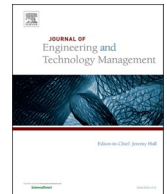




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Disruptive innovation and entrepreneurship in emerging economics

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ABSTRACT

Disruptive innovation has increasingly become a core subject for researchers across disciplines, from economics to engineering and technology. This is understandable as companies all over the world over are facing contemporary challenges such as intense global competition, rising market volatility, constantly changing consumer demand, and shortened product life cycles. Under these conditions, disruptive innovation and disruptive innovation-based entrepreneurship are increasingly becoming a strategic means for achieving sustainable company growth and competitiveness. Yet, limited research exists today on disruptive innovations in or by emerging economies. Therefore, this Special Issue in Journal of Engineering and Technology Management on Disruptive Innovation and Entrepreneurship in Emerging Economics is devoted to publishing original research that enriches our knowledge about the nature of disruptive innovation and entrepreneurship related with emerging economies, as well as their models, antecedents and economic, social and organizational consequences. The issue also highlights key research areas of disruptive innovation and innovation-based entrepreneurship for future scholarship, inviting more systematic research on the important areas.

1. Introduction

A vast body of research has emerged over the past two decades examining the nature and consequences of disruptive innovation. Although researchers do not always view these innovations in a uniform matter, there is an agreement they have profound and pervasive effects on companies, industries and societies. However, most of our knowledge about disruptive innovation comes from developed economies which have been traditionally the source of these innovations. In this special issue we focus on disruptive innovations related with emerging economies. Disruptive innovation has increasingly become a core subject for researchers across disciplines, from economics to engineering and technology (Christensen et al., 2018; Si and Chen, 2020). This is understandable as companies all over the world are facing contemporary challenges such as intense global competition, rising market volatility, constantly changing consumer demand, and shortened product life cycles. Under these conditions, disruptive innovation and disruptive innovation-based entrepreneurship are increasingly becoming a strategic means for achieving sustainable company growth

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and competitiveness.

Proposed by Christensen (1997), the disruptive innovation theory initially described the concept as “disruptive technology”. As these technologies improve over time, they come slowly to surpass the dominant technologies in specific markets. The concept of disruptive technology suggests that the winning technology is not necessarily radical or superior technology. A dominant design is generated through a process of social, economic and political negotiation and selection. Companies that take actions first to adopt technologies that become dominant later usually survive and prosper, while those refuse or are slow to adopt those technologies are more likely to fail (Si and Chen, 2020; Nair and Ahlstrom, 2003). Later, the concept of disruptive technology was extended to broader applications, such as disruptive product innovations and disruptive business model innovations (Christensen and Raynor, 2003; Markides, 2006; Hang et al., 2015). Over the past years, disruptive technology and innovation have been widely adapted in the study of entrepreneurship with the key application being the increasingly ubiquitous disruptive innovation technology/disruptive innovation based entrepreneurial companies.

Disruptive innovation is a process rather than a mere outcome (e.g., Ansari et al., 2016; Christensen, 2006); it initially focuses on the low-end markets or the new markets (e.g., Christensen et al., 2004; Christensen et al., 2015). Its products or services are usually inferior to those of incumbents in the attributes that consumers in the mainstream market are more interested in and value, but they still can meet the needs of consumers from the low-end or new markets in the attributes that these consumers appreciate (e.g., Bower and Christensen, 1995; Christensen, 1997; Huesig et al., 2014). The products or services created by disruptive innovation do not develop along existing technological trajectories (e.g., Bower and Christensen, 1995; Christensen et al., 2000; König et al., 2012); yet, they will continue to improve until they meet the needs of consumers in mainstream market and gradually penetrate to the mainstream market (e.g., Bower and Christensen, 1995; Christensen et al., 2015).

The developing process of disruptive innovation involves two stages. In the entry stage, disruptive innovations in the low-end markets or new markets are typically ignored by incumbents. Such innovations attract underserved consumers from these markets with products or services which have comparative advantages in subordinated attributes, thereby avoiding competition with incumbents while gaining market space (Huesig et al., 2014; Pinkse et al., 2014). Later, in the transformation stage, the mainstream attributes of its products or services will gradually improve through continuously improving technology or related processes until they attract mainstream consumers and gradually win a certain market share of that market. Thus, the success of a disruptive innovation-based-entrepreneurship largely depends on whether the attributes of the mainstream products or services are improved in the transformation stage.

Hoskisson et al. (2000) defined an emerging economy as a low-income, rapid-growth country using economic liberalization as its primary engine of growth. Disruptive innovation has been a key factor in the rapid growth, particularly in China and India. Disruptive innovation is also a hot issue in emerging economies (Bruton et al., 2013). Theoretical and practical exploration take place not only in mature economies but also in emerging economies. This special issue intends to introduce new insights of disruptive innovation and innovation-based entrepreneurship in emerging economies. We highlight relevant research approaches that can transform academic research on entrepreneurship in relation to disruptive innovation and help people better understand concepts and relevant principle of disruptive innovation, especially in emerging economies.

2. Theoretical perspectives

The original theory of disruptive innovation has evolved and examined from various perspectives. The first perspective on defining disruptive innovation is based on four main specific types of innovation activities. The first type is the disruptive business model innovation (Gilbert and Bower, 2002; Markides, 2006), which focuses on building a new activity system in which new partners and activities are configured in an unprecedented way compared to existing business models (Snihur et al., 2018). Thus, a disruptive innovation disrupts established models or redefines the meaning of value creation and acquisition (Cozzolino et al., 2018). The second type of activity is termed as disruptive technology innovation (Bower and Christensen, 1995; Christensen, 1997; Carayannopoulos, 2009; Danneels, 2004, 2006). This type focuses on developing a more concise and convenient technology that the mainstream markets do not currently value to enter a niche market or new market. Then the technology is gradually improved to flow into the mainstream market from niche market or new market. The third type is disruptive product innovation (Christensen and Raynor, 2003; Gilbert and Bower, 2002; Govindarajan et al., 2011), which emphasizes developing simpler, less functional, cheaper but “good enough” products to serve the market which is overlooked by mainstream products. The fourth and final type is disruptive strategic innovation (Charitou and Markides, 2003), which stands for a strategic model that aims at inferior products and niche market that is totally different from or even in conflict with the traditional strategy of innovation.

The second perspective on defining disruptive innovation is based on its evolutionary process. It emphasizes that disruptive innovation is not merely an outcome, but a complete and progressive process (Ansari et al., 2016; Bower and Christensen, 1995; Christensen, 2006; Christensen and Raynor, 2003; Govindarajan and Kopalle, 2006a, 2006b; Guttentag, 2015; Guttentag and Smith, 2017; Hang et al., 2010; Schmidt and Druehl, 2008). Any missing or faulty element of the process would deny the status to an innovation as disruptive. The central view of this perspective is that the products or services which created by disruptive innovation are initially inferior in performance attributes that are not valued by the current mainstream customers. As a result, they are often underestimated and neglected by the incumbents. However, such products or services have better performance in other dimensions which are ignored by the mainstream customers and established incumbent firms but are valued by other customer groups. These products or services would attract these new customer groups, who are usually from low-end or new markets that are ignored by industry incumbents. Then, as the attributes of disruptive products or services are gradually improved to a certain extent over time, they would ultimately come to appeal to mainstream customers, gradually taking over the market share of mainstream market from, or

even replacing the dominant positions of the incumbents (Guttentag, 2015; Guttentag and Smith, 2017; Lindsay and Hopkins, 2010; Schmidt and Druehl, 2008).

The third perspective on defining disruptive innovation is based on its effect. The definitions generated from this perspective are usually scattered and cannot be easily integrated. For example, according to Christensen et al. (2015), disruptive innovation is an innovation disrupting an established trajectory of performance improvement in an industry or reshaping the meaning of performance. Baden-Fuller et al. (2006) suggest that disruptive innovation is a subset of new business that directly threatens the established incumbents, which enables new entrants to provide products or services at a lower cost than the existing ones. Afterwards, they even further extend this definition to include all innovations that could change the stock prices of existing companies. Ramani and Mukherjee (2014) view disruptive innovation as a new design of product, process or business model, which can greatly change the whole industry. Wan et al. (2015) contend that innovations which challenge the existing value propositions or business models in the market may be disruptive. Kostoff et al. (2004) regard disruptive innovation as an innovation that leads to significant improvement and more effectively achieves superior unit performance. Orlikowski (1993) and Sherif et al. (2006) indicate that disruptive innovation is a new idea or behavior. When introduced into organization settings, it will greatly change the workflow structure. Snihur et al. (2018) define disruptive innovation as a process in which a start-up with few resources can effectively challenge an established business. Padgett and Mulvey (2007) view an innovation as disruptive if it can change the products that mainstream customers use. The definitions just presented above demonstrate that these definitions are developed with specific outcomes in mind. Although it is difficult to integrate, these definitions usually refer to something in common such as “innovative” or “new” that changes the status quo in fundamental ways.

The last perspective on defining disruptive innovation is based on its basic key characteristics (Christensen et al., 2015; Pandit et al., 2018; Yu and Hang, 2010). For example, Christensen et al. (2000) observe that the key features of disruptive innovation are: (1) locking customers in a new way; (2) usually lowering gross profit; (3) usually not following the traditional trajectory¹ of improving the performance valued by mainstream consumers; and (4) introducing new trajectory of performance and improving performance along parameters different from the traditional ones. Christensen and Raynor (2003) propose standards to help identify potential disruptive innovations. They suggest that if the product of an innovation is inferior in the attributes valued by mainstream customers when introduced, but has new features that are appreciated by the low-end or new market customers (such as being cheaper, smaller or easier to use), this innovation can be considered as disruptive. Further, its business model should be disruptive (for example, low margin, niche market, and small scale), which makes the incumbents do not feel concerned and fight back, so that companies which introduce disruptive innovation have time and space to grow without being perceived as a threat. Govindarajan and Kopalle (2006b) also suggest four standards for disruptive innovations: (1) inferior performance in attributes that mainstream consumers value; (2) providing a new value proposition to attract new customer segments or customers who are more sensitive to price; (3) selling at lower prices; and (4) penetrating from a niche market into the mainstream market. In addition, King and Baatartogtokh (2015) highlight four key elements of the disruptive innovation: (1) the existing market incumbents are improving along the trajectory of sustaining innovation; (2) the incumbents overshoot customers' needs; (3) the incumbents feel that they have the ability to deal with the disruptive threat; and (4) the result is that the incumbents would face a struggle eventually. Husig et al. (2005) extract some of the most important features, which are believed to indicate the threat of disruption: (1) cheap, simple, initially lower performing and then fast improving; (2) performance oversupply; (3) leading to customer rejection; (4) lowering margins and profits; (5) emerging market success; (6) asymmetrical preference overlapping; and (7) intersecting trajectories. Applying three characteristics which may potentially change the market (i.e. functionality, technical standards, and ownership), Nagy et al. (2016) define disruptive innovation as “an innovation that changes the performance metrics, or consumer expectations, of a market by providing radically new functionality, discontinuous technical standards, or new forms of ownership”.

3. Theoretical applicability and applications

From the above discussion, we can see that the definitions of disruptive innovation vary widely owing to the different perspectives taken. The perspective based on process, and the perspective based on the main characteristics of disruptive innovation are the most popular and are usually applied with less controversy as well. The definition based on the specific activity of disruptive innovation is a complex concept that has been used differently by different scholars who initiate in-depth studies based on their specific research objectives and processes (Reinhardt and Gurtner, 2015; Si and Chen, 2020). Nevertheless, no matter how specific objectives change, the definitions have all retained the fundamental features of disruptive innovation. Thus, we suggest that these four perspectives can be adopted in the research on disruptive innovation. However, we believe that the main reason that creates the confusion surrounding the concept of disruptive innovation lies in the third perspective (i.e., based on its effect). When judged primarily based on their effects, disruptive innovations may not necessarily be disruptive, and innovations that do not conform to the characteristics of disruptive innovations may still disrupt incumbents and markets (Reinhardt and Gurtner, 2015). This would easily cause confusion. Further, we can see that some definitions of disruptive innovation based on the perspective of effects are loose, and most may not capture the basic characteristics of disruptive innovation originally proposed when the theory was first introduced. Rather, these definitions take some of the other features as alternative standards and curiously identify an innovation as disruptive. Although some have called for “loosening” the concept of disruptive innovation (Kamolsook et al., 2019), it does not mean that this loosening can be divorced from what the

¹ Performance trajectory refers to the speed of a product's performance improvement, and the expected improvement over time. Almost every industry has a key performance trajectory.

theory has originally proposed. Extending a basic concept is not easy; it must be accomplished through a strict process of logical reasoning, induction, and verification. Thus, we believe that the accuracy and applicability of definitions of disruptive innovation based on its effect are still open for discussion.

Despite the confusion caused by the perspective based on the effects of disruptive innovations, we believe that the other three different perspectives advanced to define disruptive innovation have the consistency of capturing many or most of the basic characteristics of these innovations. What is more, we regard the first perspective to define disruptive innovation is only a more detailed and specific description of disruptive innovation activities following the idea of the other two perspectives. As [Alberti-Alhtaybat et al. \(2019\)](#) indicate, although the disruptive innovation theory has various explanation and application, there is consensus on its core characteristics. Moreover, [Nagy et al. \(2016\)](#) believe that the definition of disruptive innovation must be based on the inherent characteristics of innovation. Hence, we believe that defining disruptive innovation based on its indispensable characteristics and process would be the most appropriate way to capture the real connotations and implications of the theory.

To trace the evolution of research on the disruptive innovation theory ([Christensen, 1997](#)), we conducted a literature review and finally searched 208 articles. The distribution of the articles according to their timeline is shown in [Fig. 1](#). These articles have been selected from the database of *Web of Science* and published in the variety of SSCI journals.

The [Fig. 1](#) shows that the research on disruptive innovation has begun to gain its popularity since 2013. In addition, like other management theories, research on disruptive innovation has evolved from more qualitative in early days to more empirical in recent years. The research content has also expanded from disruptive technology to the extensive exploration of business models, products, strategies, internal conditions, and external conditions of firms. Further, the development of emerging technologies, including big data and blockchain, and new social and technological scenarios such as sharing economy, have been increasingly investigated in the more recent research on disruptive innovation. This clearly shows that more researchers have recognized these changes and directed research efforts to address these issues.

3.1. Individual level of disruptive innovation

corporate actions originate from managerial decisions. Therefore, exploring how managers perceive disruptive innovation is helpful in predicting their reaction to disruptive innovation and how they will allocate resources for it. If managers consider disruptive innovation a threat, they may apply excessive resources to resist it; by contrast, if managers consider it an opportunity, they may invest resources early. [Gilbert and Bower \(2002\)](#) asserted that disruptive innovation should not be treated solely as a threat or an opportunity; instead, a balanced framework must be established to enable managers to recognize threats and seize opportunities. [Osiyevskyy and Dewald \(2015\)](#) used the explorative perspective, which involves the development of new opportunities, and the exploitative perspective, which involves the use of existing solutions, to observe managers. These researchers found that managers' explorative intentions are primarily driven by perceived opportunity, perceived performance-reducing threat, and experience of past risk. However, managers' exploitative intention is negatively correlated with perceived threat and industry tenure but is positively correlated with experience of past risk. [Dewald and Bowen \(2010\)](#) found that for small-scale incumbents facing disruptive innovation in business models, managers' prior experience with risk may reduce their perceived opportunity and urgency may reduce their perceived threat of new circumstances. Managers of incumbent companies often adopt several cognitive models to resist disruptive innovation, such as rewarding incrementalism, neglecting the positive effects of disruptive innovation, focusing on perceptions of

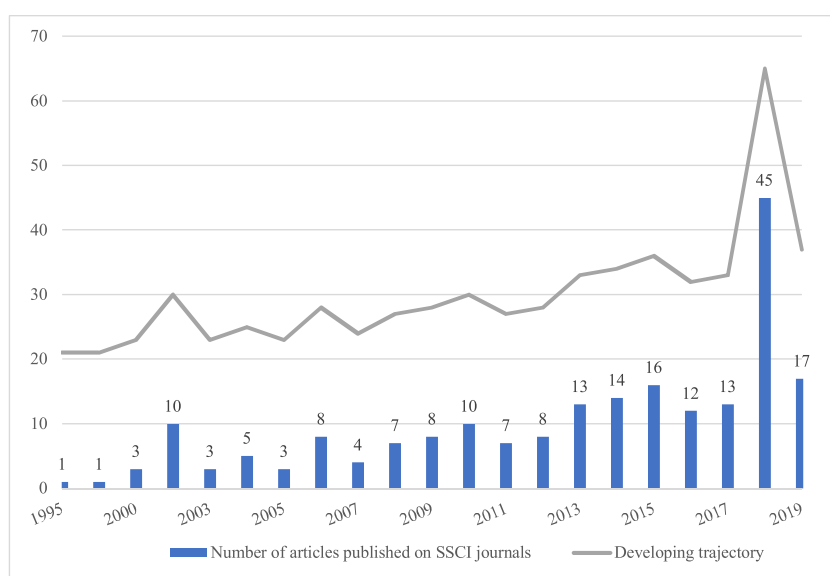


Fig. 1. Articles related to disruptive innovation published on SSCI journals (1995–2019).

previous success, emphasizing developing success perceptions, and maintaining faith in the face of uncertain information (Lettice and Thomond, 2008).

3.2. Corporate level of disruptive innovation

Companies, as entities that pursue maximized profits, are the primary means for realizing business model functions—value creation and value acquisition (Chesbrough, 2010). In the following sections, we discuss three aspects related to corporate level decisions: organization and process, market, and resources.

From an organizational perspective, organizational inertia is the primary factor that impedes incumbent companies from responding to disruptive innovation, preventing companies from reallocating resources to address challenges (Bergek et al., 2013). Although incumbent companies recognize the importance of reform and innovation, companies may fail to reform effectively because of internal cultural inertia or rigid internal bureaucracy (Wan et al., 2015; Lucas and Goh, 2009).

Many studies at individual levels of analyses claim that managers' misperception lead to negligence of the threat of disruption. However, this view omits the customer- and market-oriented organizational capacities embedded in firms, which shape their responses to disruptive innovation (Henderson, 2006). The lack of a response by incumbent companies may be a method to maximize the benefits to such organizations, suggesting that asymmetric motivation exists between incumbents and disruptors (Christensen and Raynor, 2003). The revenue and cost structures of companies basically determine the direction of technology innovation. Benefiting from technological developments, companies also create corresponding organizational designs and resource allocation processes to prevent the intraorganizational development of innovation that existing clients do not require (Bower and Christensen, 1995). However, this tendency may obfuscate the pursuit of opportunity of developing disruptive innovation in incumbent organizations. Ansari et al. (2016) reported that companies that invest considerable resources in their existing projects are typically reluctant or unable to adjust their resource portfolios or develop new functions or procedures to confront external changes. Sherif et al. (2006) revealed that when companies adopt disruptive innovation. The differences between different groups in the allocation of responsibilities and resources are key reasons. Therefore, in the face of disruptive innovation, successful companies establish new businesses independent from their core businesses and provide capital and diverse assistance to their new ventures in a step-by-step manner following market development. During the development period of new ventures, an active integrator is often required to manage interorganizational tension (Gilbert and Bower, 2002). If management failures lead to the inertia of the original business unit spreading to new business units, the development of new ventures in disruptive innovation might be affected (Lange et al., 2009). Also, in the face of highly heterogeneous, fluctuating, and uncertain market environments, enterprises can successfully address disruption by using their dynamic capabilities, flexible innovative activities, and the skillful handling of "discoordination" (Pandit et al., 2018; Khanagha et al., 2018).

From market perspective, "Disruption" in disruptive innovation is often related to market positioning, instead of the product or technology itself (Lindsay and Hopkins, 2010; Si et al., 2020). Therefore, the key to successful commercialization of disruptive innovation is combining market strategies and innovative management (Slater and Mohr, 2006). Uzunca (2018) found that division of market segments in an industry is usually based on the technology and customer capabilities needed to make and sell different products. If incumbents lack either of these capabilities, and disruptors have the opportunity generate disruptive innovation. Adner (2002) observed that a cause of disruptive innovation is the uncertainty of incumbents about potential needs. Roy (2013) indicated that when large enterprises possess incumbent capacities but face uncertainty about the expected demand of products, they tend to adopt disruptive innovation when introducing new products. Govindarajan et al. (2011) conducted an empirical study revealed that mainstream customer orientation positively affects radical innovation product development but negatively affects disruptive innovation product development. In contrast, new customer orientation positively affects disruptive innovation but has no significant effect on radical innovation. Moreover, from the perspective of economies, emerging markets have greater uncertainty levels and more limited customer consumption capacities than mature markets. Therefore, emerging markets are particularly suited to the development of disruptive innovation (Hart and Christensen, 2002; Wan et al., 2015; Yu and Hang, 2010).

Consumer characteristics differ within different innovation patterns. Early adopters of disruptive innovation typically have more product knowledge than do late adopters. However, early and late adopters of sustaining innovation differ little. This indicates that the general public is commonly familiar with sustaining innovation products, but no significant differences exist between early and late adoption of such products. However, disruptive innovation introduces new value claims; thus, early adopters have higher levels of involvement in the products than late adopters. As a result, enterprises must identify their innovation types when developing corresponding marketing strategies (Reinhardt and Gurtner, 2011, 2015).

From resource perspective, a cause of disruptive innovation is that incumbents have excessively relied on mainstream customers (Christensen and Bower, 1996) and existing value networks (Hill and Rothaermel, 2003), as well as the existence of rigid resources or processes (Gilbert, 2005). From the perspective of disruptors, whether new business models can be adopted to satisfy new customer value is the key to successful disruptive innovation (Sandström, 2011). However, in many industries, successful companies actively develop networking strategies and extract complementary assets, resulting in disruptors' need to obtain support from incumbents upon entry into the market; otherwise, disruptors cannot access or monopolize the key resources needed for disruptive innovation (Ansari et al., 2016; Rothaermel, 2001). In addition, if innovators cannot effectively control complementary assets, the created value may be extracted by other companies, thereby affecting the company's profitability (Teece, 1986). Lindsay and Hopkins (2010) stated that successful incumbent companies establish taskforces to develop intelligent property strategies early to reduce the possible devastating external effects and increase the opportunities of internal adoption of disruptive innovation.

3.3. Network and ecosystem level of disruptive innovation

Current business models are prone to competition across ecosystems (Moore, 1996). Hall and Martin (2005) emphasized the importance of network and ecosystem levels in disruptive innovation. Successful disruptive innovation must consider the internal factors of companies and influence of peripheral interactive roles. In a value network or ecosystem, disruptive innovation

Table 1

Summary of how disruptive innovation/entrepreneurship are theorized in each paper.

Authors	Title	Findings
Peter J. Williamson, Feng Wan, Edén Yin and Linan Lei	Is Disruptive Innovation in Emerging Economies Different? Evidence from China	This qualitative study that identifies three important differences in the kinds of disruption observed in developed economies. First, rather than being based on launching products with inferior performance, disruptive innovations in China focus on offering different value propositions. Second, the rate at which Chinese disruptive innovations are improved and extended is typically faster than in developed markets. Third, Chinese disruptive innovations are often launched directly into a mass market rather than a niche. Besides identifying these differences, the paper also discusses how Chinese firms generate disruptive innovations.
Sahrok Kim, K. Praveen Parboteeah, John B Cullen and Wan Liu	Disruptive Innovation and National Cultures: Enhancing Effects of Regulations in Emerging Markets	This empirical study draws from the sociological framework of Institutional Anomie Theory and hypothesizes that disruptive innovation is a form of positive deviance to anomic conditions in societies. Using multilevel analysis, the results provide support for the moderating effects of the regulatory institutional context; i.e., rule of law and regulatory quality on the cultural drivers and disruptive innovation relationships.
Jin Chen, Robert Burgelman, Jiaxue Li, Hang Chang Chieh and Gang Zheng	Leading for Constructive Innovation: Preliminary Evidence from China	This qualitative study investigates several Chinese companies' disruptive growth to further develop the original disruptive innovation theory. The authors divide disruptive innovation types into disruptive strategic innovation, technology innovation, and business model innovation, then analyze their characteristics separately. Using this perspective to examine different Chinese companies' innovation processes, and adopting holistic innovation theory, the authors build a model for leading constructive innovation that bypasses the western disruptive innovation and creative construction model.
Alexander Lennart Schmidt and Laurent Scaringella	Uncovering Disruptors' Business Model Innovation Activities: Evidencing the Relationships between Dynamic Capabilities and Value Proposition Innovation	This empirical study collected survey data from 98 German strategy executives and performed partial least squares structural equation modeling to study the antecedents and sub-constructs of value proposition innovation. The results suggest that value proposition innovation activities centered on new offerings and new channels fully mediate the relationship between dynamic capabilities and disruptive innovation.
Justin Tan, Liang Wang, Hongjuan Zhang and Wan Li	Disruptive Innovation and Technology Ecosystem: The Evolution of the Intercohesive Public-private Collaboration Network in Chinese Telecommunication Industry	This empirical study traces the trajectory of a previous public-private collaboration and investigates the governance and structure of a collaboration network. The study reveals that: (1) a network has a more centralized structure at its inception; (2) intercohesion increases and structural folds facilitate knowledge generation in the orchestration phase; and (3) in the embedded phase, the public institutions' status generally remained stable.
Ji-Ye Mao, Fang Su, Bing Wang and Sirkka L. Jarvenpää	Responding in Kind: How do Incumbent Firms Swiftly Deal with Disruptive Business Model Innovation?	This case study shows that incumbent firms can swiftly develop a new business model (BM) through a two-stage process. In the separation stage, firms establish autonomous units to experiment via experiential learning, which brings multiple BMs in co-existence. Subsequently, in the integration stage, the various BMs are consolidated into and integrated into a new BM, via learning from industries.
Zhiwei Wang, Juan Ling and Jay Inghwee Chok	Relational Embeddedness and Disruptive Innovations: The Mediating Role of Absorptive Capacity	This empirical study tested the hypotheses with a survey of 251 firms in China and iterated the conceptual model to reflect the crucial insight that disrupters in emerging economies can leap from exploratory learning to disruptive innovation. The authors surmise that exploratory learning can help disrupters outsource transformative and exploitative learning through their supply chains.

complements, competes, and interacts with a variety of market participants, such as suppliers, complementors, customers, competitors, investors, and governments (Hall and Martin, 2005; Brandenburger and Nalebuff, 1996). Changes in technology, products, and business models may affect the overall ecosystem. Ecosystems may also affect technology, products, and business models, and, in turn, disruptive innovation. If (potential) disruptors adopt existing value networks when entering the market, they may fail to disrupt the market because they are confined by existing business models (Christensen, 1997).

Active ecosystems require the support of sufficient complementors. A study on the video game industry in the United States by Ozalp et al. (2018) revealed that when incumbents introduce new-generation platform technology with advanced capacities, existing complementors' learning curves become steep and their ecologies are disrupted. These changes may force complementors to shift to other platforms with lower thresholds that may hinder the growth of the new platform. This indicates that when core players in a platform ecosystem adopt disruptive innovation, they must consider not only value capture and competitive advantages but also the learning costs of complementors in the face of technology transition; otherwise, the adoption of disruptive innovation may weaken the platform itself. Parry and Kawakami (2017) found that the partnership interaction in the value network and existing laws and regulations limit the market development of disruptive innovation products. Pinkse et al. (2014) divided disruptive innovation into autonomous, systemic, and socially embedded innovation according to the levels of involvement of other companies or public participation required. Autonomous innovation refers to the development of independent disruptive innovation by a company, whereas systemic and socially embedded innovation requires the participation of other companies (e.g., vertical or horizontal integration) or governmental intervention such as legislation to promote replacement of polluting technologies or the provision of tax incentives and subsidies (Havighurst, 2008; Pinkse et al., 2014). Si and Chen (2020) highlighted other roles and activities affecting ecosystems including suppliers, consumers, complementors, and other stakeholders (Afuah, 2000; Conrad et al., 2014; Garud and Kumaraswamy, 1995; Ozalp et al., 2018; Pinkse et al., 2014), venture capital (Markides, 2006; Pinkse et al., 2014), official strategic alliances (Markides, 2006), mergers and acquisitions (Gilbert and Bower, 2002; Wagner, 2016), and cooperation with schools or other institutes (Gilbert and Bower, 2002).

4. Special issue articles

The seven papers (Williamson et al., 2020; Kim et al., 2020; Chen et al., 2020; Schmidt and Scaringella, 2020; Tan et al., 2020 ; Mao et al., 2020; Wang et al., 2020) that comprise this special issue are summarized in Table 1. Taken together, they offer new perspectives on disruptive innovation from current views. Although the Call for Papers for this special issue focused exclusively on disruptive innovation, we sought to encourage high-quality qualitative research on any aspects of disruptive innovation/entrepreneurship in emerging economies and some researches in matured economies but highly related to the emerging economies. We deemed this an important goal, given that our intent was to demonstrate the cutting-edge nature of ongoing theoretical research of disruptive innovation/entrepreneurship.

The first paper is "Is Disruptive Innovation in Emerging Economies Different? Evidence from China" by Peter J. Williamson, Feng Wan, Eden Yin and Linan Lei. It fills a gap in existing research on disruptive innovation and its processes, which are not fully studied in emerging economies. Analyzing disruptive innovations in and from China, the authors found that the differences of disruptive innovation in developing countries are threefold. First, rather than being based on launching products with inferior performance, disruptive innovations in China focus on offering different value propositions. Second, the rate at which Chinese disruptive innovations are improved and extended is typically faster than in developed markets. Third, Chinese disruptive innovations are often launched directly into a mass market rather than a niche. Besides identifying these differences, the authors also discuss how Chinese firms generate disruptive innovations. The findings of this study expand our understanding of disruptive innovation and hence enrich the existing literature on this important phenomenon.

The second paper in the special issue is "Disruptive Innovation and National Cultures: Enhancing Effects of Regulations in Emerging Markets" by Sahrok Kim, K. Praveen Parboteeah, John B Cullen and Wan Liu. Noting the scarce research on the effects of national cultures and their interactions with the regulatory institutional environment on disruptive innovation in emerging economies, this paper draws from the sociological framework of Institutional Anomie Theory to hypothesize that disruptive innovation is a form of positive deviance to anomic conditions in societies. Using multilevel analysis, the results showed support for moderating effects of the regulatory institutional context; i.e., rule of law and regulatory quality on the cultural drivers and disruptive innovation relationships. Besides, the study's contributions, limitations and future research are also discussed.

The third paper is "Leading for Constructive Innovation: Preliminary Evidence from China" by Jin Chen, Robert Burgelman, Jiaxue Li, Hang Chang Chieh and Gang Zheng. Based on an investigation of several Chinese companies' disruptive growth, the original disruptive innovation theory is further developed. Applying the perspective of disruptive innovation, the authors examine different Chinese companies' innovation processes. They also build a model for leading constructive innovation that bypasses the western disruptive innovation and creative construction model by adopting holistic innovation theory. The authors also propose this new model which offers a useful alternative framework for global corporate innovation.

The next paper is "Uncovering Disruptors' Business Model Innovation Activities: Evidencing the Relationships between Dynamic Capabilities and Value Proposition Innovation" by Alexander Lennart Schmidt and Laurent Scaringella. The literature suggests that ongoing debates highlight continuous business model innovation for inducing disruptive dynamics. However, studies on this issue are mostly of conceptual or qualitative nature, impeding generalizable principles. Therefore, the authors explore the antecedents and sub-constructs of value proposition innovation by collecting survey data from 98 German strategy executives and performing partial least squares structural equation modeling. Their results show that value proposition innovation activities regarding new offerings and new channels fully mediate the relationship between dynamic capabilities and disruptive innovation. This paper offers interesting insights

that contribute to improving our understanding of the unfolding business model problem inherent to disruptive innovation, guiding future theory development on disruption.

The fifth paper is “Disruptive Innovation and Technology Ecosystem: The Evolution of the Intercohesive Public-private Collaboration Network in Chinese Telecommunication Industry” by Justin Tan, Liang Wang, Hongjuan Zhang and Wan Li. To offer improved understanding about the issue of public-private collaboration, the authors traced the trajectory of a previous public-private collaboration and investigated the disruption and restructure of a technology ecosystem. Their results show that through the standardization process of China’s TD-SCDMA Technology, a network has a more centralized structure at its inception. In addition, intercohesion increases and structural folds facilitate knowledge generation and disruptive innovation in the orchestration phase. They also note that, in the embedded phase, the public institutions’ status generally remains stable. Essentially, the government empowers various institutions to form a strategizing group and leads this group across the disruption and reconfiguration of the industrial network.

The sixth paper is “Responding in Kind: How do Incumbent Firms Swiftly Deal with Disruptive Business Model Innovation?” by Ji-Ye Mao, Fang Su, Bing Wang and Sirkka L. Jarvenpaa. The paper elaborates a new approach, developing a novel business model (BM) swiftly, to deal with this threat rather than either imitate disruptive BMI or strengthen the existing BM as prescribed in the literature. Their findings show that incumbent firms can swiftly develop a new BM through a two-stage process. In the separation stage, firms establish autonomous units to experiment via experiential learning, which creates multiple BMs that co-exist. Subsequently, in the integration stage, the various BMs are consolidated into an integrated new BM, via learning from industries.

The last paper is “Relational Embeddedness and Disruptive Innovations: The Mediating Role of Absorptive Capacity” by Zhiwei Wang, Juan Ling and Jay Inghwee Chok. Their study investigates the factors that drive disruptive innovations in emerging economies from a network perspective. They tested their hypotheses using a survey of 251 firms in China and iterated the conceptual model to reflect the crucial insight that disrupters in emerging economies can leap from exploratory learning to disruptive innovation. Their findings help disrupters outsource transformative and exploitative learning via their supply chains. Suggestions for future research and limitations are also discussed in this paper.

5. Discussion and future studies

In this special issue, we have sought to bring greater attention to and focus on disruptive innovations and their importance for emerging economies. Some of these economies are undergoing massive changes, moving from attempting to catch up technologically with more developed economies to entering a stage where they are pursuing original innovation. With this transition, questions arise as to the currency of the literature and what it offers scholars studying emerging economies or those who are charting their national policies or designing their institutions. Disruptive innovation is, in itself, a complex and confusing concept that has come to mean different things to different scholars as presented earlier. It is diverse in its domain, components, types and purposes. This diversity is likely to frustrate some researchers but should excite others as it foretells the potential of disruptive innovations to profoundly affect industries as well as national and global economies.

This special issue adds to a growing body of research that shows the relevance of disruptive innovation for emerging economies. It helps to address the shortage of relevant studies in the topic; the articles it contains offer fresh views and perspectives that collectively inform us about the nature and consequences of these innovations for individuals, teams, companies and societies at large. The articles also reiterate the crucial value of these innovations for economic development by inducing the birth and growth of entrepreneurship as a means of taking advantage of these innovations, thus perpetuating the cycle of creative destruction that Schumpeter (1942) envisioned long ago. Moreover, the articles open the door for more systematic research on disruptive innovation in emerging economies taken in account their uniqueness, different stages of development and their ideological heterogeneity. The articles raise interesting research questions worthy of study as we discuss next.

5.1. The need for taxonomies

As our discussion makes clear, research on disruptive innovations suffers from the proliferation of definitions. Each paper we have reviewed appears to adopt and (or) present a different definition. While this is usually characteristic of “early stage” research on a topic or concept, we believe research on disruptive innovations has achieved some maturity. To ensure its relevance as well as scholarly and managerial impact, time has come to be more systematic about two fundamental questions: When is an innovation disruptive? And, what are the different types of disruptive innovations and how do they relate to each other? Our preceding presentation in this article has sought to answer these questions. Yet, our discussion highlights a plethora of definitions and informal typologies of the concepts.

This suggests an important question for future research: Can we empirically develop a taxonomy, or even a set of taxonomies, of disruptive innovations? Having such taxonomies can serve multiple useful purposes. For instance, this can promote consistency and coherence across studies, making it easier to speak about the same theoretical domains. It also provides an opportunity to examine whether the content of these innovations vary across industries, countries and time. Additions to and deletion from these taxonomies would have to be theoretically explained, making the link clearer between theory and empirical analyses (which is currently lacking). In fact, this would help focus future theory building efforts while providing a more compelling foundation to evaluate empirical findings. Finally, developing taxonomies would enable and perhaps expedite the integration and accumulation of research findings.

5.2. Implications of disruptive innovations on emerging economies

Given the rapid growth some emerging economies are experiencing, they provide fertile grounds for the adoption and development

of disruptive innovations. Emerging economies seeking to technologically catch up with their developed counterparts can make good use of disruptive innovations developed elsewhere. To do so, however, they need to revamp their infrastructures and develop their human capital. Emerging economies also need to find their own recipe to develop innovative business models that transform these innovations into a source of unique advantage for themselves. This suggests that future researchers need to probe the key cultural, technological and organizational barriers to the adoption of disruptive innovations in emerging economies. How do these barriers influence the development of the innovative business models needed to implement these innovations locally? Do these economies have the requisite absorptive capacities essential to gaining advantage from disruptive innovations? How can these economies customize these innovations for their own use?

It is imperative to explore factors that limit emerging economies' capacity to develop their own original disruptive innovations. Many of these economies face major economic problems that require innovative solutions, which should encourage the development of local disruptive innovations that can fuel growth and ensure economic development. This makes it essential to understand the cultural, institutional and technological forces that handicap these countries' ability to come up with their own unique disruptive innovations, perpetuating their dependence on developed countries. What are these forces and how can they be overcome? Scholars using the national innovation system (NIS) have long argued that the interrelationships among these factors need to be restructured in order to bring about fundamental changes in the type and pace of changes occurring in a society (Nelson, 1993). In turn, this makes it important to investigate how this transformation can be achieved and determine the change agents that lead and crystallize this change.

When studying emerging economies, researchers need to recognize that they usually face a multitude of issues that require attention and resolution. This means that disruptive innovations need not be only technology-based in the traditional sense. Other innovations in emerging economies such as second innovation and frugal innovation in China and India. In addition, plenty of social innovations could also be disruptive in emerging economies (Bruton et al., 2013). Hence, we need to better understand the domain and scope of disruptive innovations in emerging economies. Further, given that technological change can disrupt existing institutions, how does this influence the direction and speed of change in a society? How does disruptive technological change lead to disruptive social innovations and vice versa? Under what conditions does this effect materialize? What is the net effect of these disruptive technological and social innovations on the pace of development of the national economy?

Our review of the literature presented earlier highlights the paucity of research on disruptive innovation in emerging economies. This paucity may reflect the fact that traditionally these innovations originated primarily in advanced economies. Emerging economies also have the need and incentive to engage in, make use of, and develop disruptive innovations. Of course, the scope and scale of disruption may be different in different industries as well as different economies, a possibility that existing research tends to overlook. It would be beneficial to identify the sources of variability in the scale and scope of the disruptions. We also need to better understand how these innovations diffuse domestically and internationally. Are the processes and mechanisms of diffusion different in developed vs. emerging economies? Further, given that emerging economies are not monolithic in nature, how do these processes and mechanisms differ across different emerging economies? Answers to these questions can improve future theory building on the emergence, evolution and diffusion of disruptive innovations in emerging economies.

We are stuck by the dearth of studies examining the diffusion and adoption of disruptive innovations into emerging economies. What are the roles of multinational companies, independent researchers and national institutions in this regard? What are the mechanisms used in these processes? Which processes work best to enable this diffusion and promote adoption? These are simple but important questions that require thoughtful consideration in future research as they have implications for the national policies that emerging economies may enact.

5.3. Multilevel view of disruptive innovations

Our review also underscores the hierarchically nested nature of disruptive innovations. Individuals, teams, organizations and societies all affect (as well as are affected) by these innovations. Yet, while acknowledging this fact, prior studies continue to ignore multilevel issues in their research designs and analyses. Moving forward, it would be beneficial to adopt multilevel research designs and analyses to better understand the nature and consequences of these innovations.

Attention to multilevel issues makes it possible to address two other limitations of existing research. The first is ignoring the processes associated with the development and subsequent diffusion of disruptive innovations. It is not clear how these processes would be different from other types of innovations or whether they change across developed vs. emerging economies. The second shortcoming of the literature is overlooking the interrelationships among different levels of the analyses. This is a serious omission as deficiencies in one part of a system (e.g., national institutions) can frustrate and stifle the success of other parts of the system, thereby creating a vicious cycle that impedes disruptive innovation. Of course, the opposite scenario might exist where a deficiency in one part (e.g., a company trying to develop disruptive innovation) is offset by the contribution of another part (e.g., state support), creating a virtuous innovation cycle. Many emerging economies have established policies seeking to promote their "national innovation systems" by building linkages among their different parts. Researchers need to investigate these countries' success in this regard.

5.4. Consequences of disruptive innovations

Interest in disruptive innovations persist because of their profound impact on industries, firms, markets and shareholders. These effects are well documented in the context of developed economies but less so in the case of emerging economies. This is surprising given that disruption in one sector can lead to major changes in other sectors. Technological disruption can also lead to economic, social and cultural changes. These effects need to be better documented to appreciate the contributions of disruptive innovations.

Disruptive innovations are often the source of new waves of entrepreneurship, where new technological and market opportunities come into existence. While this is important for all societies, it is often more so for emerging economies seeking to achieve growth, building new capabilities and creating new industries. Future researchers need to examine these effects. Moreover, because transforming these innovations into a source of new firm creation requires multiple skills, how emerging countries develop or acquire these skills to benefit from disruptive innovations is another interesting question to explore.

Equally important is the fact that these changes often bring upheaval that destroys the competencies of existing companies, rendering them strategically irrelevant. This has serious negative consequences for these companies' shareholders, employees, suppliers and communities. These effects should be better documented in future research. Such research is especially relevant in emerging economies which are likely to undergo greater and more frequent technological transitions as they pursue disruptive innovation as means of effecting change in their societies.

5.5. From disruptive innovation to entrepreneurship

One of the glaring shortcomings of existing research is failing to discuss how disruptive innovations are transformed (converted) to entrepreneurship. These innovations often embody complex knowledge that few people understand how to use or commercialize. This knowledge has to be deciphered and translated in order to be practically useful commercially. Therefore, future research needs to pay greater attention to these issues and how the knowledge embedded in disruptive innovations is "converted" into applications. Researchers need also to consider entrepreneurial activities needed to make this conversion possible; these activities include resource assembly and mobilization, building the network, identifying relevant customers (defining the business opportunity), raising capital, and gaining access to essential capabilities such as marketing, production and distribution, among others. These capabilities can determine the successful utilization of disruptive innovations in creating new firms that capitalize on them.

6. Conclusion

The world is undergoing a rapid economic shift as high technology firms have long dominated the economies of Europe and North America are increasingly being challenged by firms from emerging economies. This shift is major—such that today emerging economies and their firms are fast becoming the driving force behind economic development around the world. Particularly, entrepreneurial companies from emerging economies are reshaping the world economy by introducing a variety of new/disruptive technologies and innovations.

We hope this special issue, with its seven articles, helps to highlight the evolution and transformation of the disruptive innovation in emerging economies, identify blind spots in the literature, and highlight relevant research avenue that can transform scholarship on disruptive innovation, especially in emerging economies. The collection of articles includes in this special issue articles range from managerial to the institutional levels, hoping to draw attention to recognize the multilevel nature of disruptive innovations. We hope future researchers will espouse a broader view of disruptive innovation than existing studies do. We believe that scholars from the fields of technology management, strategic management, industry and competitive analyses, business model innovation, entrepreneurship and organizational behavior have much to offer. We hope they take on the grand challenges that firms/entrepreneurs face in the new economies, both benefiting from disruptive innovations while introducing new ones that change the very fabric of their industries and world economic order.

Declaration of Competing Interest

The authors report no declarations of interest.

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