving from cooperators to collaborators as value co-creators. The aim of this introductory article is to discuss the role of innovation in business networks by focusing on two major topics: Network innovation versus innovation through networks. In addition, we provide an overview of the articles included in the special issue on *Networks and Innovation* focusing on the questions: (1) what is the impact of network characteristics on a firm's innovation?; and (2) what are the determinants of innovation in interfirm networks?

Keywords Network innovation, innovation through networks, networked firms, value co-creation, theoretical perspectives on networks and innovation

*Corresponding author.

E-mail addresses: josef.windsperger@univie.ac.at (J. Windsperger), marijana.sreckovic@tuwien.ac.at (M. Sreckovic).

1. Introduction

Schumpeter (1911, 1934) stated in *The Theory of Economic Development* that innovation creates profits and drives economic development. He viewed the entrepreneur as the personification of innovation (Hagedoorn, 1996; Sweezy, 1943). However, today's innovation activities are based on collaborations between firms due to the dynamics of knowledge and capabilities under hyper competition (D'Aveni, 1994; Forkmann, Henneberg & Mitrega, 2018). In dynamic, complex and interconnected environments, business networks in its various forms (e.g. franchising, retail and service chains, cooperatives, financial networks, joint ventures, strategic alliances, clusters, public-private partnerships and digital networks) are becoming increasingly important in helping firms improve their competitive position through an enhanced access to innovation, knowledge and complementary resources otherwise not available to them (Koch & Windsperger, 2017; Tiwana, 2014). Network relationships are moving from cooperation to collaboration and value co-creation. Therefore, the locus of value creation and the organizational form is shifting from individual firms towards interfirm networks, which encompass a firm's relationships to suppliers, customers, competitors, or other stakeholders across boundaries of industries or countries. In that context, driven by increased performance pressures in unpredictable environments, firms embedded in networks are increasingly moving from cooperators to collaborators and value co-creators in innovative ways (Lusch, Vargo & Gustafsson, 2016).

Today firms are vigorously transforming their strategies with the aim of actively shaping and changing their highly uncertain market environments. These effectuation processes (Sarasvathy, 2001), where firms are (creatively) reconfiguring their value chains and actively disrupting existing business models for innovation and sustained competitive advantage, influence business network structures and create new network forms, such as the network-centric organization, which identifies the inter-organizational network as the primary source of value creation (Aarikka-Stenroos & Ritala, 2017; Forkmann, Henneberg & Mitrega, 2018; Pagani & Pardo, 2017). The development of organizational capabilities, such as network capabilities for the creation of value, leads to an improved performance (Kohtamäki, Partanen, Parida & Wincent, 2013; Srećković, 2018; Fang, Zhou, Wu & Qi, 2019). In addition to new network forms, firms are creating new markets for their innovations, formed through alliances and collaborative strategies, as a mode of reducing or eliminating uncertainty or entry barriers. In that context, the globalized digital economy is reinforcing this network effect, by increasingly shaping interconnected and borderless markets and business, where the

need for adaptive and innovative business models as well as new and flexible network forms is becoming more important than ever.

The aim of this introductory article is to discuss the role of innovation in business networks by focusing on two major topics: Network innovation versus innovation through networks. In addition, we provide an overview of the articles included in the special issue on *Networks and Innovation* focusing on the questions what is the impact of network characteristics on firm's innovation and what are the determinants of innovation in interfirm networks?

2. Network Innovation vs. Innovation through Networks

In today's hyper-competitive, digitalized, knowledge- and innovation-driven, high velocity business environments, it is challenging for firms to stand alone and rely solely on their internal resources to gain sustainable competitive advantage. Even large firms, generally considered resourceful, are increasingly finding it difficult to nurture efficiency, productivity and innovation within their exclusive organizations (Lee, Olson & Trimi, 2012a). Economic advantage is moving from a less concentrated to a more asymmetrically dispersed state, with fewer in-housed fully and/or quasi integrated firms, to more close-knit socially-embedded collaborative organizational structures. Consequently, there is a manifold rise in interfirm collaborations and a subsequent emergence of a wide array of hybrid, and more significantly networked forms of organization in the last decades. Such collaborative networked structures, however, need to adopt an evolutionary attitude and constantly re-invent themselves for sustained social and economic performance (Han & Li, 2015; Hite & Hesterly, 2001).

Nowadays, firms are increasingly embracing the present necessity to connect strongly and creatively with communities of efficacious partners for co-creation and co-sharing of value (Morgan, Anokhin & Wincent, 2016; Vargo & Lusch, 2016), thereby improving their chances for survival and growth in a highly competitive and globalized world. Therefore we are witnessing businesses to be increasingly transforming from traditional *value chain organizations* to more fluid, dynamic and robust collaborative structures, sometimes referred to as *value networks* (Allee, 2000, 2008; Clarysse, Wright, Bruneel & Mahajan, 2014). These *value networks* seek to generate superior economic value through complex dynamic exchanges between enterprises and their suppliers, strategic partners, communities, customers, as well as other stakeholders at the micro-, meso- and macro-levels of social embeddedness. Such higher order collaborative structural arrangements are highly dynamic as they continuously transform (or reconfigure) their portfolios of relational resources (Lusch &

Nambisan, 2015; Koch & Windsperger, 2017) through successive widening, deepening and/or altering of the collaborative permutations of their relational activities (Ojala & Tryvainen, 2011; Yaqub, 2009, 2017). We contend that heterogeneity of competitive advantage between such collaborative entities, besides various other factors, depends upon the differentiation in the (re)configuration management of their relational resources, more specifically service ecosystems (Lusch & Nambisan, 2015).

2.1. *Innovative Collaboration*

Drucker (2014) draws attention to contemporary business organizations' increased need for organizational innovation in the face of an ever-escalating complexity in their economic, social, technological, cultural and ecological environments. Powell (1998) long argued that innovation-driven firms should not only learn from collaboration but should also learn how to collaborate in novel ways. In recent time, there has been a continuing debate on the need for new and innovative approaches to interfirm collaborations, extending the classic toolset of innovative corporate collaboration (Kotler, Kartajaya & Setiawan, 2017; Koch & Windsperger, 2017; Lee, Olson & Silvana, 2012b). In this *pursuit of disruptive collaboration*, the walls within and among industries are increasingly getting blurred, with the scope of collaboration shifting from narrower to broader, more specifically to the crowds. Lee, Olson & Trimi (2012b) argue that for the co-creation of superior value, resources need to be combined in unique ways - and crowdsourcing is one of the significant means to accomplish that desirable end. Digitalization has especially facilitated this major shift by providing platforms and tools that could enable resource-seeking firms to better access and/or tap the true potential of *collective intelligence* (Lee, Olson & Trimi, 2012b) and *efficacy of the crowd*. As *Crowds* feature the unique advantage in pooling up valuable, rare, inimitable and complementary relational resources, crowdsourcing remains the impetus for the creation of a disruptive collaborative relational space not only in digitization-driven ecosystems but also in the classical offline business communities.

2.1.1. *Crowd sourcing*

Since sharing critical resources unobtrusively requires higher intimacy and trust, it has generally been considered more appropriate to build fewer relationships with valuable, familiar, and like-minded partners with greater outcomes, especially while facing resource scarcity (Batt & Purchase, 2004; Ritter, Wilkinson & Johnston, 2004). However, Forkmann,

Henneberg & Mitrega (2018) and Kim, Oh & Swaminathan (2006) argue that collaboration may lose its value if strong bonds lead to cognitive lock-ins from developments outside the current business affiliations. In such situations, collaborations may rather become a liability for the pursuit of value enhancement (Antonioli, Marzucchi & Savona, 2017; Guzzini & Iacobucci, 2017; Villena, Revilla & Choi, 2011). Crowdsourcing though may not allow as much depth and intimacy as the smaller groups but it offers vast opportunities to create unique permutations of relational resources that could profoundly galvanize the disruptive value co-creation and appropriation (Johnson, Fisher & Friend, 2019; Lee, Olson & Trimi, 2012b) It is vastly believed that almost all great pieces of work in the history emerged from collective efforts of *the many*. The Internet itself has been developed through the collaborative efforts of researchers from many research institutions and universities. Linux, Wikipedia, Youtube, Amazon are few other notable manifestations of crowdsourcing. Even though there has been a proliferation of debate on the efficacy of crowdsourcing in fostering innovation and speed in creating novel business solutions (Lee, Olson & Trimi, 2012b), our discussion in the subsequent sections focuses primarily on the instrumentality of crowdsourcing in fostering innovation and creativity in (re)structuring and functioning of the collaborative organizations like strategic networks.

The service-dominant (S-D) perspective (Lusch & Nambisan, 2015; Vargo & Lusch, 2011, 2016) has profoundly shifted the locus of value creation from firm-level to the network level. Considering interfirm services as the building blocks of higher-order, multilayered, value-networks (Allee, 2000, 2008; Fiss, 2011) of independent, self-driven but cooperating actors (referred to as the first order Value-Added Models [VAMs] by Crespo, Suire & Vicente, 2013), we envision strategic networks to maintain a broad, dynamic and flexible pool of crowdsourced relational resources where nodes have the freedom to move back and forth in their successive collaboration cycles (Ring & van de Ven, 1992; Yaqub, 2017), while responding to the environmental opportunities and/or constraints. As such, we vouch for a loosely integrated web/cluster of nodes contributing intermittently and flexibly on a *supplies-on-demand* basis under varying levels and permutations of organizational engagement. It might be possible that certain nodes get (re)engaged with significant time-lags and as such remain *dormant* first or higher order elements of a network's service ecosystem due to the changing needs and preferences of the collaborative organization. However, the intermittent nature of interaction/cooperation with certain nodes becoming dormant for a sufficiently longer period of time, may lead to a decline of productivity attributable to organizational

forgetting (de Holan & Phillips, 2004; Thompson, 2007), loss of network identities (Eklinder-Frick, Eriksson & Hallén, 2014) and strategic blindness as “hidden costs of trust” (Selnes & Sallis, 2003; Minarikova, Mumdziev, Griessmair & Windsperger, 2020). In essence, the efficacy of such collaborative networks for dynamic co-creation of value depends, to a reasonable extent, upon the perseverance of identities, quality of social embeddedness and the innovative generativity in their social capitals.

2.2. *Disruptive Social Capital*

Social capital theory elaborates upon the notion of organizations accessing resources and capabilities through networks (Lin, Cook & Burt, 2001). Anderson & Jack (2002) viewed social capital as a relational resource comprising of personal ties, but the subsequent broader conceptualization described social capital as a set of resources embedded in business relationships (Inkpen & Tsang, 2005). Coleman (1988, 1990) and Burt (2000) argue that social capital, unlike all other forms of capital, is located not in the actors, but in the modalities/routines of their relationships with other individuals and/or organizations. Social capital is perceived to be the key driver in providing access to the critical resources for the co-creation of value (Dattée, Alexy & Autio, 2018; Hitt & Duane, 2002). Drawing mostly on the flow model, many studies have endeavored to explain how ties and/or networks should be transformed in order to facilitate the flow of resources to co-create superior value (Monferrer, Blesa & Ripollés, 2015; Fisher & Qualls, 2018).

Prashantham & Dhanaraj (2010) content that strategic networks may change over time. Firms actively create, perpetuate and modify their network structures by acquiring, activating, altering and adjusting relational permutations (Dattée, Alexy & Autio, 2018; Gulati & Srivastava Sameer, 2014; Yaqub, 2017). A value change over time may induce the exchange partners to reconfigure their relational space, which could prompt them to take risks, try out new permutations and determine disruptive ways to expand their joint pie of benefits (Flint, Woodruff & Gardial, 2002; Vargo & Lusch, 2016; Yaqub, 2017). This could lead to the redefining of scope and responsibilities, re-activating, or even abandoning certain relationships at the micro-, meso- and macro-levels of their collaborative organization. At a network level, disruptive social capital could correspond to a creative (re)configuration of relational resources at the micro-, meso- and macro-level of the network organization in order enhance the co-created value. We would refer to this disruptive reconfiguration of social capital as *relational creativity*. As Christensen (2005) noted, traditional management practices for superior performance seldom produce expected results when working with

disruptive mindsets, therefore, a creative reconfiguration of relationships (hereafter, relational creativity) is much better to be undertaken with a disruptive, emergent and opportunity-driven mind-set rather than as a conventional, planned incremental intervention (Christenson, Raynor & McDonald, 2015).

2.3. Relational Creativity

Creativity is all about creating or recreating things in new ways. The connotations of creativity, innovation and/or (re)configuration though seem to be pertaining more to the tangible objects like products and/or processes rather than intangible objects such as strategy, (business) models or relational ecosystems. However, like all other objects, relationships could also be created, configured and re-configured in unique ways in order to increase efficiency, productivity and economic/social satisfaction to improve cooperative gains. Considering interfirm relationships as bundles of commitments and/or services, following the service-dominant logic (Koch & Windsperger, 2017; Vargo & Lusch, 2016) that considers service to be the key denominator of all economic exchange and value-creation, we may unbundle and/or reconfigure the service ecosystems (Lusch & Nambisan, 2015; Vargo & Lusch, 2016) in order to effectively deal with the changing dynamics of a high-velocity business environment. We refer to such re-appropriation of interfirm services as *relational creativity* and while following the *logic of leverage*, contend that strategic networks need to exercise these creative (re)appropriations of services within its (crowdsourced) social capital more often than contracting these out to any new agents - aforesaid being a sort of quasi-integration of hybrids.

Digital technologies certainly offer broad opportunities for a creative reorganization of those corporate interactions and/or resource permutations that might have originally been created or programmed for different purposes (Koch & Windsperger, 2017; Lee, Olson & Trimi, 2012b). Supported by technological advancements, big data availability, social media and other digital platforms, digital ecosystems do not just provide enormous opportunities to enhance value co-creation and co-sharing but could also expose interfirm collaborations to surmounting uncertainties and complexities (Nambisan, Lyytinen, Majchrzak & Song, 2017). Having fast, efficient, innovative and very well integrated (collaborative) routines (Parmigiani & Howard-Grenville, 2011) and processes, could serve as an enabling platform of flexibility to respond to these environmental challenges swiftly, accurately and above all profitably.

2.3.1. Digitization-driven relational creativity

According to Yoo, Boland, Lyytinen & Majchrzak (2012) digitalization corresponds to the transformation of socio-technical structures and relationships enabled through a migration from non-digital artifacts to digital artifacts. Developments in internet and digital technology have in general made collaborations much more efficient, easier, productive and befitting (Kotler, Kartajaya & Setiawan, 2017; Lee, Olson & Trimi, 2012b). Even though it is true that – theoretically and practically – in most discussions around Industry 4.0 (Burmeister, Lüttgens & Piller, 2016; Kotler, Kartajaya & Setiawan, 2017), firms view connectivity simply as an enabling platform and infrastructure to gain efficiency and productivity in business processes, neglecting thereby its far more strategic importance (Bharadwaj, El Sawy, Pavlou & Venkatraman, 2013; Kiel, Müller, Arnold & Voigt, 2017; Koch & Windsperger, 2017). Digitalization has certainly galvanized the evolution of innovative organizational designs (especially the hybrid forms of organizations) and/or the disruptive organizational routines (the social capital) in the fast changing social and economic ecosystems in the last couple of decades (Jean, Sinkovics & Cavusgil, 2010). Firms seeking to explore and enlarge their resource-base could use flexible (digital) collaborative platforms in order to efficiently and effectively pool knowledge, resources and/or relationships for the sake of pursuing shared aims (Tiwana, Konsynski & Bush, 2010; Tiwana, 2014). Digitally enabled collaboration expands the toolbox that any business has available for networking and building highly efficacious business models. The potential, scope and contributions of such interfirm collaborations are certainly increasing, especially in the digitization-driven economies, hence enabling firms to combine their (relational) resources in unique ways across traditional industry boundaries (Parker, van Alstyne & Jiang, 2017).

From a network-centric viewpoint (Koch & Windsperger, 2017), firms in digital environments operate in multiple intertwined dynamic ecosystems to co-create and co-share value. Value creation in a digital economy is rooted in the precepts of generativity that envisages to open value creation processes for multiple actors aiming at combining and recombining resources in unique ways (Koch & Windsperger, 2017). Generativity as a source of value-creation needs to be achieved by combining heterogeneous resources across multiple layers, where control and knowledge is asymmetrically distributed among various firms in this complex web of relationships. Digital generativity, that could be referred to as the dynamic reconfiguration of digitization-driven loosely coupled multi-layered modular processes (Zittrain, 2006), that seek to co-create value through the integration of various

resources from a complex web of activities among multiple market actors (Vargo & Lusch, 2016), has strongly shaped the value-enhancement strategy in recent times (Christenson, Raynor & McDonald, 2015; Koch & Windsperger, 2017). The co-created value could profoundly be enhanced through a disruptive equifinal sharing of heterogeneous but complementary resources and competencies through digital platforms (Yoo, Boland, Lyytinen & Majchrzak, 2012). These platforms seek to creatively moderate the interactions and/or service-exchanges (Vargo & Lusch, 2011, 2016) among distributed and heterogeneous firms, transcending conventional industry and/or geographical boundaries (Demirkan & Demirkan, 2012; Jean, Sinkovics & Cavusgil, 2010; Snow, 2015).

2.3.2. Relational creativity as a dynamic organizational capability

Dynamic capabilities enable firms to propel their performance efforts in the face of surmounting turbulences in the environment by constantly creating/acquiring, combining and/or recombining resources in an agile and improvisational manner, facilitating the generation of new opportunities as well as handling of environmental constraints (Forkmann, Henneberg & Mitrega, 2018; Helfat, Finkelstein, Mitchell, Peteraf, Singh, Teece & Winter, 2009; Teece, Pisano & Shuen, 1997). Alliances - that could be referred to as the exchange partners' ability to integrate, build and/or reconfigure internal and external competences to address rapidly changing environments, to achieve new and innovative forms of competitive advantage - has been consistently discussed as a significant dynamic capability in literature (Eisenhardt & Martin, 2000; Nenonen & Storbacka, 2010; Teece, 2007; Yaqub, 2009, 2017). Vanpoucke, Vereecke & Wetzels (2014) argue that dynamic capabilities enable companies to develop new processes and (re)configure and/or integrate resources in unique ways for an enhanced economic or social advantage.

Relational creativity as a dynamic (network) capability results from complex, interactive, iterative and interdependent processes involving multiple actors and their influences within the first as well as the higher order dynamic systems. The heterogeneity of economic and competitive advantage of this type of dynamic organizational capability depends upon: social capital, technology enablement (more precisely, digital enablement), (relational) intent and the efficacy of individual as well as collaborative leadership, not only of the focal firms but also the critical VAMs in this multilayered, dynamic and complex web of relationships. Various actors in such a multi-layered relational space may exercise creative reconfiguration

management in their own ways in their respective VAMs (Lusch, Vargo & Gustafsson, 2016). However, dynamic organizational capabilities can be created and leveraged only if their individual efforts are integrated, synchronised (da Silveira & Arkader, 2007), institutionalized and synergized in a holistic manner (Aarikka-Stenroos & Ritala, 2017; Monferrer, Blesa & Ripollés, 2015). Beyond synergies, the impetus of such an integrated and holistic approach to exercise relational creativity is not only the reduction of path dependence on a few *centres of excellence* at the micro- or meso-levels, but also the preclusion of the possible *efficiency fall outs* attributable to the partial or fuller defections in these VAMs. Besides such an alignment of relational creativity efforts (Hutzschenreuter & Matt, 2017), enhancing organizational learning on relational creativity and promoting a creativity culture (Dahl, 2014) could enhance the individual and collective efficiency and efficacy to exercise relational creativity at all levels throughout these collaborative structural arrangements.

3. The Special Issue Articles and Their Research Implications

This special issue includes twelve articles dealing with the following topics on networks and innovation: (a) Impact of networks characteristics on focal firms' innovation (Ali, Ali, Salam, Bhatti, Arain & Burhan, 2020; Dahms, Cabrilo & Kingkaew, 2020; Jiang, Yang, Zhao & Li, 2020; Liu, Rindt & Hart, 2020; Raza, Saeed, Yousafzai, Shahid & Muffatto, 2020; Greco, Grimaldi & Cricelli, 2020); and (b) determinants of innovation in interfirm networks (Bouncken, Fredrich, Ritala & Kraus, 2020; Cappiello, Visentin & Giordani, 2020; Cremer & Loebbecke, 2020; Maghssudipour, Lazzeretti & Capone, 2020; Sadeh & Kacker, 2020; Watson, Senyard & Dada, 2020).

The theoretical frameworks applied in these studies are derived from a diverse set of perspectives (see Table 1) such as resource-based theory, theory of institutional polycentrism, knowledge-based theory, social exchange theory, social network theory, organizational learning theory, signaling theory, agency theory, transaction cost theory, resource dependence theory, configurational view and cultural theory. Table 1 provides an overview of the main contributions and research implications of these studies.

Table 1. Articles in the Special Issue: New Directions and Research Implications

Article	Theoretical / literature base	Main contribution	Research implications / future research questions
Raza, Saeed, Yousafzai, Shahid & Muffatto (2020)	Institutional polycentrism theory Knowledge-based view	<i>Impact of external network partners on innovation</i> Contributes to the innovation management literature on firms' innovative performance by investigating the under-researched role of external knowledge sources as an integral component of new ventures' innovation. Integrates the institutional polycentrism theory with the literature on external knowledge-sourcing. With an empirical cross-country study delivers interplay among external knowledge-sourcing, adversity that arises from institutions, and new ventures' innovation.	What kind of mechanisms facilitate or prevent external knowledge-sourcing activity? What is the likelihood of excessive dependence on external knowledge sourcing and what implications does it have on new ventures' innovation?
Liu, Rindt & Hart (2020)	Organizational learning SECI (socialisation, externalisation, combination and internalisation) theory	<i>Impact of direct and indirect network relationship on learning</i> Presents a refined understanding of interfirm learning in new product development (NPD) networks that is captured in the 4S model. The syndicated, situated, selected and synergised (4S) modes of learning constitute an iterative, open-ended learning process in NPD. In contrast to existing, linear stage-gate approaches to understanding NPD processes, that draw predominantly on single firm or dyadic levels of analyses, the 4S model presents a more holistic understanding of how firms learn through direct and indirect networks relationships over time.	How do firms combine formal and informal contractual governance to facilitate interfirm learning at each stage of NPD? How can firms access and appropriate joint value and resources from NPD collaborations?
Jiang, Yang, Zhao & Li (2020)	Knowledge-based view Social network theory	<i>Impact of partner's centrality diversity on innovation</i> Contributes to the understanding of the value of second-order social capital by exploring the effects of partners' centrality diversity on the innovation performance of the focal firm. Partners' centrality diversity refers to the extent to which network centrality occupied by a firm's network partners differ from one another. Proposes that centrality diversity among network partners can improve a focal firm's innovation through integrating tacit and novel knowledge, exposing the firm to divergent thinking styles, enabling legitimacy, and receiving support from partners.	How does network centrality of interlocking partners produce social capital? In what way does social capital influence knowledge transfer and innovation? How are different types of knowledge transferred from diverse partners in the network?
Ali, Ali, Salam, Bhatti, Arain & Burhan (2020)	Organizational learning Internationalization theory	<i>Impact of learning from local SMEs relationships on innovation and performance of international SMEs</i> Contributes to the body of knowledge by proposing and empirically evidencing the mediating role of the strength of ties and success experience of local SMEs in the transnational market, by deriving benefits of vicarious learning from local firms which improves international SMEs' absorptive capacity, innovation, and overall performance. Implies that networking with local SMEs in host countries is necessary if foreign SMEs wish to adapt to local market conditions.	What role does absorptive capacity play in improving vicarious learning and innovation of international SMEs (is there a directional causality between ACAP and vicarious learning)? What are the innovative outcomes of vicarious learning throughout the lifespan of international SMEs?

Dahms, Cabrilo & Kingkaew (2020)	Configurational perspective Network theory Resource-based view	<i>Role of interfirm networks for innovation of foreign-owned subsidiaries</i> Focuses specifically on asset bundle configurations to understand which assets determine innovation and subsequently market performance. Develops and empirically tests a configurational perspective-based framework that encompasses networks, information technology, and competencies, and investigates their bundling characteristics and interplay. Contributes to literature by showing the important role of innovation performance in determining market performance of the subsidiaries.	How do configurations of asset bundles influence innovation performance? How do network relationships develop over time? How can theoretical archetypes be identified, i.e. configurations that are context specific and based on an array of organizational features?
Greco, Grimaldi & Cricelli (2020)	Interorganizational collaboration Resource-based view	<i>Impact of diversity of networks on abandonment of innovation</i> Analyzes the relationship between interorganizational collaboration diversity and innovation abandonment. Contributes to literature by showing that breadth of interorganizational collaborations is associated with a lower likelihood of innovation abandonment. Shows that collaborating with external organizations likely increases the number of innovation activities as well the number of abandoned ones; but wide networks of partners are mitigating the abandonment problem.	How should firms engage in interorganizational collaborations/networks to reduce the risk of innovation abandonment? What is the effect of collaboration depth and what kind of synergies may arise from the combination of specific types of partners ?
Cappiello, Visentin & Giordani (2020)	Social capital Network theory	<i>Impact of social capital on network firm innovation</i> Offers empirical research on the impact of social capital developed within a cluster initiative on the performance of participating firms. Shows that cognitive and structural dimensions of social capital exert positive effects on innovative and competitive performance, while the relational dimension displays more varied effects. Adds empirical evidence from the social capital perspective to the literature on R&D cooperation arising from cluster policies.	How should firms manage their membership and participation (i.e., social exchanges and trustworthiness between peer companies) in clustered innovation networks? How to create and support activities which stimulate the creation of social capital among members of a cluster initiative?
Sadeh & Kacker (2020)	Signaling theory Agency theory Transaction Cost Theory	<i>Impact of screening and signaling mechanisms to attract innovate franchise partners for network growth</i> Contributes to extant literatures on interfirm networks, voluntary information disclosure, signaling, and franchising. Shows that ex-ante signaling and screening at the contractual relationship formation stage are complementary mechanisms that enhance network performance when used simultaneously. Suggests that the joint use of screening and signaling and the synchronization of specific investment commitments by franchise firms can assist an entrepreneurial business network in mitigating the double-sided adverse selection problem at the formation stage of dyadic network partnerships.	How does signaling interact with other channel governance mechanisms (i.e., incentives, monitoring, and socialization) and other transaction attributes? What kind of strategies should prospective franchisees use in order to reduce the double-sided adverse selection problem?

Maghssudipour, Lazeretti & Capone (2020)	Knowledge-based view Network theory	<p><i>Role of social and economic ties for knowledge sharing in networks</i></p> <p>Analyses the roles played by different local knowledge ties within a sector critically driven by the exchange of knowledge among economic actors. Designs a new picture of network multiplicity from a theoretical perspective and empirically shows that different typologies of ties may have different impacts on local knowledge diffusion. Suggest that, as complementarities, they co-exist in several economic systems as sources of innovation and differentiation of knowledge.</p>	How is one knowledge tie (e.g. social tie) more likely to bridge structural holes in other networks generated by other kinds of knowledge ties (e.g. economic tie)? How do social and economic ties in clusters evolve over time and what impact do they have on knowledge sharing?
Bouncken, Fredrich, Ritala & Kraus(2020)	Coopetition Resource-based view Resource dependence theories	<p><i>Value-creation-capture role of coopetition, expert power and alliance importance in new product alliances</i></p> <p>Aims to explain how firms can achieve an equilibrium in the relative value creation and value capture. Combines the relational view with literature on innovation alliances and models three determinants that might influence the value-creation-capture role of coopetition (VCCE) - coopetition intensity between alliance partners; expert power of the alliance partner; and focal firm's relative importance of the particular NPD alliance.</p>	How can innovation-related value creation be generated? How to capture net value mutually created by multiple actors? In what way do isolation and governance mechanisms influence VCCE over time?
Cremer & Loebbecke (2020)	Cultural looseness Knowledge-based view	<p><i>Role of cultural looseness for innovations in networks</i></p> <p>Investigates the impact of cultural looseness on developing patented innovations in networks. Contributes to theory on the impact of culture on innovation and helps decide how to best source knowledge and thereby foster innovations. Demonstrates that – especially in loose cultures – developing innovations in networks builds more on knowledge from countries that are culturally, linguistically, and geographically close to the innovation country.</p>	How to connect impact of distinct organizational cultures with links between national level cultural looseness and innovation? How can innovation diffusion be measured over time? How to assess in what way cultural looseness impacts innovation communication among participants in a network over time?
Watson, Senyard & Dada (2020)	Social exchange theory Network theory	<p><i>Determinants of franchisee-led innovation processes in franchise networks</i></p> <p>Delivers insights into the role of franchisee-franchisee networks on sharing of innovation ideas. Develops a new theoretical framework of franchisee-led innovation processes which contributes to the role of social exchange theory in innovation practices within business-to-business contexts. Evaluates both the relational influences and critical internal organizational factors which shape innovation creation, sharing (or concealment), and adoption.</p>	How do density and centrality impact franchisee's innovation activities and sharing? How does centrality of actors influence innovation collaborations within the context of franchise networks?

3.1. *The Impact of Network Characteristics on Focal Firm's Innovation*

The article entitled “Institutional adversity, external knowledge sources, and new ventures’ innovation: An institutional polycentrism theory perspective” by *Raza, Saeed, Yousafzai, Shahid & Muffatto*, examines how adversity that arises from formal institutions affects the relationship between external knowledge-sourcing and new ventures’ innovation. The authors argue that country-level institutional adversity reduces the likelihood of entrepreneurial success and increases opportunity costs because it makes entrepreneurs prone to shift their focus on dealing with that issue. With their research framework they aim at explaining how new ventures that operate in these resource-constrained contexts (high adversity) may face unique challenges, and how capitalizing on external knowledge-sourcing can improve performance and bring their innovations to market. Based on the knowledge-based view and the theory of institutional polycentrism, nested in different institutional contexts, they test their hypotheses using data from 28,660 entrepreneurs from 47 countries. With their framework, they identify four types of external knowledge-sourcing relevant to the entrepreneurial context - professional and international networks, which play an important role in new ventures’ innovation, and market and workplace networks, which do not. Their study delivers an explanation on the multiplicity of institutions as part of institutional polycentrism and highlights their important role in new ventures’ ability to achieve positive entrepreneurial outcomes through various types of external knowledge-sourcing. Thereby the contingent nature of the type of external knowledge-sourcing and its significance for innovation is emphasized.

The article entitled “How firms learn in NPD networks: The 4S model” by *Liu, Rindt & Hart*, examines interfirm learning processes across direct and indirect business relationships in new product development (NPD) networks. The authors, while employing a multiple case study research design, propose the 4S model that seeks to develop a conceptually robust, systematic and holistic understanding of the dynamics of interfirm learning at the network level while they collaborate to develop new products. Building on the knowledge-based, the practice-based and the relational governance approaches to learning, the authors argue that firms engage in iterative cycles of syndicated, situated, selected and synergised modes of learning in NPD networks. The article is one of very few studies to provide an empirically grounded analysis of how firms learn over time throughout the NPD process. The authors, besides highlighting the benefits to be gained from network-level crosspollination, also alerts managers to actively manage the selection of network partners

and invest in protection agreements to ensure value creation and appropriation beyond dyadic interfirm relationships.

The article entitled “Partners’ centrality diversity and firm innovation performance: Evidence from China” by *Jiang, Yang, Zhao & Li*, investigates empirically the impact of the firm’s network structure on the innovation performance of firms. The importance of this research resides in highlighting the heterogeneity of the network of the nodes / partners having a direct connection to the firm, whereas previous research focused on either the firm’s own network structure (first-order social capital) or the average network structure of partners (second-order social capital). The empirical results show that innovation performance of the firm is higher when there is more diversity in the board interlock network of partners. This positive relationship is strengthened by the proportion of non-independent ties and weakened by the knowledge breadth of the focal firm.

The article entitled “Does international SMEs’ vicarious learning improve their performance? The role of absorptive capacity, tie strength with local SMEs, and prior success experiences” by *Ali, Ali, Salam, Bhatti, Arain & Burhan*, highlights the role of vicarious learning from networked firms in the host country to improve their innovation, absorptive capacity, as well as the overall performance. It also discusses the moderating roles of the strength of ties with prior successful experience of SMEs in the host country market in enhancing international SMEs’ vicarious learning, to improve their absorptive capacity to achieve higher levels of innovation and overall performance. The authors found that international SMEs’ innovation and overall performance are significantly influenced by their vicarious learning through networking with local firms, with their absorptive capacity improving as a result. International SMEs’ adaptation to a host country’s market conditions can be improved by networking with local firms, however, both the strength of the relationship and the selection of the right networking partners are crucial. It is suggested that international SMEs should develop strong ties with local firms with strong prior success experience to benefit from the latter’s knowledge of local business conditions.

The article entitled “The role of networks, competencies, and IT advancement in innovation performance of foreign-owned subsidiaries” by *Dahms, Cabrilo & Kingkaew*, uses the configurational perspective to explore how bundles of networks, competencies, and information technology, in their combination, drive innovation performance in foreign-owned subsidiaries. Hence, the authors develop and empirically test their framework grounded in the configurational perspective and thereby integrate network theory and the resource-based view of the firm. For the empirical analysis they use survey data from 235 foreign-owned

subsidiaries located in Singapore and Thailand and apply a fuzzy set qualitative comparative analysis. First, in order to identify innovation and market performance enhancing configurations in foreign-owned subsidiaries, and second to determine the configurations causing the absence of innovation and market success. Their results show that information technology advancement and high overall competence levels are important asset bundles for the occurrence of high innovation performance outcomes. They also conclude that maintaining strong interfirm network relationships for innovation performance is significant for some subsidiaries, especially in combination with higher information technology advancements. Network strength as a cause of innovation performance seems as well to be dependent on the business environment and practices of the host country. This study identifies patterns of asset configurations, highlights the role of bundling (the process of combining firm resources to construct or alter firm's capabilities) in value creation, and gives insight into the link between asset management and the creation of value.

The article entitled "Interorganizational collaboration strategies and innovation abandonment: the more the merrier?" by *Greco, Grimaldi & Cricelli*, demonstrates that firms collaborating with a wider network of external partners for the purpose of managing their innovation activities are less likely to abandon these networks. The study analyses how different categories of partners among customers & suppliers, competitors, consultants & private R&D institutions, universities & public R&D institutions, are associated with the risk of innovation abandonment. It also studies the association between innovation abandonment and domestic and foreign collaborations. The authors performed a quantitative analysis using a sample of 4070 Italian manufacturing firms. They found that the breadth of inter-organizational collaborations is associated with a lower likelihood of innovation abandonment. The results also show no statistically significant evidence that any specific collaboration channel has a greater correlation with this kind of abandonment than any others do. Nevertheless, international collaborations are more likely associated with this problem than domestic ones. The paper suggests a necessity to explore the trade-off between the opportunity of reducing innovation abandonment through collaboration diversity, and the risk of increasing it due to an exaggerated number of external partnerships.

3.2. Determinants of Innovation in Interfirm Networks

The article entitled "Social capital and its effect on networked firm innovation and competitiveness" by *Cappiello, Visentin & Giordani* examines the effects of cognitive, structural and relational dimensions of social capital on innovation and competitiveness of

networked firms. International and local policymakers have repeatedly encouraged the development of clusters to boost competitiveness at both the firm and regional levels, as well as to foster innovation and new product development. Based on firm-level primary data, derived from the participants of “Polo di Innovazione ICT - Abruzzo”- cluster in Italy, this study shows that the cognitive and structural dimensions of social capital exert positive effects on innovative performance, while the relational dimension has more varied effects. Overall, this study adds empirical evidence from the social capital perspective to the literature on R&D interfirm collaboration arising from cluster policies.

The article entitled ‘Performance Implications of Using Signaling and Screening for Expanding Interfirm Business Networks: Evidence from Franchising’ by *Sadeh & Kacker*, investigates the effect of signaling and screening mechanisms to attract innovative network partners (i.e. franchisees) for enhancing network performance. Based on agency and transaction cost theory perspectives, the theoretical framework focuses on two mechanisms that impact network performance: a mechanism signaling the quality of the business concept to attract prospective franchisees by disclosing network performance, and a screening mechanism to ensure the high quality of franchisees. Using data from Bond’s Franchise Guide, the findings highlight that signaling and screening at the contractual formation stage are complementary mechanisms that improve network performance when they are used simultaneously. Additionally, the results show that specific investments by the focal firm and by the partners positively moderate the effects of screening and signaling. Overall, the findings suggest that the joint use of screening and signaling can assist an entrepreneurial business network mitigating the double-sided adverse selection problem at the contract formation stage in order to attract innovative network partners for high network performance.

The article entitled “The role of multiple ties in knowledge networks: complementarity in the Montefalco wine cluster” by *Maghssudipour, Lazzarotti & Capone*, examines the role of social and economic ties for knowledge sharing in interfirm networks. Based on an original dataset collected by surveys directly administered in local wineries in the Montefalco wine region (Italy), the authors apply an exponential random graph model (ERGM) to investigate the driving forces of knowledge diffusion and exchange. The results showed that economic and social ties positively affect the spread of knowledge, but the former has a higher magnitude impact than the latter. This study contributes to the debate on interfirm knowledge networks, innovation, and the competitiveness of firms proximate in space. It provides more in-depth information concerning knowledge networks through relational multiplicity, and it

offers new insights for business, management and industrial marketing scholars into the critical roles played by relational structures with a multiple network perspective.

The article entitled “Value-creation-capture-equilibrium in new product development alliances: A matter of cooptation, expert power, and alliance importance” by *Bouncken, Fredrich, Ritala & Kraus*, analyzes the determinants of value creation and value capture in dyadic new product development (NPD) alliances. It aims at explaining how firms can achieve an equilibrium in the context of relative value creation and value capture (VCCE). The authors combine the relational view with the literature on innovation alliances and model three important determinants influencing the VCCE- cooptation intensity between the alliance partners (i.e. simultaneous competition and collaboration), expert power of the alliance partner, and the focal firm’s relative importance of the particular NPD alliance. All three conditions facilitate imbalances and learning opportunities related to a relational view of dyadic alliances. The model is tested within an empirical study of 471 high-tech firms pursuing these kind of alliances. It is hypothesized that cooptation intensity stabilizes VCCE, and furthermore that partner’s expert power and the focal firm’s relative alliance importance negatively moderate the relationship between cooptation intensity and VCCE. The results show that cooptation stimulates balanced VCCE in NPD alliances, destabilizes value creation in important NPD alliances with non-experts, and stabilizes value capture in unimportant NPD alliances with experts.

In the article entitled “Patented Innovations Developed in Networks: The Role of Cultural Looseness” *Cremer & Loebbecke* study how the acquisition of knowledge in an innovation network is influenced by the cultural looseness of a country. It is established empirically that innovators source knowledge of higher breadth and depth in countries which are culturally looser. It seems inevitable that the development of innovation networks in terms of connections and knowledge acquisition is influenced by cultural or country constraints. Other forces may also matter, such as the nature of the innovation, the size of the country, and so on. This raises questions about the determinants of the size and focus of networks. For example, it is known from the strategy literature that the product portfolio of enterprises is shaped by the strictness of country boundaries. The development of the European Union has decreased the importance of country borders. Enterprises have responded by reducing their product portfolios and increased the number of countries in which the products of the remaining portfolio are being sold. Similarly, networks are likely to be shaped in terms of their connections and knowledge acquisition by the environment in which they develop.

The article entitled 'Acts of hidden franchisee innovation and innovation adoption within franchise systems' by *Watson, Senyard & Dada*, focuses on the contradiction between franchising, as a network which is based on franchisees' replication of the franchisor's concept, and franchising as a network for creating innovations by using franchisees' exploration capabilities. Drawing on data from two related empirical studies of franchisees operating in the UK, the aim of the study is to understand how franchisees contribute to innovation within their systems. To answer this research question, the authors conducted a quantitative and qualitative study: the quantitative study reveals that although many franchisees develop innovations, these innovations are not always adopted by the franchise system, suggesting acts of hidden innovation. These findings were used to conduct a follow-up qualitative study. Through a case analysis of 29 franchisees from seven different franchise systems, the results show a number of organizational and relational factors that influence both franchisee engagement in innovation, and the extent to which their innovations are disclosed to the network. Based on these results, the authors develop a theoretical framework of franchisee-led innovation processes, which contributes to the role of social exchange theory in innovation practices within business-to-business contexts. Overall, the findings extend emerging research on innovation in franchise systems, and provide practical insights on how franchisees can be supported in creating and disclosing innovations to benefit the franchise system.

4. The Future of Research on Networks and Innovation

Although the articles presented in this special issue will enrich the understanding about networks and innovation, important future research tracks concern innovation diffusion and networks, the role of stakeholders in innovation networks and the impact of digitalization on networks.

There is a paucity of research about the link between innovation diffusion on consumer markets and innovation stemming from interfirm networks like strategic alliances, franchise systems or cooperatives. One can wonder whether the presence of many firms or outlets speeds up innovations in the market. This question could be of significant interest for retail and service networks as well as for other firms that need to use these outlets to deliver their products. The role of social media could also be critical in this diffusion process. The role of social contagion is important in understanding innovation diffusion processes and is particularly relevant to research in international new product development (van den Bulte & Stremersch, 2004). Shiller (2019) has recently advanced the idea of contagious narratives that

can change the 'spirit of the times'. He suggests to analyze them through epidemic curves and requests the economists to consider word-of-mouth (WOM) as 'contagion of ideas in the form of stories'. This idea of using WOM has already been implemented to model the innovations' diffusion process (Bass, 1969), but only in a quantitative way and with no spatial aspects. Most diffusion models of innovations (Bagozzi, 1983; Easingwood, Mahajan & Muller, 1983; Rogers, 1995) and recent ones (Balakrishnan & Pathak, 2014), do not take space into account. Even though, Cliff & Ord (1975) develop a spatial model of innovation diffusion of tractors in the US Midwest, and Stummer, Kiesling, Günther & Vetschera (2015) develop an agent-based simulation approach taking into account both temporal and spatial dimensions to model innovation diffusion, this research does not take into account organizational forms. Linking innovation diffusion and interfirm networks could profoundly lead to the development of highly efficacious models of spatial diffusion of innovations through network organizations.

Concerning the role and influence of stakeholders on network innovations and vice versa, it is argued that firms act in a multilateral stakeholder environment (Freeman, Martin & Parmar, 2020; Raha, Hajdini & Windsperger, 2018) where potential investors, suppliers, bankers and communities etc. hold significant value for growth. In stakeholder research, it has always been of substantial interest to enhance understanding on when and how the partners enter the innovation process (Smirnova, Rebiazina & Khomich, 2018). Varadarajan (2017) argues that stakeholders are getting increasingly sensitive to the environmental stakes as consumers demand is shifting towards ecological concerns. Consequently, dealing with environmental innovation can bring social legitimacy among stakeholders (Watson, Wilson, Smart & Macdonald, 2018). Even though research focusing on innovation, ecology and stakeholders (Kivimaa, Boon, Hyysalo & Klerkx, 2019) have increased, almost none have taken into account the organizational forms. Hence the following question could be of significant interest for future research: How could interfirm networks attract and maintain stakeholders' interest in innovations, especially ecological innovations? Moreover, even though, plenty of recent stakeholder theory literature (Bridoux & Stoelhorst, 2016; Freeman, Phillips & Sisodia, 2020; Harrison & Wicks, 2013; Tantalo & Priem, 2016) has focused on their value creation role, this research, however, has scarcely applied the stakeholder perspective to networks (Raha, Hajdini & Windsperger, 2017). The fact remains that primary stakeholders in franchise networks, cooperatives and other forms of strategic alliances, and especially in digital ecosystems, contribute to the value creation process by providing critical intangible resources (Amit & Han, 2017; Hillebrand, Driessen & Koll, 2015; Lusch & Webster, 2011). Future research in stakeholder theory could seek to answer the questions

alike: how could the new value-creation roles of stakeholders influence the emergence of new network forms (Pera, Occhiocupo & Clarke, 2016) by changing the allocation of residual income and decision rights?

Pagani & Pardo (2017) argue that the internal as well as external innovation processes would be transformed through the development of the digital economy. The adequate implementation of digital technologies and hence development of digital capabilities increases an organization's innovation potential (Srećković, 2019). Technological innovations have an incremental or disruptive nature. Incremental innovations aim at small improvements in existing products, services, processes, whereas disruptive innovations (specifically through digital technologies) destruct existing value chains and business models (Koch & Windsperger, 2017; Yoo, Boland, Lyytinen & Majchrzak, 2012). Even though much of the research in technological innovation has endeavored to investigate the impact of technological advancements on the innovation processes and/or performance until recently, contemporary research in (disruptive) innovations is seeking to answer the questions such as: What are the effects of disruptive technological innovations on interfirm networks? Does technological innovation create new network forms? What kind of interfirm networks are being created in new digital environments? A new development in the field of business process innovation (Afuah, 2014) is the application of blockchain technology (Li, Kassem & Watson, 2020; Srećković, Šibenik, Preindl, Kastner & Breitfuß, 2020). Based on blockchain and smart contracts, novel forms of organizing such as decentralized autonomous organizations (DAOs) are emerging fast (Srećković & Windsperger, 2019) resulting in the transformation of business models and requiring new forms of governance and control mechanisms within and among the network partners (Davidson, de Filippi & Potts, 2018; Ritter & Pedersen, 2020; Yermack, 2017). A blockchain-based organization of networks is characterized by more codified knowledge regarding the different value chain activities, which changes the allocation of decision rights between network partners (Windsperger, 2004; Srećković & Windsperger, 2019). For instance, applied to franchise networks, blockchain will facilitate a shift toward decentralization of decision making in the network, when a larger part of the system know-how can be codified in smart contracts. On the other hand, it will facilitate a shift toward centralization of decision making in franchise networks, when a larger part of the value chain activities at the local market can be codified in smart contracts. Hence, digital innovation will change the network design in franchising, and the same could profoundly be extended across other forms of strategic networks as well.

In addition, in platform businesses, the innovation of digital products results in new network forms with weaker ties than the innovation of physical products (Chesbrough, 2003; Parker, van Alstyne & Choudary, 2016). Firms will manage their value creation process of digital innovation by loosening control through the usage of open networks. Compared to networks with stronger ties and closed vertical integration in the case of physical products, open external contracts enable a firm to enhance competitive advantage, through access to a broad range of knowledge sources for a firm's digital innovation. Therefore, in a digital platform business, "the locus of value creation moves from inside the firm to outside" (Parker, van Alstyne & Jiang, 2017, p. 263) by loosening control, which eventually requires networks with weaker ties (Granovetter, 1973, 1983). Consequently, new digital technologies could revolutionize collaboration and value co-creation between network partners, thereby generating new networked organizational structures (Tiwana, Konsynski & Venkatraman, 2013). Future research could investigate the impact of digitalization on these new network forms.

Referring to the value-enhancement through network innovations, the authors have described *disruptive social capital* to be a creative (re)configuration of relational resources at the micro-, meso- and macro-level of the network organization in order to enhance the co-created value. This disruptive reconfiguration of social capital has been termed as *relational creativity*. Future research may enhance the contemporary understanding of these phenomena by endeavoring to answer questions like: What could be the scope, domains and key elements/dimensions of relational creativity as re-configuration of a relational space? What factors may drive networks to seek a creative reconfiguration of their interfirm relationships (the antecedents)? What factors may enhance or limit the motivation, efficacy and operationalization of exercising relationship creativity (the ecosystem)? How could relationship creativity enhance (individual or mutual) gains in cooperative relationships (the rationale)? How could digital technologies (especially, blockchain technology and cloud computing) and resources (more specifically, digital platforms) be strategically and disruptively controlled and deployed for a continuous enhancement of the co-created value? What could be a suitable organizational framework for exercising relational creativity in an integrated and holistic manner? Some useful theoretical frameworks to which the researchers could make an appeal to in this regard, may include innovation theory, configuration-based management, relational view of networks, value-based management, cloud computing, network theory etc. Theoretical advancements in this field could not only offer significant new insights into the dynamics of disruptive innovation (especially, digital innovation) but

could also help the practitioners in developing efficacious business models for tapping into the true potential of *innovation sweet spots* (Christensen, 2005).

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