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Linking disruptive innovation to sustainable entrepreneurship within the context of small and medium firms: A focus on Nigeria

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This study illuminates the linkages between disruptive innovation (DI) and sustainable entrepreneurship (SE) within the context of small and medium firms (SMFs). By adopting a systematic review of the literature, we thematized the possible connections between DI and SE practices to include: (i) contextualization of DI in Nigeria's entrepreneurship ecosystem; (ii) a model for linking DI and SE among firms in Nigeria; and (iii) mechanisms and structures that achieve DI and SE. The study elaborates on theoretical and practical implications for the SMFs stakeholders. *Among the viable arguments of this research is that disruptive efforts should align with financial expectations and social value, and other expected returns for the customers.* Our study extends the theoretical frontiers of the DI literature by demonstrating the interconnectedness of the DI model for SE in a developing economy, specifically Nigerian SMFs, which is seeking a transition from heavy reliance on oil exploration to a much more widespread economic base that taps other natural resources and diverse economic contributors.

Keywords: DI, sustainable entrepreneurship, small and medium enterprises, Nigeria

Introduction

In the last two decades, there has been a vast proliferation of research on disruptive innovation (DI), a trend that underlines the contemporary relevance of this theme first popularized by Clayton Christenson in 1997. That seminal work described DI as a strategic pathway through which new market entrants, predominantly smaller companies with limited resources, identify and provide products/services that functionally serve previously neglected market segments at lower costs. Their roles as disruptive innovators reflect in the ability of smaller firms to gradually climb up to the mainstream customer segment of the market and secure endorsement of their products, thus disrupting the operations of the well-established incumbent firms (Christensen, Raynor, and McDonald 2015). Hence, DI offers tremendous opportunities to small, entrepreneurial firms because it enables them to penetrate highly competitive markets by strategically targeting customers at low-end or new markets (Corsi and Di Minin 2014; King and Baatartogtokh 2015; Opute 2020).

Within developed economies, DI has been discussed, especially with regards to categorizing disruptive firms based on factors that influence their disruptive capacities (Markides 2006; Chen, Zhu & Zhang, 2017) and its impact on sustaining competitive advantage for small and medium firms (SMFs) (Li et al. 2010; Opute 2020). High technology-driven economies are characterized mainly by disruptive technology products and sporadic innovation changes (Hopp et al. 2018; Sandstrom, Berglund, and Magnusson 2014). The assertion points to the fact that SMFs pursue a sustainable entrepreneurship (SE) goal. However, the conjectural linkages that bind DI with SE practices of SMFs remain relatively under-explored in the literature. For example, existing studies

are yet to clarify what critical mechanisms and structures are pertinent to disruptive innovators in accomplishing SE. Also, existing studies have not established the core research directions that contribute to a more precise understanding and harnessing of the DI strategy to drive SE. Therefore, this study adopted a systematic literature review approach to identify the trajectory of DI and SE to fill the identified research void.

The potential contributions of DI, especially related to SE of SMFs in sub-Sahara Africa and especially Nigeria, are strategic. The assertion holds, bearing in mind that despite the enormous intellectual, physical and natural resources that exist in the continent (Ajewole et al. 2015; Oludayo and Ibidunni 2019), there is significant scale poverty, unemployment and underutilization of skill in the region (Afolabi 2013; Dana and Ratten 2017; Iwu and Opute 2019). Meanwhile, in Nigeria, opportunities abound for firms to spring forth, thrive, and maintain SE to impact economic growth by carefully leveraging DI strategy (Opute 2020; Tidd and Bessant 2018). Therefore, the present study focuses on establishing a theoretical linkage of DI and SE for SMFs in Nigeria and proffering future research directions for empirical investigations on DI and SE. It is noticeable that such theoretical explanation remains a gap in the existing literature, especially within a developing context like Nigeria, with a fast-growing small and medium firms sector and acclaimed to be a potentially fast-developing economy (The World Bank 2020; Ibidunni, Ogundana, and Okonkwo 2021). The approach taken in the present study is to demonstrate, by a systematic review of the existing DI and SE literature, the possible emerging patterns of conceptual relationships that have been well-established in more developed economies and how these can be adapted within Nigeria's developing

economy. The adaptation of such conceptual relationships in the present study will contribute to the DI literature by expanding the frontiers of understanding about what is known of the theory, primarily through novel insights drawn from the African culture, precisely Nigerian-based SMFs. Next, the literature review is undertaken, explaining DI theory and DI and SE. After explaining the mechanisms and structures of DI, DI in Nigeria's entrepreneurship ecosystem is analyzed and contextualized. Following that, we proposed a DI and SE model for Nigerian firms. To conclude, the study explained implications for theory and practice and conclusions and research agenda presented.

Theoretical background

Disruptive innovation: an emerging economy perspective

Substantial literature on DI reflects perspective from the developed economies (Yu and Hang 2010; Summerer 2012; King and Baartartogtokh 2015; Foss and Saebi 2017; Arundel, Bloch, and Ferguson 2019). Over time, the focus of DI research has extended beyond the understanding of meanings of the concept to identifying different characteristics which disruptions can take given a demand-side and supply-side views of the concept (Kilkki et al. 2018; Roy 2018). The rapid growth of technology and technology-based firms have also necessitated investigations about the changing impacts of disruptions on the economy (Danneels 2004; Lia, Porter, and Suominen 2018). Nevertheless, there have also been empirical investigations into the role of mechanisms, such as social media, that facilitate the spread of disruptive changes (Laurell and Sandström 2018; Muninger, Hammedi, and Mahr 2019; Opute 2020).

In emerging economies, DI is a strategic entrepreneurial opportunity for driving highly competitive small and medium enterprises (Hang, Garnsey, and Ruan 2015; Opute 2020; Ibidunni, Ufua, and Opute 2019). By simply thinking of the tenets of the DI concept, firms that have intentions to be disruptive in their industry must be of an entrepreneurial mindset. Such viewpoint confirms a departure from the conventional focus, where efforts gear towards discovering and creating new opportunities and modalities for getting work done and sustaining value in the firm's operational procedures (Pansera 2013; Ibidunni et al. 2020a). It involves emphasizing technology as an effective strategy for the organization, strategically aligned to satisfy customer needs at a profit (Nogami and Veloso 2017; Ibidunni, Ufua, and Opute 2019; Akpan and Ibidunni 2021).

Concerning the applicability of DI theory to emerging and developing economies, scholars suggest that the ability of DI theory to relate 'bottom line technology' to low-end customers justifies DI's utility in driving SE practices among developing economies (Christensen & Raynor, 2003; Kamolsook, Yuosre, and Björn 2018). According to Christensen, Raynor, and McDonald (2015), disruptive innovators have an enduring attribute that drives them to build up the quality and maintain low-cost value consistently. They strategically define their markets from low-end markets to high demanding

markets (Corsi and Di Minin 2014). Consequently, to fully optimize the operational benefits of DI, entrepreneurial firms must strategically align their business models to that objective (Moyer and Olliffe 2015; Ibidunni, Mozie, and Ayeni 2020b). Conforming to that operational logic, Aramex – a global logistics firm with a home-base in the Middle East, has created a disruptive business model that combines knowledge management capacities and disruptive technologies, like big data analytic software packages, sophisticated hardware and intelligent apps to connect its global customers to the firm (Alberti-Alhtaybat, Al-Htaybat, and Hutaibat 2019; Santonen and Julin 2019). In the Chinese economy, disruptive business models are predominantly driven through a redefined focus of innovation processes and a reengineering of research and development (R&D) activities to reflect a continuously low-cost advantage, yet sustaining quality in ways that incumbent firms find difficult to imitate (Wan, Williamson, and Yin 2015).

Disruptive innovation and sustainable entrepreneurship

It is essential to establish that DI is a pattern of complementing the efforts that emanate from managers' strategic reasoning and entrepreneurial mindset to chart marketplace competitive and sustainable positions for the firm (Ibidunni, Ufua, and Opute 2019). Interestingly, SE research has focused on large firms and small firms, even to the level of individual entrepreneurs (Hockerts and Wüstenhagen 2010; Wale-Oshinowo et al. 2018). Therefore, DI for SE involves the engagements of disruptive innovators in the discovery and exploitation of opportunities for creating socially and economically desirable transformations for industry competitiveness (Eckhard and Shane 2003; Dean and McMullen 2007; Ufua, Papadopoulos, and Midgley 2018). A critical value that DI offers to SE is that it does not only allow entrepreneurial managers to be future thinking but also inspires them to be innovative in ways that change the entire industry game plan to their advantage (Habtay 2012; Alpkhan and Gemic 2016; Ndemo and Weiss 2017; David-West, Iheanachor, and Umukoro 2019).

Therefore, innovating for SE means the capacity of enterprises to harmonize activities that guide the firm's DIs with its foreseeable market-life cycle, from the point of initiation until the innovation can satisfy the demands of high-end customer segments (Ibidunni, Ufua, and Opute 2019. See Figure 1). Therefore, this study proposes a model that reflects blended views from Christensen, Raynor, and McDonald (2015) and Hockerts and Wüstenhagen (2010) to explain the patterns of growth that DI could take from the low-end market to the high-end market extreme.

Methodology

Extensive analysis of extant literature was carried out, through an online search of relevant databases, to capture the patterns of discourse on DI and SE from a global perspective and subsequently aligned to emerging economies (see, Remane et al. 2017), with particular emphasis on Nigeria. Specifically, online databases were

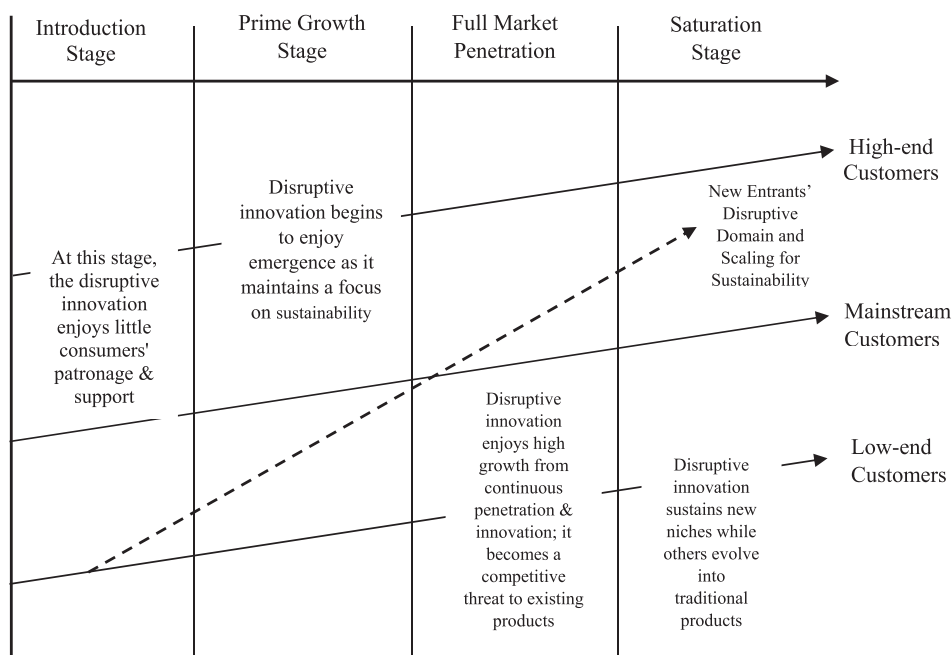


Figure 1: Disruptive innovation for sustainable entrepreneurship.

Source: The Authors

systematically examined to identify relevant academic literature relating to the discursive linkages between DI and SE. A systematic review was used in this study to collect robust evidence to address the research question about DI and SE and to perform an appraisal and synthesis of evidence towards making valid conclusions and flagging future research directions (Munn et al. 2018). More so, the use of a systematic review strategy enabled the identification of critical research gaps about contextual mechanisms and structures for advancing DI theory for SE in Nigeria and extendedly towards building a valuable foundation for driving future research in this theoretical domain (Peričić and Tanveer 2019).

As in any typical systematic review, this study adopted the following processes (i) research questions were established (ii) the characteristics of previous studies on DI and SE were determined, (iii) the relevant literature to DI and SE were retrieved (iv) the most critical literature were selected and synthesized (v) the results about mechanisms and structure that facilitate DI and SE, especially in Nigeria and appropriate directions for future research were determined and reported (Petzold, Landinez, and Baaken 2019). The research question investigated in this study was inspired by the paucity of literature regarding DI and SE in the literature (Paap and Katz 2004; Hang, Chen, and Subramian 2010), especially concerning mechanisms and structures that can facilitate such relationships in fast-growing African economies, like Nigeria. Given that fact, a critical goal of this research was to galvanize future research regarding Disruptive Innovation and Sustainable Entrepreneurship relationships. Consequently, this study included literature that had been published between the periods of 1995–2019, bearing in mind that the DI discourse gained prominence following Christenson's (1997) seminal work – *The Innovator's Dilemma*. Literature was also retrieved based

on their relatedness to the themes of entrepreneurship and SE. The specific online databases used to search for and retrieve literature for this study include Scopus, Science Direct and Google Scholar. Table A1 (see Appendix) contains a summary of studies reviewed for the present research. These databases were deliberately selected to ensure that this research included only high-quality literature works. Furthermore, to achieve standard academic quality, only peer-reviewed books, book chapters, online sources and conference papers were included for review.

Moher et al. (2009) opined that using a systematic review, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). PRISMA is a systematic review and Meta-Analysis procedure based on reporting evidence from randomized trials, evaluation of interventions, and in-depth appraisal of published systematic review. The benefits of using PRISMA include reducing the risk of an excessive number of reviews during the systematic review process and achieving transparency during the review process. Figure 2 shows the PRISMA flow chart for this study.

The results from this study align with the recommendations made by Tranfield, Denyer, and Smart (2003) and Moher et al. (2009). Therefore, this study screened a total of ($n = 52,441$) records from the online databases and other sources, such as newspapers, books and industry papers relating to the theme of the study. Eventually, ($n = 52,234$) were excluded because they addressed more generic aspects rather than directly related discourse with DI and entrepreneurship. Consequently, ($n = 207$) full-text records were eligible for further evaluation. However, an additional ($n = 80$) records were excluded for a couple of criteria, including the currency of literature, especially having the larger number of literature covering a period of the past five years, and literature that closely relates to this objective study. Hence, ($n = 127$)

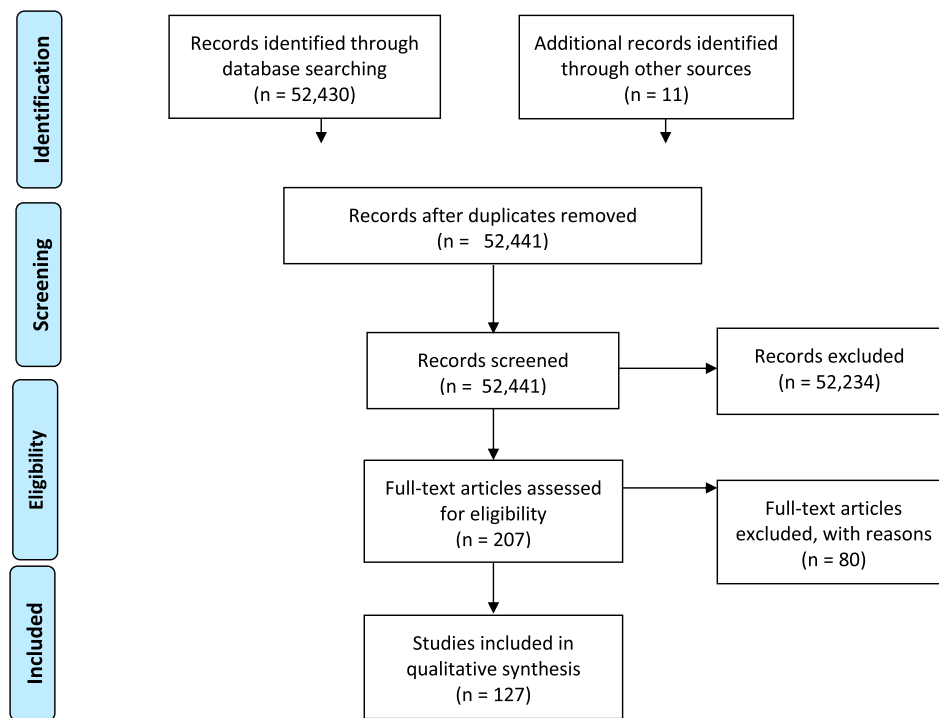


Figure 2: PRISMA flow diagram for the study.
Source: The Authors

records were found to fall within the currency criteria and to (i) to identify and contextualize mechanisms and structures that are relevant to DI and SE of SMEs in Nigeria (ii) to clarify research directions towards better understanding and harnessing of the DI strategy to drive SE in the Nigerian context and by extension developing countries.

Findings

Based on the systematic review of literature, this study established the possibilities of a relationship between DI and SE. It also identified the possibilities of future research directions that could promote disruptive initiatives within Nigeria's entrepreneurship sector. Specifically, the findings of this study included three major thematic areas, namely, contextualization of DI in Nigeria's entrepreneurship ecosystem, a proposed model for linking DI and SE among firms in Nigeria and mechanisms and structures that achieve DI and SE. Therefore, the following themes show the findings that establish the discourse on DI and SE, especially related to Nigeria as an emerging economy.

Analyzing and contextualizing disruptive innovation in Nigeria's entrepreneurship ecosystem

The entrepreneurship ecosystem in Nigeria covers all significant actors that contribute to the innovation value chain and ensure its sustainability. It consists of policy and regulatory frameworks, R&D drivers, institutions for building capacity and providing financial supports and mechanisms for facilitating logistics, such as market and customer accessibility (Ibidunni et al. 2018b). Although conceptualizations around the disruptive theory are still in their infancy stage in Nigeria, and the practices of disruptions among firms are still emerging,

there are strands of evidence that strategy and entrepreneurship researchers are aware of the concept and entrepreneurial thinking firms are striving towards disruptions. Consequently, DI is not only branded around firms (for example; Globacom Nigeria, Taxify, Jumia, Konga, Access Bank Nigeria and Covenant University) but also specific products (from foreign companies) are noticed to be disruptive in themselves (for example, dual-SIM mobile phones, as opposed to single-SIM mobile phones) (Trojer, Rydhagen, and Kjellqvist 2014; Essiet 2018).

The dual-SIM option, especially, is a significant DI strategy in Nigeria. This is because the brand has enabled successful penetration into the mobile telephone industry's low-end market niche, which was hitherto primarily ignored by major players like Nokia and Samsung (Ogunnaike, Ibidunni, and Adetowubo-King 2014). The success story of the Chinese dual-SIM brand of phones was reflective of its ability to overcome the associated lack of consistent network coverage across different Nigeria locations and high tariff rates that characterized making calls across different networks (Odikayor et al. 2012). Indeed, the innovation (entrepreneurship) ecosystem influenced the success of this disruption. Whereas the innovator was about the process of planning, designing and executing the intended DI, the government, through its relevant agencies, supplied the facilitating environments and infrastructure that aided the disruption value chain – not also leaving out the expectations of customers and some element of trust which they had in the workability of the new idea.

Generally, researchers have warned about the slow growth in innovations by firms in Nigeria's entrepreneurship sector, which primarily was traceable to a few

participants in the entrepreneurship ecosystem (e.g., Agri et al. 2018; Ibidunni et al. 2018; Ibidunni, Ufua, and Opute 2019a). Further commentaries, however, indicate that there is a growing volume of interest from practitioners in motivating support for the entrepreneurship ecosystem (e.g., Petrick and Martinelli 2012). Broadly, the increasing number of technology-based and market-based innovators in Nigeria and their continuous drive to scale operations in competitive patterns suggest an emerging trend of disruptive goals across the entrepreneurship landscape of Nigeria.

Proposing a disruptive innovation and sustainable entrepreneurship model for firms in Nigeria

Nigeria has a vibrant economy that is currently striving to transit from focusing mainly on oil explorations to sectors that engage other vast natural resources, drive technological advancements, improve the economic wheel, and address the unemployment and poverty challenge. This has positioned small and medium enterprises on a strategic pathway for achieving that transition target. However, one fundamental challenge of small and medium enterprises over time is the dominant presence of large multinational firms in the nation's business economy. Though seen as an advantage for spontaneous decision-making and flexibility in operations, the smallness of their size is undoubtedly a disadvantage for them, given their limited resources and inability to access high profile technology. A strategic road path for sustaining entrepreneurship practices and boosting competitiveness is to embrace DI orientation. Drawing from the insights on China (e.g., Li et al. 2010), we emphasize the critical importance for developing economies, and in particular, Nigeria, to endorse DI strategies.

Disruptive innovation models describe the process of SE in developed economies (Hopp et al. 2018). However, the generalization of these thoughts in developing and transiting economies like Nigeria will be inappropriate for two main reasons. Firstly, there are diversities in systemic operations of institutional frameworks and mechanisms that drive DIs and SE in these economies. Secondly, the commitments of governments and the overall entrepreneurship ecosystem to advancing disruptions in developing economies suggest a need for a more suitable model. Consequently, this study proposes that a model that will describe DI and SE in Nigeria and other similar developing economies should be characterized by theoretical and practical understanding. Specifically, conceptualizing a model must be based on: (i) understanding the uniqueness of the Nigerian economy, especially in terms of market structure, fiscal regulations and cultural dynamics; (ii) understanding how DI tenets can apply peculiarly to firms operating in the Nigerian economy; (iii) understanding the uniqueness of the industry for which DI model intends to be implemented. Based on these three levels of understanding, this study suggests modelling mechanisms that can synchronize their working together to deliver disruptive outcomes.

The literature on market structure generally describes the behavioural patterns of firms and their competitive responsiveness in the market (Shafaatu 2017). Perhaps,

the most famous model for examining market structures is the structure-conduct-performance (SCP) approach (Bain 1956). It is based upon the premise that the concentration of firms in an industry determines the emergent competitive behaviours, which in turn influences their levels of performance (Midgley, 2000; Ufua et al. 2019). For example, competitive intensity in an industry will determine the pricing system, which can direct the firms' profit levels (Palmer and Ralftery 1999). This reality may apply to monopolistic and free-market economies, where the exit and entry firms are liberal.

For this reason, several authors have produced empirical results that are contrary to the SCP's fundamental proposition that performance dominance is earned where firms in the industry constraint new entrants into the market, hence dictating fluctuations in the industry (Baumol, Panzar, and Willig 1983). Across most industries in Nigeria, the market is characterized by high levels of competitions, arising from structures and policies that guide firm operations and conduct. The Nigerian banking industry, for example, has shown performance outcomes, like returns on assets (ROA) that links directly to policy frameworks and regulations from the Central Bank (Oloniluyi and Ogunleye 2016). This fact is equally validated in the Nigerian informal food sector, where government structural mechanisms and the forces of consumers' purchasing power influenced the conducts on suppliers towards pricing mechanisms (Tiku et al. 2012). Therefore, this establishes that the Nigerian business economy primarily operates upon a stakeholders' perspective. A Based on the preceding, this study proposes a DI and SE model (see Figure 3) that is workable within Nigeria's economic system and similar developing economies.

The DI and SE model presented in Figure 3 shows a holistic picture across the three lines of understanding mentioned earlier. The firm's DI agenda and efforts must align with environmental scenarios in the specific industry of concern. At the same time, industry feedback is necessary to keep disruptions relevant to the customer need (You, Zhang, and Yuan 2019). These environmental influences are significant to the firm's DIs, considering that the environment is characterized by uncertainties, especially with regulations and policy formations (Gliedt, Hoicka, and Jackson 2018; Wanga et al. 2019). More so, support mechanisms significantly influence the extent to which DIs facilitate SE while at the same time enhancing the firm's disruptive capabilities.

Required mechanisms and structures for disruptive innovation and sustainable entrepreneurship

Extant literature shows that DIs facilitate SE activities, albeit moderated by interventions of specific institutions (Carlsson et al. 2002; Reficco et al. 2018; Ibidunni, Ufua, and Opute 2019). These institutional features include social, political/legal and economic actors, performing responsibilities in various capacities, such as strategic alliances, technological collaborations, industry support and government financing, in a synergistic manner to ensure the success of innovation efforts (Sandström, Berglund, and Magnusson 2014; Liu 2018;

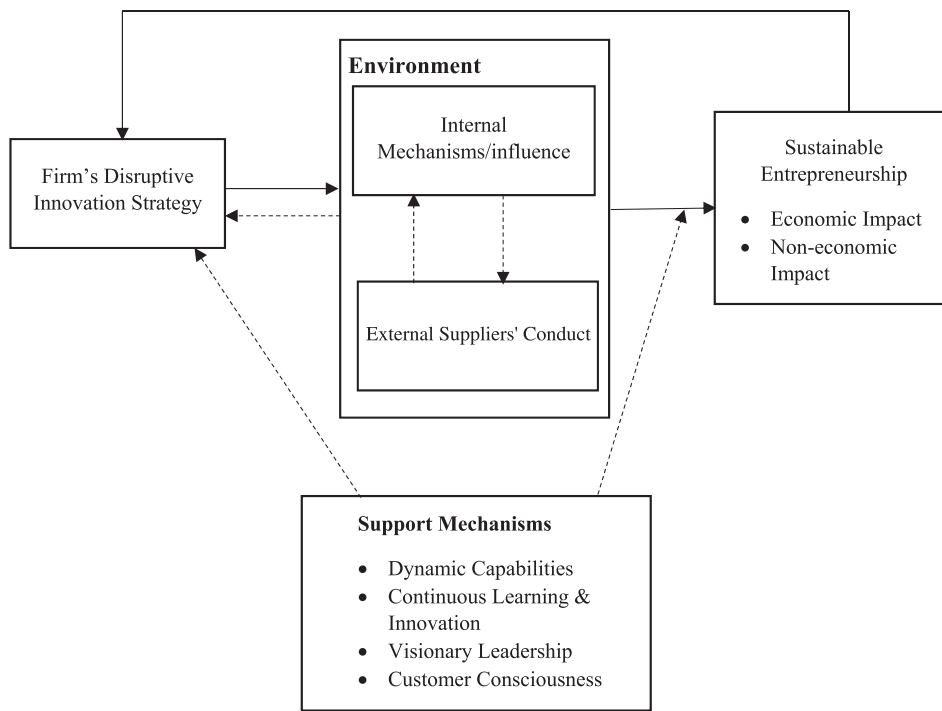


Figure 3: Disruptive innovation and sustainable entrepreneurship model.
Source: The Authors

Ibidunni et al., 2018). These mechanisms that drive DIs and SE exist within the framework of an innovation ecosystem. Innovation ecosystems are complex, interrelated, yet dynamic mechanisms that shape innovations in the industry (Schuelke-Leech 2018). Extant review of literature captured critical mechanisms of DI and SE (see Figure 4).

Networks. Firms with a disruptive focus should leverage networks, both within and outside their current industry domain, to enhance the speed and effectiveness with

which their desired disruption can happen (Öberg 2018). Networks build synergy between engineers, innovators, scientists and start-up champions for shared opportunities in the areas of mentoring, skills exploitation and professional relationships (Schuelke-Leech 2018). The role of the network of firms in an industry where DIs are highly popularized is inevitable (Osibanjo et al. 2019). Such a strong network often propels an innovation ecosystem where firms co-create and promote significant value to customers. That substance is supported by

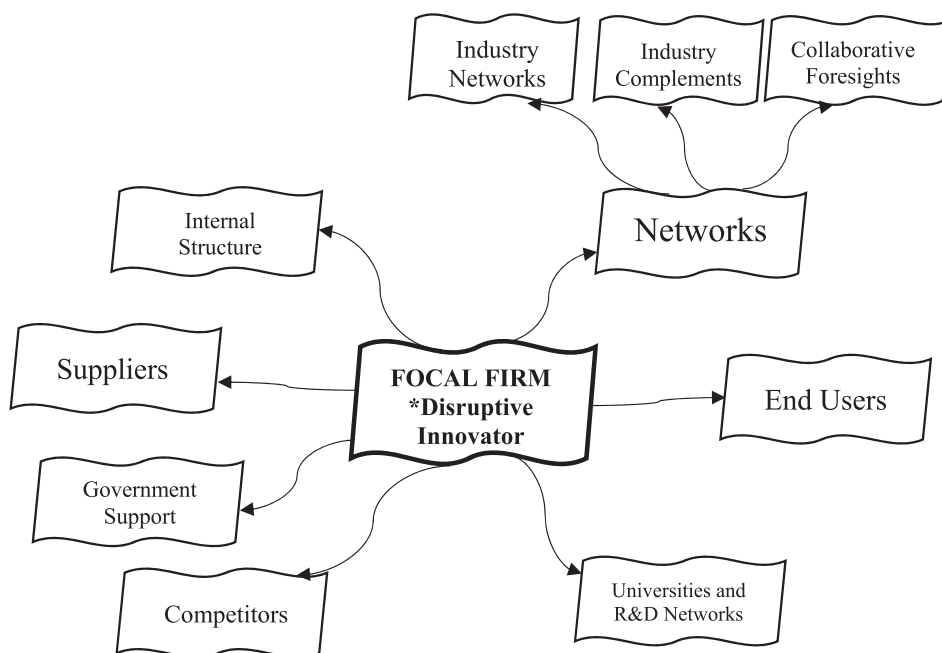


Figure 4: Mechanisms of DI and sustainable entrepreneurship.
Source: The Authors

Öberg (2018), who suggests that business networks, consisting of large and small firms that are directly and indirectly connected in a social and economic circle, and are a critical mechanism for the functionality of efficient and effective DI projects. Walrave et al. (2018) add that network of firms in DI form alliances that direct efforts towards 'ecosystems value propositions' intended to generate end-user pleasure with the innovation being offered from the network of firms while equally enhancing value for the innovation ecosystem. Consequently, each actor in the network is required to play specifically unique yet complementary functions that achieve wholesome results for customers and every actor (firm) within the network (Wiener, Gattringer, and Strehl 2018). In a network, firms should leverage the open foresight system as a mean of collaboration; for enhancing collective thinking, out-of-the-box reasoning, operating with pooled resources and innovating for the future (Heger and Boman 2015).

Industry governance. Industry governance involves co-ordinations among firms to ensure that behaviour from each firm aligns with the intended goals of inter-relationships among the firms, conflicts are speedily detected and resolved when they arise, and resource sharing is fair and effectively utilized. According to van den Broek and van Veenstra (2018), the industry governance mechanism will involve four significant arrangements: market governance, bazaar governance, hierarchy governance, and network governance. Under market governance, actors are governed by mutual contractual agreements that guide their actions. Contrary to this, the bazaar governance involves industry linkages and collaborations based on shared goals rather than formalistic contractual processes. The industry governance of hierarchical structures involves lower actors/players in the industry depending on the formal powers of their higher counterparts. On the other hand, network structures depend on highly social relationships where trust among members is the anchor for successful governance in the industry.

Government support. Government support includes regulatory controls and financial aids that serve as external rules and shockers that enhance firms' innovative performance (Curtis and Schulman 2006). A lack of consensus exists in the literature on the role of government support mechanisms on firm innovativeness; while some opine that increased government spending can facilitate innovation (Peter et al., 2018), others suggest that such effort will impede the innovativeness of firms (Zhang and Wu 2014). However, these variations in research findings may call attention to the peculiarity of contextual factors across various countries (Huego et al. 2016). Zhang and Guan (2018) opined that government support in the form of incentives, such as direct subsidies and indirect taxes, have short term and long term implications for the innovation performance of firms. The results from that study indicate that government subsidies positively affect innovation performance only within a short period but has long-term negative effects on the firm's innovativeness. The government's direct and indirect financial support have been noted to be capable of stimulating firms' interest in R&D, thus

yielding higher levels of innovations (Abisuga-Oyekunle, Patra, and Muchie 2020). More so, government regulations guide operational practice and ensure compliance with standards. However, in an innovation-driven industry/environment, over-enforcement of government regulations can have adverse effects on the growth of DIs. For example, it can result in bureaucratic processes from paper works, hence stifling the innovation process and increasing the cost associated with innovation (Hwang and Christensen 2008). Consequently, government regulations on DIs should not be too stringent.

Managerial structure. Firms that pursue a DI agenda must have the support of top management to sustain such efforts. The firm's internal structure must be such that it supports innovation and dynamism through flexible operations and the social network of firm members (Drucker 1985; Ibidunni et al. 2018). It must equally ensure that resource acquisition and distribution is a significant part of its strategy (Barney 1991; Wale-Oshinowo et al. 2018) and that the firm has a dynamic competitive strategy (Porter 1985; Uchebulam, Akinyele, and Ibidunni 2015).

Conclusion, implications and future research agenda

This study has implications for theory and practice. The implications for theory relate to establishing a research agenda for future studies, while the practical implications related to addressing a stakeholder and policy perspective to achieving higher levels of DI and SE in Nigeria (see, Ibidunni, Ufua, and Opute 2019). First, the theoretical implications are flagged, and then the implications for practice explained.

Based on an extant review of literature, this study has explained DI and flag the critical linkages of DI to SE, a theoretical premise that is of profound importance to both developed and developing economies. In aligning this body of knowledge to the Nigerian context, this study forwards a DI model that could be utilized to boost SE in a Nigerian economy that is seeking a transition from heavy reliance on oil exploration to a much more widespread economic base that taps other natural resources and diverse economic contributors. There is, however, a dearth of literature on DI in Nigeria. Consequently, there is a lack of understanding of DI practices, SE impacting propensity and associated contingencies. There are unclear frames of thoughts relating to the understanding of DI in the Nigerian context, and to contribute to knowledge development, a central objective in this paper is to galvanize future research in this area, and by so doing, impact practice (including policies that facilitate and secure SE).

Future research could seek to illuminate several critical areas regarding DI in the Nigerian context towards that target. First, future research should shed light on the nature of DI practices Nigerian firms are endorsing and why. In doing that, the product (or service)-type intricacies and industrial context implications should be explained. Also, research effort should be directed at explaining the association of DI to SE, from the point of the direct (and indirect) influence of DI and SE performance of firms. Furthermore, the role that environmental

factors play as mediator/moderator of DI and sustainable entrepreneurial performance relationship of firms should be examined. Finally, researchers could also examine the nature of support mechanisms for DIs. In that regard, two core research directions could be investigated, namely, support mechanism as an antecedent of DI and support mechanisms as mediators of DI and SE performance relationship of firms.

Disruptive innovators can reposition their firms' for SE by understanding the cultural uniqueness of the people of Nigeria, the economy in which they find themselves and the ways of doing business in that economy. This will enable them to innovate effectively by strategically offering product and (or) service packages that can satisfy the needs and wants of their customers. More so, to sustain entrepreneurship performance, practitioners must set metrics along with the spheres of economic and non-economic indicators. While much attention is often given to the economic impact of innovation, the focus on the non-economic impact of innovation, such as the social value that can be derived from DI and SE, remains largely unexplored. Consequently, SMFs in Nigeria must become more socially inclined by adopting a more strategic approach and a consciousness towards enhancing the social stance of their products and their market relevance. More specifically, the social orientation of the disruptive firm will imply adopting strategies that position human capital development as a core part of the firms' employee retention strategy. This way, the firms' knowledge stock is preserved and sustainable over time. Also, firms with such social value mindfulness disrupt through stakeholders collaboration and community engagement/empowerment. Lastly, disruptive innovators must consciously keep up-scaling efforts over the innovation value chain. Hence, they must avoid the mental state of belief that the success of the innovation depends on acceptability by customers. This is because the market is dynamic and volatile, and as shown in [Figure 1](#), disruptive products/services sometimes can grow to become a traditional product when it characterizes itself, at that growth stage, with the same characteristics of incumbent products or services. Therefore, the disruptive impact of innovation may depreciate over time. Nothing lasts forever; therefore, DI cannot have a never-ending impact, especially in today's dynamic and technology-shaped marketplace; new ideas hardly remain new for a long time.. does not always imply disruption forever. Innovation must be continuous to sustain value generation.

The study focused on DI and SE using a systematic literature review approach. A critical suggestion is implementing DI and a SE model to address the emerging structuring issues in DI practice. Among the viable arguments of this research is that disruptive efforts should align with financial expectations and social value, and other expected returns for the customers. In addition to sustaining entrepreneurship performances, this study argues that practitioners of DI must focus on critical environmental factors that influence or facilitate decisions and actions, especially concerning the customers.

Limitations of the study

The practical and theoretical implication pointed out in this study provides a direction for future research efforts. Managers of SMFs in Nigeria, and other related economies, will be guided towards a value-based implication and harness the gains that accrue from DI and SE as a strategic part of their firm's activities. Therefore, this study has advanced the theoretical premise of the DI theory, especially from a developing African economy perspective, precisely that of Nigeria. Nevertheless, this study has limitations, which may influence how the conclusions in this study can be transported to contexts beyond the theoretical premise covered in this study. Thus, there is a limitation from the point of the theoretical framing of this study. Specifically, this study focused on DI and SE. We do not claim to have considered all relevant components to understand the topic addressed in this paper. Within the theoretical framing limitation of this study, it is also essential to acknowledge that a further limitation of this study relates to the methodological approach adopted in this study. Based on the literature review, extant literature has been reviewed in carrying out this study. However, we acknowledge that further research can carry out empirical investigations, especially within emerging economies, to strengthen the theoretical arguments proposed in this study. Hence, the models presented in this present research (see [Figure 4](#)) will serve as a basis for hypothetical relationships that can explain the direct and indirect relationships among the variables.

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Authors' contributions

ASI conceived the research, developed the initial literature review, and generated the final draft. DU contributed to the literature review. PO contributed to developing the methodology.

Availability of data and material

This study did not utilize any quantitative data gathering source.

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Appendix.

Table A1: Summary of publications on DI and sustainable entrepreneurship.

S/ No	Author(s) and Year	Title	Research design	Country (-ies)	Source	Core Theme
1.	Agri et al. (2018)	Technology Innovation and Sustainable Entrepreneurship Development in Nigeria: Stakeholders’ Impact Assessment in Central Nigeria	Quantitative Survey	Nigeria	Journal of Economics, Management and Trade	Technology innovation on sustainable entrepreneurship development
2.	Ajewole et al. (2015)	Gender analysis of agricultural innovation and decision-making among rice farming households in Nigeria	Quantitative Survey	Nigeria	<i>Journal of agricultural informatics</i>	Innovation
3.	Alberti-Alhtaybat, Al-Htaybat, and Hutaibat (2019)	A knowledge management and sharing business model for dealing with disruption: The case of Aramex	Qualitative Case Study	Dubai	<i>Journal of Business Research</i>	Disruptive Technologies
4.	Alpkan and Gemici (2016)	Disruption and Ambidexterity: How innovation strategies evolve?	Conceptual	–	<i>Procedia – Social and Behavioral Sciences</i>	Evolving Innovation Strategies
5.	Arundel, Bloch, and Ferguson (2019)	Advancing innovation in the public sector: Aligning innovation measurement with policy goals.	Conceptual	–	<i>Research Policy</i>	Innovation processes and strategies in the public sector
6.	Carlsson et al. (2002)	Innovation systems: Analytical and methodological issues	Critical review of literature	–	<i>Research Policy</i>	Analytical and methodological issues arising from various innovation system
7.	Christensen, Raynor, and McDonald (2015)	What is Disruptive Innovation	Qualitative Case Study	–	Havard Business Review	Disruptive theory
8.	Christenson (1997).	The Innovator’s Dilemma: When New Technologies Cause Great Firms to Fail.	Textbook	–	Havard Business School Press, USA	Disruptive theory

(Continued)

Table A1: Continued.

S/ No	Author(s) and Year	Title	Research design	Country (-ies)	Source	Core Theme
9.	Corsi and Di Minin (2014)	Disruptive innovation... in reverse: Adding a geographical dimension to DI theory	Critical review of literature	–	<i>Creativity and Innovation Management</i>	Disruptive innovation and Reverse innovation
10.	Curtis and Schulman (2006)	Overregulation of Health Care: Musings on Disruptive Innovation Theory	Theoretical paper	–	<i>Law and Contemporary Problems</i>	Application of DI theory in healthcare
11.	Dana and Ratten (2017)	International entrepreneurship in resource-rich landlocked African countries	Theoretical paper	Botswana, Zambia, and Zimbabwe	<i>Journal of International Entrepreneurship</i>	International entrepreneurship in Africa
12.	Danneels (2004)	Disruptive technology reconsidered: a critique and research agenda	Theoretical paper	–	<i>Journal of Product Innovation & Management</i>	Disruptive technology
13.	David-West, Iheanachor, and Umukoro (2019)	Mobile money as a frugal innovation for the bottom of the pyramid – Cases of selected African countries	Multiple case study	Tanzania, Uganda, Kenya, Zambia, Nigeria, Ghana and Gabon	<i>Africa Journal of Management</i>	social innovation, technological innovation, and institutional innovation
14.	Dean and McMullen (2007)	Toward a theory of sustainable entrepreneurship: reducing environmental degradation through entrepreneurial action	Critical review of literature	–	<i>Journal of Business Venturing</i>	Entrepreneurship within the context of environmental problems of global socio-economic systems
15.	Doh and Arcs (2010)	Innovation and Social Capital: A Cross-Country Investigation	Quantitative	US and Europe	<i>Industry and Innovation</i>	Social capital and innovation
16.	Drucker (1985)	Innovation and Entrepreneurship: Practice and Principles	Textbook	–	Harper & Row, New York, NY	Sustainable Entrepreneurship
17.	Eckhard and Shane (2003)	Opportunities and Entrepreneurship	Theoretical paper	–	<i>Journal of Management</i>	Entrepreneurship through opportunities
18.	Flor, Cooper, and Oltra (2018)	External knowledge search, absorptive capacity and radical innovation in high-technology firms.	Quantitative	Spain	<i>European Management Journal</i>	Effect of open innovation and absorptive capacity on a firm's radical innovation
19.	Foss and Saebi (2017).	Fifteen years of research on business model innovation: how far have we come, and where should we go?	Systematic review	–	<i>Journal of Management</i>	Evolving business model innovation
20.	Galdino et al. (2018).	The Informal Economy in pan-Africa: Review of the Literature, Themes, Questions, and Directions for Management Research.	Systematic review	–	<i>Africa Journal of Management</i>	Pan-Africa's informal economy
21.	Gliedt, Hoicka, and Jackson (2018).	Innovation intermediaries accelerating environmental sustainability transitions.	Systematic review	–	<i>Journal of Cleaner Production</i>	The role of innovation intermediaries in promoting technological innovations
22.	Habtay (2012).	A Firm-Level Analysis on the Relative Difference between Technology-Driven and Market-Driven Disruptive Business Model Innovations.	Multiple case study	South Africa	<i>Creativity and Innovation Management</i>	Relative disruptiveness potential between technology-driven and market-driven innovations

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Table A1: Continued.

S/ No	Author(s) and Year	Title	Research design	Country (-ies)	Source	Core Theme
23.	Hall and Martin (2005).	Disruptive technologies, stakeholders and the innovation value-added chain: a framework for evaluating radical technology development.	Theoretical paper	–	<i>R&D Management</i>	Disruptive innovation amidst social and organizational uncertainties
24.	Hang, Garnsey, and Ruan (2015).	Opportunities for disruption.	Multiple case study	China, India and EU	<i>Technovation</i>	Opportunity generation in DI
25.	Hang, Chen, and Subramian (2010).	Developing Disruptive Products for Emerging Economies: Lessons from Asian Cases.	Multiple case study	India and China	<i>Research-Technology Management</i>	Disruptive products
26.	Heger and Boman (2015).	Networked foresight – the case of EIT ICT Labs.	Interviews and email survey	EU	<i>Technological Forecasting & Social Change</i>	foresight conducted in innovation networks
27.	Hockerts and Wüstenhagen (2010).	Greening Goliaths versus emerging Davids – Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship.	Theoretical paper	–	<i>Journal of Business Venturing</i>	Sustainable entrepreneurship
28.	Hopp et al. (2018).	Disruptive innovation: conceptual foundations, empirical evidence, and research opportunities in the digital age.	Editorial	–	<i>Journal of Product Innovation Management</i>	Disruptive innovation
29.	Hwang and Christensen (2008).	Disruptive Innovation In Health Care Delivery: A Framework For Business-Model Innovation.	Theoretical paper	–	<i>Health Affairs</i>	Disruptive innovation and innovative business models
30.	Ibidunni et al. (2018a).	Moderating Effect of Entrepreneurial Orientation on Entrepreneurial Competencies and Performance of Agro-based SMEs.	Quantitative	Nigeria	<i>International Journal of Entrepreneurship</i>	Sustainable entrepreneurship
31.	Kamolsook, Yuosre, and Björn (2018).	Consumers' switching to disruptive technology products: The roles of comparative economic value and technology type.	Quantitative	Bangkok	<i>Technological Forecasting & Social Change</i>	Consumer preferences in disruptive technologies
32.	Kasmirea, Korhonenb, and Nikolic (2012).	How radical is a radical innovation? An outline for a computational approach.	Theoretical paper	–	<i>Energy Procedia</i>	Agent based models of innovation
33.	Keszezy and Biemans (2016).	Sales–marketing encroachment effects on innovation.	Quantitative	Hungary	<i>Journal of Business Research</i>	Encroachments and new product development
34.	Kilkki et al. (2018).	A disruption framework.	Multiple case study	–	<i>Technological Forecasting & Social Change</i>	Industry-level disruptions
35.	King and Baartartogtokh (2015).	How useful is the theory of DI?	Multiple case study	–	<i>MIT Sloan Management Review</i>	Industry-level applicability of DI theory
36.	Kuratko, Covin, and Garret (2009).	Corporate Venturing: insights from actual performance.	Quantitative	United States	<i>Business horizons</i>	Corporate entrepreneurship
37.	Laurell and Sandström (2018).	Comparing coverage of disruptive change in social and traditional media: Evidence from the sharing economy.	Content Analysis	–	<i>Technological Forecasting & Social Change</i>	Differences between social media and traditional media in DIs

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Table A1: Continued.

S/ No	Author(s) and Year	Title	Research design	Country (-ies)	Source	Core Theme
38.	Li et al. (2010).	The influencing factors of DI in China's high-tech SMEs: A case study.	Case Study	–	IEEE International Conference on Management of Innovation & Technology	Factors influencing DI
39.	Lia, Porter, and Suominen (2018).	Insights into relationships between disruptive technology/innovation and emerging technology: A bibliometric perspective.	Bibliometric method	–	<i>Technological Forecasting & Social Change</i>	interplay of technological emergence, disruption, and innovation
40.	Liu (2018).	The philosophical views of national innovation system: The LED industry in Taiwan.	Qualitative case study	Taiwan	<i>Asia Pacific Management Review</i>	Macro-level innovation
41.	Lucas (2019).	Exploring the role of context in motivating entrepreneurial behaviours: the motivations of migrant entrepreneurs in the Republic of Ireland and Northern Ireland.	Exploratory research	Republic of Ireland and Northern Ireland	<i>International Journal of Entrepreneurship and Innovation Management</i>	The importance of internal characteristics as drivers of entrepreneurial motivation
42.	Lui, Ngai, and Lo (2016).	Disruptive information technology innovations and the cost of equity capital: The moderating effect of CEO incentives and institutional pressures.	Quantitative	USA	<i>Information & Management</i>	Disruptive information technology (IT) innovations
43.	Lyytinen (2003).	The disruptive nature of information technology innovations: the case of Internet computing in systems development organizations	Semi-structured Interviews	USA and Finland	<i>MIS Quarterly</i>	Disruptive information technology (IT) innovations
44.	Mahto, Belousova, and Ahluwalia (2018).	Abundance – A new window on how DI occurs	Theoretical paper	–	<i>Technological Forecasting & Social Change</i>	Disruptive innovation in a resource-constrained environment
45.	Markides (2006).	Disruptive Innovation, in need of better theory.	Theoretical paper	–	<i>Journal of product innovation management</i>	Disruptive innovations within the contexts of business-model innovations and radical (new-to-the-world) product innovations
46.	Martínez-Pérez, Elche, and García-Villaverde (2019).	From diversity of interorganizational relationships to radical innovation in tourism destination: The role of knowledge exploration.	Quantitative	Spain	<i>Journal of Destination Marketing & Management</i>	Radical innovation through interorganizational knowledge sharing
47.	Muninger, Hammedi, and Mahr (2019).	The value of social media for innovation: A capability perspective.	Qualitative	Western Europe and the United States	<i>Journal of Business Research</i>	Firm capabilities that are required for building innovations through social media
48.	Nagy, Schuessler, and Dubinsky (2016).	Defining and identifying DIs.	Theoretical paper	–	<i>Industrial Marketing Management</i>	Redefining DIs through use of innovation adoption characteristics
49.	Ndemo and Weiss (2017).	Making Sense of Africa's Emerging Digital Transformation and its Many Futures.	Theoretical Paper	–	<i>Africa Journal of Management</i>	Elaborated on the multiple environments that digital technologies are embedded in and the multidimensional change processes they need to ignite

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Table A1: Continued.

S/ No	Author(s) and Year	Title	Research design	Country (-ies)	Source	Core Theme
50.	Nogami and Veloso (2017).	Disruptive innovation in low-income contexts: challenges and state-of-the-art national research in marketing.	Theoretical Paper	–	<i>RAI Revista de Administração e Inovação</i>	Analyzing DI theory in low-income markets
51.	Öberg (2018).	The role of business networks for innovation.	Multiple case study	–	<i>Journal of Innovation & Knowledge</i>	Types and consequences of business networks to innovations
52.	Odikayor et al. (2012).	Dual-SIM Phones: A Disruptive Technology?	Case study	Nigeria	In: Ekwewe, N. & Islam, N. <i>Disruptive Technologies, Innovation and Global Redesign: Emerging Implications.</i> IGI Global, USA	Disruptive technology and Entrepreneurship
53.	Paap and Katz (2004).	Anticipating Disruptive Innovation.	Multiple case study	–	<i>Research-Technology Management</i>	Disruptive and sustaining innovations
54.	Petrick and Martinelli (2012).	Driving Disruptive Innovation: Problem Finding and Strategy Setting in an Uncertain World.	Multiple Case Study	USA	<i>Research-Technology Management</i>	Disruptive innovation
55.	Petzold, Landinez, and Baaken (2019).	Disruptive innovation from a process view: A systematic literature review.	Systematic Literature Review	–	<i>Creativity and Innovation Management</i>	Disruptive innovation
56.	Raffaelli, Glynn, and Tushman (2019).	Frame flexibility: The role of cognitive and emotional framing in innovation adoption by incumbent firms.	Theoretical	–	<i>Strategic Management Journal</i>	Innovation
57.	Reficco et al. (2018).	Collaboration mechanisms for sustainable innovation.	Multiple Case Study	–	<i>Journal of Cleaner Production</i>	Sustainable Innovation
58.	Reinhardt, Gurtner, and Griffin (2018).	Towards an adaptive framework of low-end innovation capability – A systematic review and multiple case study analysis.	Systematic review and multiple case study analysis	–	<i>Long Range Planning</i>	Innovation
59.	Remane et al. (2017).	The business model pattern database – a tool for systematic business model innovation.	Systematic review	–	<i>International Journal of Innovation Management</i>	Innovation
60.	Roy (2018).	Role of relevant lead users of mainstream product in the emergence of DI.	Qualitative	–	<i>Technological Forecasting & Social Change</i>	Disruptive innovation
61.	Sandström, Berglund, and Magnusson (2014).	Symmetric Assumptions in the Theory of Disruptive Innovation: Theoretical and Managerial Implications.	Theoretical paper	–	<i>Creativity and Innovation Management</i>	Disruptive innovation
62.	Santonen and Julin (2019).	How Transnational Living Labs Can Help SMEs To Internationalise.	Semi-structured Interviews	Baltic Sea Regions	<i>International Journal of Innovation Management</i>	Sustainable Entrepreneurship
63.	Schmidt and Druehl (2008).	When is a DI disruptive?	Theoretical paper	–	<i>Journal of Product Innovation Management</i>	Disruptive Innovation
64.	Schuelke-Leech (2018).	A model for understanding the orders of magnitude of disruptive technologies.	Theoretical paper	–	<i>Technological Forecasting & Social Change</i>	Disruptive technologies
65.	Stam (2009).	When does community participation enhance the performance of open source software companies?	Quantitative	Netherlands	<i>Research Policy</i>	Innovation

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Table A1: Continued.

S/ No	Author(s) and Year	Title	Research design	Country (-ies)	Source	Core Theme
66.	Summerer (2012).	Evaluating research for DI in the space sector.	Multiple Case Study	–	<i>Acta Astronautica</i>	Disruptive Innovation
67.	Thomond and Lettice (2002).	Disruptive innovation explored.	Theoretical paper	–	Cranfield University, Cranfield, England. Presented at: 9th IPSE International Conference on Concurrent Engineering: Research and Applications (CE2002)	Disruptive Innovation
68.	Tidd and Bessant (2018).	Innovation management challenges: From fads to fundamentals.	Theoretical paper	–	<i>International Journal of Innovation Management</i>	Innovation
69.	Tushman (1997).	Winning through innovation.	Theoretical paper	–	<i>Strategy & Leadership</i>	Innovation
70.	van den Broek and van Veenstra (2018).	Governance of big data collaborations: How to balance regulatory compliance and DI.	Multiple case study	Netherlands	<i>Technological Forecasting & Social Change</i>	Disruptive Innovation
71.	Vecchiato (2017).	Disruptive innovation, managerial cognition, and technology competition outcomes.	Multiple case study	–	<i>Technological Forecasting & Social Change</i>	Disruptive Technologies
72.	Walrave et al. (2018).	A multi-level perspective on innovation ecosystems for path-breaking Innovation.	Theoretical paper	–	<i>Technological Forecasting & Social Change</i>	Disruptive Innovation
73.	Wan, Williamson, and Yin (2015).	Antecedents and implications of DI: Evidence from China.	Multiple Case Studies	China	<i>Technovation</i>	Disruptive Innovation
74.	Wanga et al. (2019).	Uncertain environment, dynamic innovation capabilities and innovation strategies: A case study on Qihoo 360.	Case study	–	<i>Computers in Human Behavior</i>	Disruptive Innovation
75.	Wiener, Gattringer, and Strehl (2018).	Collaborative open foresight – A new approach for inspiring discontinuous and sustainability-oriented innovations.	Multiple Case Studies	–	<i>Technological Forecasting & Social Change</i>	Disruptive Innovation
76.	Wolf and Redford (2019).	Fostering entrepreneurship for innovation in African Banks' subsidiaries	Qualitative	Nairobi	<i>Africa Journal of Management</i>	Sustainable Entrepreneurship
77.	You, Zhang, and Yuan (2019).	Environmental regulation and firm eco-innovation: Evidence of moderating effects of fiscal decentralization and political competition from listed Chinese industrial companies.	Quantitative	China	<i>Journal of Cleaner Production</i>	Innovation
78.	Yu and Hang (2010).	A Reflective Review of Disruptive Innovation Theory.	Systematic Literature Review	–	<i>International Journal of Management Review</i>	Disruptive Innovation
79.	Yuliani (2018)	Disruptive innovation and the creation of social capital in Indonesia's urban communities.	Case Study	Indonesia	<i>Asia Pacific Business Review</i>	Disruptive Innovation
80.	Zhang and Guan (2018).	The time-varying impacts of government incentives on innovation.	Quantitative	China	<i>Technological Forecasting & Social Change</i>	Innovation