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Disruptive Innovation at the Base-of-the-Pyramid: Negotiating the Missing Links

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Abstract: The disruptive innovation framework has become a topical issue in recent years. Despite its popularity, as well as the perceived strategic advantages it bestows on entrant firms, little is known about the disruptive innovation capability of new-technology-based firms (NTBFs) in the South African context. This article explores the contextual factors that influence disruptive innovation capability in South Africa's base-of-the-pyramid (BoP) environment and how, given the specifics of this operating environment, entrepreneurs strategize for disruptive innovation capability. Following the development of a conceptual framework, we used a grounded theory approach to conduct in-depth interviews with purposefully selected stakeholders in the NTBF incubation sector. Our findings show that South Africa has the catalytic socio-economic dynamics to encourage the development of disruptive innovations. However, despite having fairly robust institutions in the entrepreneurial ecosystem, these fall short of enabling the innovation capability of NTBFs, owing to the poor-quality linkages between and among institutions within the ecosystem. On the strength of these findings, we synthesised a framework of disruptive innovation capability in BoP environments that highlights the contextual factors that influence disruptive innovation capability. Specifically, we demonstrate how the quality of linkages in the entrepreneurial ecosystem influences the innovation outcomes for innovators.

Keywords: base-of-the-pyramid (BoP); disruptive innovations; resource-constrained innovations; national systems of innovation (NSI); new technology-based firm (NTBF); emerging economies; grounded theory



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1. Introduction

Faced with a low-growth economy and a high unemployment rate, entrepreneurship and small business development are often seen as the panacea for economic growth and employment creation by the South African government [1]. Yet, in South Africa most small, medium, and micro enterprises (SMMEs) do not survive in the long term. The global average for small businesses succeeding past the 3 $\frac{1}{2}$ year mark is 7.6%. In contrast, only 2.1% of new ventures in South Africa succeed past this milestone [2]. In 2020, the Global Entrepreneurship Monitor (GEM) Report reported that the survival rates of new enterprises in South Africa continued to be below that of other countries at similar levels of economic development [3].

Alvarez and Barney [4] argue that entrepreneurship is not created equal regarding growth outcomes and poverty alleviation. Therefore, policy emphasis in most developing countries has shifted to so-called 'gazelles', fast-growing, innovative, and typically technology-based entrepreneurs who provide better economic outcomes compared to subsistence entrepreneurs [5]. It has become essential to find the appropriate formulations that can encourage the growth of these fast-growing new businesses in emerging economy contexts to stimulate growth and employment and improve standards of living. As a result, the applicability of the disruptive innovation framework to base-of-the-pyramid (BoP)

environments, with its emphasis on expanding low-end markets and creating new markets, has garnered increased scholarly attention in recent years [6,7].

South Africa is the third largest economy in Africa and one of the most technologically advanced. However, the income divide in the country remains wide, compounded by high unemployment rates [8]. Government policies such as the National Development Plan [1] and the Broad-Based Economic Empowerment Act [9] often focus on economic inclusion and employment creation. As a result, the South African small business ecosystem has strong support from various ministries such as the Department of Small Business Development; Department of Trade, Industry and Competition; agencies such as the Industrial Development Corporation of South Africa (IDC); the Small Enterprises Development Agency (SEDA); the Small Enterprises Funding Agency (SEFA); a myriad of government-funded incubation agencies; and small business development initiatives such as the government's Enterprise and Supplier Development Programme. Despite this strong support, a study by Prashantham and Yip [10] that compared start-up outcomes in three emerging economies found that South Africa performed relatively poorly compared to China and India in fostering mass entrepreneurship and successful new businesses.

The Disruptive Innovation Framework

As both an innovation type and innovation strategy, the disruptive innovation framework has been suggested as the answer to the growth imperative that most small enterprises and start-ups face in their formative years [11–13]. Disruptive innovations have been defined as products, services, or business models that create a new market or enter from the bottom of an existing market. This is as incumbent businesses focus on improving their products or services to cater for their most demanding and profitable mainstream customers with sustaining innovations [14,15]. In this process of disruption, a start-up with fewer resources may successfully challenge established and larger competitors in a market to eventually upset the status quo of an industry [11,16].

On the innovation continuum, the contrasting innovation type to a disruptive innovation is called a sustaining innovation. The disruptive innovation framework highlights how incumbent firms eventually lose market share by focussing on improving their products and services to satisfy their most demanding customers with sustaining innovations [16]. Sustaining innovations improve products along the dimensions valued by the organisation's current target market. The cycles of continual improvement result in these products and services eventually exceeding the performance requirements of some customer segments while at the same time ignoring the needs of others, usually the lower end and least profitable customer segments [13,17]. This market overshoot creates a gap in the market that new entrants can exploit to gain a foothold in the market by introducing simpler and more affordable products that appeal to cost-sensitive consumers. In this instance, the source of disruption is a low-cost business model [17,18]. Driven by a profit imperative, disruptive entrants typically improve their products and services until their quality and performance intersect with the quality demanded by the mainstream market. When entrants start gaining market share from the incumbents' target market, then disruption is said to have occurred [11].

A new-market disruption presents a unique value proposition by introducing an aspect of performance along which products did not previously compete. Value is created by competing against non-consumption [15]. For example, in Africa, due to numerous infrastructural challenges, including a lack of basic services such as electricity and running water, entrepreneurs often must compete against the otherwise non-consumption of these services by providing products such as 'pay-as-you-go' solar energy and household cleaning products [19,20]. With the focus on catering to low-end and completely new markets at inception, disruptive innovations have been found to combine sustainable organisational growth with social responsibility [21,22], an ideal strategic combination for businesses operating in BoP environments.

A disruptive innovation capability can be defined as the firm's ability to leverage external and internal resources and competences to seek and exploit opportunities presenting in new, underserved, and overlooked market segments for competitive advantage through transforming knowledge and ideas into competitively viable disruptive innovations. Due to the focus on low-cost business models and unserved new markets, disruptive-innovation-based entrepreneurship has increasingly been seen as a strategic means of accomplishing sustainable innovation-driven growth in low-income environments [6].

The bottom- or base-of-the-pyramid is an economic term first conceptualised by Prahalad and Hart [23] in reference to the over four billion low-income consumers worldwide who survive on less than USD 2 per day. While every country in the world has a BoP population, by far the largest concentrations of BoP consumers are found in developing and emerging economies [24]. The seminal work by Prahalad and Hart [24] has since opened a new stream of scholarly enquiry on innovating in resource-constrained environments to cater for the needs and wants of low-income consumers who mostly reside in environments with significant resource and institutional challenges [25–29]. The BoP concept is a model of development that brings in low-income consumers, who have often been underserved, from the fringes into new networks of inclusive capitalism [19,30,31].

Scholars theorise that the continued rise in fortunes of emerging economies with their large BoP populations has made emerging markets ideal environments for disruptive innovations [17,21,32,33]. Yet, there is limited research available on disruptive innovations in the context of emerging economies [6,34]. Additionally, most published studies on disruptive innovations in emerging economies have largely focused on investigations of India and China [21,35–37], with regions such as Africa and Latin America receiving little attention [24,38]. Therefore, while the disruptive innovation framework has been lauded as enhancing entrepreneurial outcomes, particularly of technology-based entrepreneurs, in BoP environments [6,17,20,22], it is not clear whether and how disruptive processes are occurring in other BoP dominant economies outside India and China. Resultingly, very little is understood about the contextual factors that encourage the emergence of disruptive innovations in the South African operating environment. Our paper fills this gap and explores the contextual factors that influence disruptive innovation capability in South Africa's BoP environment and how, given the specifics of this operating environment, entrepreneurs organise for disruptive innovation capability. We found it worthwhile to study these dynamics to enhance the understanding of how institutional and other external factors enable or constrain the development of relevant and contextualised disruptive innovations in differently configured emerging economy environments.

The rest of the paper is structured as follows: the next section presents the theoretical perspectives of innovating in resource-constrained environments, entrepreneurial market entry, and the national systems of innovation literature. A conceptual framework is then developed on the basis of these theories. The section following describes the research setting and presents the methodology employed in the study. In the next section, the findings of the study are presented, and their implications are discussed. This leads to the development of a framework of disruptive innovation capability in BoP environments. The paper is then concluded.

2. Theoretical Perspectives and Conceptual Framework

To fully understand the contextual factors that influence disruptive innovation capability in BoP environments, we drew insights from the literature on innovating in resource-constrained environments, the disruptive innovation framework and its implications on entrepreneurial market entry, and the national systems of innovation (NSI) framework.

2.1. *Innovating in Resource-Constrained Environments*

Resource-constrained innovations are conceived under conditions of scarcity with an emphasis on the large BoP populations in emerging economies. They typically possess a no-frills structure as they are developed for consumers with low disposable incomes [29].

The lower prices resulting from low-cost innovations are essential to unlock the mass market segment of BoP consumers with limited disposable incomes in most emerging economies. BoP consumers have traditionally been underserved by mainstream business due to the condescending assumption that the low-income market segment did not need products and services beyond basic necessities [30]. As a result, the BoP is often served by small businesses that are mostly informal and unorganised, leading to uncompetitive and potentially dysfunctional markets [10,30].

Frugal innovation has become the umbrella term for various types of resource-constrained innovations [31], including frugal engineering [39], BoP innovations [24,30], cost innovations [40], grassroots/jugaad/bricolage and Gandhian innovations [41,42], and disruptive innovations [25,43].

Cost innovations typically gain market share through price competitiveness. However, they are usually dependent on lower factor costs, such as cheaper labour and raw materials, which can be eroded over time. Furthermore, competing on price alone is risky because it is a source of advantage that can be easily imitated by competitors leading to the commodification of goods sold. Bricolage, with its improvisational use of materials at hand [42], suggests a non-structured approach to innovation and doing business, which is typical in subsistence entrepreneurs. While these types of micro-entrepreneurs may help their own families out of poverty, their businesses are usually not scalable, do not become fully competitive, and thus do not grow the economy or create employment [4,44].

Frugal engineering involves technological re-engineering that may require higher investments in research and development. Technological re-engineering calls for increased financial resources that start-ups in emerging economy environments do not usually have access to. This may be why most examples of frugal engineering cited in the literature, such as the Tata Nano car, GE's Logiq Book portable ultrasound machine and the ChotuKool mini-refrigerator by Boyce and Godrej, were introduced by large, diversified corporations operating in BoP environments [28,43,45].

We argue that disruption is a practical strategy and innovation outcome for new entrepreneurs to employ for competitively innovating in BoP environments [46]. Disruptive-innovation-based entrepreneurship implies a strategic focus on competitively innovating in low-income environments by initially focussing on a low-end or niche market that is overlooked by incumbent firms with good enough but affordable products and services. Buoyed by a unique business model and enabling technology, disruptive innovations arguably become more competitive over time, thereby improving the chances of survival for small local innovators in low-income environments. Additionally, by focussing on innovation (business model innovation, for example), rather than invention [47], disruptive innovations do not require large outlays of resources at inception. This makes disruptive innovation a useful innovation type in low-income environments.

2.2. *The Disruptive Innovation Framework and Entrepreneurial Market Entry*

The disruptive innovation framework argues that entrants succeed with disruptive innovations as they follow an atypical trajectory from the fringe, low-end markets that are the least profitable market segments for incumbents. Disruptive innovations emphasise creating new markets from non-consuming occasions and expanding low-end market capacity. The changes to product design and business models inherent in the disruptive innovation framework can lower costs and provide BoP entrepreneurs with opportunities and incentives to develop low-cost innovations that target an underserved or un-served BoP populace. As Wan et al. [48] contend, the disruptive innovation framework applied to emerging markets also increases the chances of business survival by focussing business strategies and concepts on the largest consumer market in these markets.

Christensen et al. [10] assert that when entering a market, entrepreneurs are faced with a strategic choice, that is, whether to take a sustaining path or a disruptive path. In his seminal work on the disk drive industry, Christensen [49] found that during the period 1956 to 1992, only 6% of new entrants who entered the industry with a sustaining innovation

flourished compared to 37% of disruptive entrants. This is likely because market leaders often lack the motivation to defend their least profitable customer segments [50]. This gives new companies entering a market on a disruptive trajectory the advantage of time. Time to grow and perfect their business processes before larger incumbents become interested in the market segment in which they are operating.

Markman and Waldron [51] found that micro-entrants in an industry dominated by large incumbents succeed when they either solidify the incumbents' position by offering complementary products or when they target small niche markets that are insignificant to incumbents. Therefore, paradoxically, small entrants who seem highly vulnerable due to their lack of resources seem to be better able to survive market entry. Their lack of resources, experience, and perceived lack of legitimacy gives the advantage of low competitive visibility [51,52]. A high degree of similarity with incumbent offerings or business models was found to result in high competitive visibility in the market and elicit a corresponding competitive response from incumbents [8]. Entrepreneurs are, therefore, advised to search for opportunities that are disruptive to incumbents in the target market by targeting low-end markets or targeting non-consumption and creating new markets [50].

2.3. National Systems of Innovation Framework

NSI literature suggests that national and geographic settings in which businesses operate have a significant impact on how individual entrepreneurs behave and how ventures perform [53–56]. Entrepreneurs learn and gain knowledge through their efforts and spillovers from their external environment. This occurs through knowledge flows and interactions with other market actors and institutions. This concept closely parallels open innovation literature that highlights that supportive public policy that creates favourable environments for knowledge transfer and sharing are necessary for the development and sustainability of innovative SMMEs within ecosystems [57,58]. Open innovation involves purposefully managing knowledge inflows and outflows across organisational boundaries for improved innovation performance [59–61].

The NSI framework is built on the premise that national economies vary in terms of economic organisation and institutional relationships. These differences create advantages or disadvantages for the businesses operating within these environments in terms of business processes and innovation outcomes [62]. Autio et al. [63] argue that the contextual features that affect entrepreneurial innovation are an under-researched theme in the existing literature. Entrepreneurship literature has tended to focus on the characteristics of individual entrepreneurs and entrepreneurial teams while ignoring how the context in which they operate affects their behaviour and activities.

Liu [64] notes that innovation systems in developing countries are more fragmented than those of developed economies, with some components being highly developed and others being poorly developed or missing. This results in institutional environments that are considered unfavourable to SMME sustainability [65,66]. Context is important to how entrepreneurs innovate in a particular environment by influencing their behaviour; information available to them; choices available; and, consequently, performance outcomes for their businesses [63,67]. We found the NSI approach to be a useful lens for assessing the contextual factors that influence the disruptive innovation capability of South African new-technology-based firms (NTBFs).

On the basis of an extensive review of the literature on disruptive innovations, innovating in resource-constrained environments, and national systems of innovation, several propositions were formulated on the contextual factors that influence disruptive innovation capability in BoP environments [46]. The developed propositions are articulated in Table 1.

Table 1. Study propositions.

Category of Investigation	Proposition Number	Proposition
(a) Drivers/enablers of disruptive innovation capability	1	Social and demographic changes, as well as consumer trends in BoP environments, influence the ability of NTBFs to develop a disruptive innovation capability.
	2	Commercial success with a disruptive innovation depends on the rate of adoption of the innovation by the target market.
(b) Entrepreneurial ecosystem	3	A robust entrepreneurial ecosystem in terms of enabling policies, funding, supporting institutions, and knowledge transfers facilitates the disruptive innovation capability of NTBFs in BoP environments.

The propositions in Table 1 informed a preliminary framework of the contextual determinants of disruptive innovation capability in BoP environments, as shown in Figure 1.

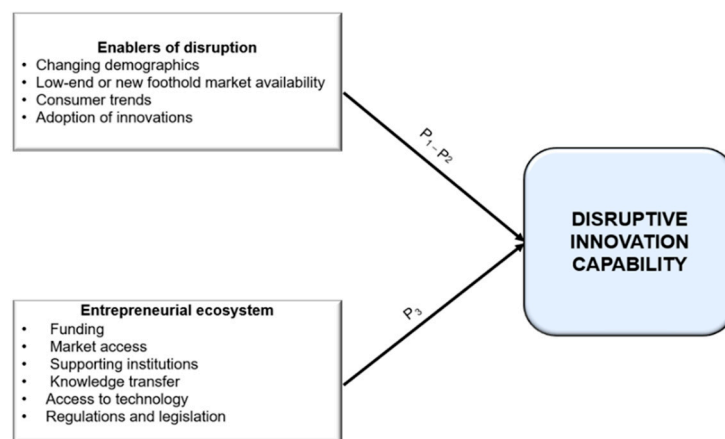


Figure 1. Conceptual framework of contextual determinants of disruptive innovation capability in BoP environments.

The conceptual framework highlights how enablers of disruptive innovation such as foothold market availability, consumer trends, and the adoption of innovations interact with other factors in the contextual environment and entrepreneurial ecosystem to influence the disruptive innovation capability of NTBFs in the South African BoP environment.

3. Research Setting and Methods

The research setting for the study was The Innovation Hub Management Company (TIHMC), also referred to as the Innovation Hub. The Innovation Hub is a subsidiary of the Gauteng Growth and Development Agency under the Department of Economic Development of the Gauteng provincial government. Gauteng Province is a highly urbanised economic hub in South Africa, contributing 35% of gross domestic product and providing 42% of national employment [68]. The Innovation Hub is an incubator that has created and fostered innovative enterprises and start-ups for nearly 20 years. The incubator offers several start-up incubation programmes in the smart economy, bio-economy, and green economy sectors. The incubated start-ups are assisted with advisory services, business and enterprise development skills, market access, infrastructure and networking, and funding opportunities.

This study focussed on the eKasiLabs and BioPark programmes of The Innovation Hub. The eKasiLabs incubation programme offers business development support to innovative start-ups in various low-income township areas in The Innovation Hub’s priority sectors such as smart industries and the creative economy. Therefore, the eKasiLabs programme suited the requirements of this research, owing to its emphasis on technology

entrepreneurship in low-income environments. The BioPark programme focusses on start-ups in the health, agriculture, and industrial biotechnology sectors. Start-ups incubated in the BioPark programme use technology to offer novel value-addition to both low-end and new markets.

Individuals were selected to participate in the study on the basis of their involvement in a technology-based start-up, through their participation as a founder, in an advisory role, or in an ecosystem support role. The biographical information of the 20 participants can be found in Table 2.

Table 2. Demographic profile of participants.

Category	Sub-Category	Total Number of Interviewees
Gender	Male	16
	Female	4
Interviewee type	Start-up founder	11
	Business mentor	6
	Industry expert	3
Age group	≤29 years	4
	30–39 years	6
	40–49 years	7
	50–59 years	3
Highest level of education	Matric	3
	Post-matric certificate/diploma	1
	Undergraduate degree	6
	Postgraduate degree	10
Start-ups by industry sector = 11	Manufacturing	1
	Business services	4
	Engineering	2
	Agriculture	2
	Healthcare	2

Overview of the Research Process

The research purpose was largely exploratory, and thus the study lent itself to a qualitative methodology. Qualitative methods emphasise the discovery and interpretation of meanings from the experiences and perceptions of study participants [69]. This study used a grounded theory approach [70], which is a multistage process that generates a substantive explanation or theory of a process, action, or interaction from qualitative data [71,72].

Theory development was abductive. Abduction is a means of inferencing that assists researchers in reaching new insights in a manner that is logical and methodical by employing both inductive and deductive reasoning to construct an explanation of the phenomenon under study [73]. Abductive inference is a common form of reasoning in the grounded theory tradition [74], where a cyclical procedure is utilised to move from theory, data collection, and interpretation of data, whilst constantly comparing new data to previously collected data and sorting it into categories and themes. In this manner, a theory that explains the collected data and makes it comprehensible gradually emerges [73]. For this study, a preliminary conceptual framework was initially developed inductively from a review of existing literature. Data were then collected from the study participants in the form of in-depth interviews to inductively inform an emerging provisional theory. The emergent theory was deductively tested through further interviews with new participants in a manner of iterative constant comparison [70] to develop a theoretical framework of the disruptive innovation process in BoP environments.

Data were collected through 20 in-depth interviews with selected start-up founders, business mentors, and industry experts over three months. Three distinct groups of respondents were interviewed to facilitate a range of views and enable a holistic examination of the phenomenon. An interview protocol with a series of open-ended questions, with some probes, was developed on the basis of the study's research questions (Appendix A). While the interview guide used pre-formulated questions as a guide, there was no strict adherence to them, allowing for flexibility during the data collection process as new questions and meaningful insights could be easily accommodated into the interview as they arose. Given the multiplicity of views and definitions of disruptive innovations found, particularly in popular media, participants needed to understand the definition of a disruptive innovation being employed in this study. This was discussed with the participants before any interview questions were posed to them.

Consistent with a grounded theory methodology, this study used theoretical sampling that initially employs purposive, non-probability sampling to select the study participants [75]. Sampling initially proceeded on a judgemental basis where study participants were selected on the basis of their perceived knowledge of the phenomenon and their ability to provide rich information that meets the analytical needs of the study. The initial interviews generated the primary concepts of the phenomenon that provided the basis for subsequent data gathering [70]. New cases were added to the sample on the basis of their theoretical relevance to the emerging and evolving theory. Theoretical saturation was deemed to have been reached after 17 participants had been interviewed as no new codes were emerging and the developing theory was comprehensive. An additional three participants were interviewed to ascertain that saturation had indeed been reached. Thus, a total of 20 participants were interviewed.

Grounded theory analysis and coding procedures [70] were used to analyse the data. The data went through three cycles of coding comprised of open, selective, and theoretical coding. Each coding cycle deepened the analytical level of the data. After the initial or open coding cycle, 144 codes were extracted from the data. The codes were cleaned up to merge similar codes and delete redundant codes to remain with a total of 112 codes. The second cycle of selective coding facilitated the categorisation of codes. Theory generation was enabled by theoretical coding in the final coding cycle. This stage consisted of relating the abstracted categories from the selective coding process to each other as a means of building theory [76,77]. An example of the analytic process of abstracting codes to concepts and categories from the original data used in this study is shown in Figure 2.

The data analysis phase was enhanced by use of ATLAS.ti 8 software (<https://atlasti.com/>) (accessed on 28 February 2020) to store, sort, retrieve, and assign researcher-generated codes to the large amounts of textual data in the form of transcribed interviews and memos produced throughout the research process. The software was used as a means of mechanically organising the large amount of textual data generated and not as an analysis tool.

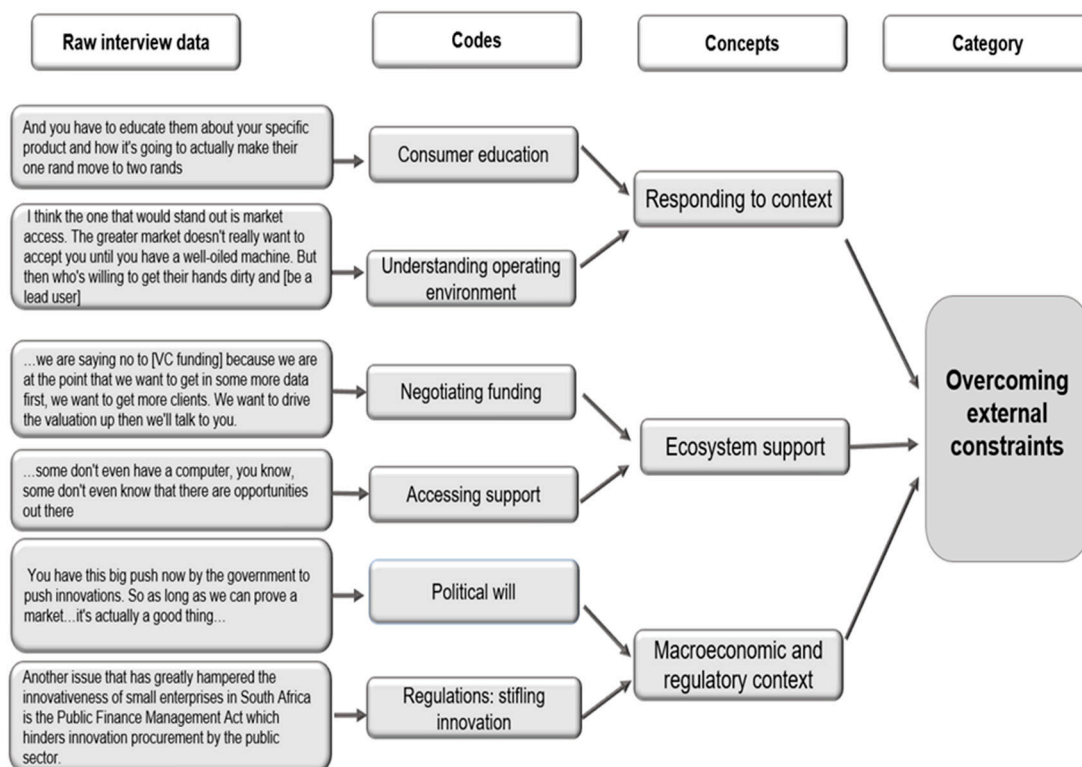


Figure 2. Process of category development from raw data (synthesised by researchers).

4. Findings

Findings are presented in the form of verbatim quotes from the study participants. Participant names were coded for confidentiality. These codes appear after each quote to indicate the participant who is being quoted and can be understood as follows:

1. **P1.SF**—Participant 1; Start-up founder.
2. **P4.BM**—Participant 4; Business mentor.
3. **P13.IE**—Participant 13; Industry expert.

The findings are divided into sub-categories for clarity, and these pertain to the demand environment, the ecosystem environment, and the macro environment.

4.1. Demand Environment Factors

Several socio-economic drivers were identified by the research participants as influencing the demand environment for disruptive innovations in the South African BoP environment. These included the need for lower-cost products and services, improved accessibility to products and services, healthcare, safety and security, social and environmental concerns, changing consumer lifestyles, and the adoption rate of innovations.

4.1.1. Improved Access to Products and Services and Changing Consumer Trends

Seventeen of the twenty participants highlighted one or more socio-economic drivers in the demand environment that enable disruptive innovation capability. These perceptions were expressed as follows:

“So, I think there are certain margins where there is lack of access to facilities, infrastructure and everything and entrepreneurs can offer innovative solutions there”. (P7.BM)

“... we kind of plugged into the urban agricultural change that was happening in [Johannesburg] at that time and it's definitely still kind of going on ... there's the effect of current factors like unemployment and all those things and they've been key factors in certain stakeholders trying to revive that [agricultural] value chain ... ”. (P15.SF)

These findings echo the work by Dolan and Rajak [19] and Adegbile and Sarpong [20], who found that governments in emerging economies are often unable to provide even the most basic services and infrastructure such as running water and electricity in exponentially growing cities that are fuelled by rapid urbanisation. In this environment, alert entrepreneurs step in to provide consumables and services in the place of public infrastructure. With stagnating growth rates failing to absorb the working population, leading to high levels of youth unemployment [78], entrepreneurship is often offered in the place of formal employment [19].

4.1.2. Need for Affordable or Lower-Cost Products

A start-up founder stressed the low incomes prevalent in BoP environments and noted the following with regards to developing products for such a market:

“So, to me the South African economy and the rest of the African economy is there for the taking if you come up with something that is useful to people at the correct price point. You have to price it as low as possible, as simply as possible, because the consumer market at the low end is not fussy. It’s about functionality . . . People will go for the cheapest stuff”. (P14.SF)

BoP environments encourage the development of potentially disruptive products and services that address the needs of low-income consumers. Taken together, the preceding findings suggest that the South African operating environment has the right catalytic factors to encourage disruptive innovations. Systemic shortcomings in service provision for basic services such as healthcare, quality food, safety and security, and other social and environmental concerns present gaps that entrepreneurs can service with disruptive innovations. These findings corroborate prior studies on disruptive innovations in other BoP dominant countries such as China, India, and Brazil [18,79]. This supports proposition P₁ of the conceptual framework where we surmised that social and demographic changes, as well as consumer trends in South Africa’s largely BoP environment, influence the ability of NTBFs to develop a disruptive innovation capability.

4.1.3. Adoption of Innovations

Adoption influences how innovations developed by NTBFs become potentially disruptive. Eighteen of the twenty participants mentioned concerns around adoption of innovations developed by local entrepreneurs. Interviewees also mentioned issues around the need for customer education due to a lack of trust in the products and services developed by local innovators. This was expressed in the following quotes:

“[Market penetration] was very difficult. Any [innovation] requires a lot of education of the consumer . . . So we had to educate [the end users] and we had to show them evidence that we had done sufficient research to prove the safety and efficacy with the technology . . . ” (P12.SF)

“I find that many [entrepreneurs] get a bit fatigued by that, that they have to work so hard to create confidence in the product and there’s no PR (public relations) machinery that they can kind of rely on to create confidence in the product”. (P6.BM)

Potential customers, therefore, often must be educated on the benefits of the innovations or trained on how to use them, which leads to increased costs of customer acquisition and retention [80]. The increased costs of customer acquisition and retention in the South African environment are a challenge for start-ups that often do not have the financial resources to invest in market adoption initiatives and branding efforts [81].

Additionally, we also found that market adoption is a significant challenge for innovators who have trouble attaining commercial success due to a lack of demand for locally produced innovations. The poor adoption rates for innovations could be the result of a potential misalignment between what entrepreneurs are producing and consumer needs and wants. Markides [12] as well as Altman and Engberg [82] have suggested that local entrepreneurs are most likely to introduce disruptive innovations as they are immersed in the

daily lives of the consumers, resulting in a better understanding of consumer aspirations, needs, and wants. However, our findings indicate this is not the case in the South African BoP as entrepreneurs tend to target the wrong markets. This was highlighted by some of the participants as follows:

“ . . . to our surprise, everybody is targeting the high-end [market segment], because they want to use a cocktail of eight ingredients which are super expensive. And therefore, you, find that a jar of a [cosmetic] cream is like ZAR200 to produce. Therefore, you need to charge ZAR499 [at the retail shop]. Who’s going to pay for that? So, we need to educate [the entrepreneurs] about, you know, look at the population of South Africa; what are their needs; what can they afford? So as a result, not all of them become successful because they’ve totally missed the point”. (P10.BM)

“There is a lot of targeting of the wrong market because most of our start-ups think that getting [their products] into Dischem, Pick n Pay, Makro etc. (mainstream market shops) is the ultimate thing . . . And the issue of entrepreneurs, not producing what is required by the market boils down to the misalignment of understanding of what resides within the market, what the market needs and what the entrepreneurs produce . . . ”. (P13.IE)

In other emerging markets such as India, Rao [43] and Yadav and Goyal [83] point to the success of innovations built from local customs and knowledge, such as the MittiCool clay fridge, which fulfils the need for a low-cost solution to a local problem. This implies that innovation success is context specific. The norms, cultures, and lived experiences of the local populace should be considered in developing useful innovations that find market success. Simply imitating innovations from elsewhere without due regard to the consumer context may well not work.

Nine of the twenty participants identified a need to better contextualise innovations in the South African operating environment. Specifically, six of the participants suggested that leveraging indigenous knowledge, which is defined as context-specific, locally embedded knowledge that is accumulated over time and is specific to a culture, people, or local community [84], can enable the development of contextualised disruptive innovation capability. Indigenous knowledge includes traditional ways of food preparation, preservation, and nutrition; indigenous oils and creams for cosmetic use; traditional herbal medicine and pharmacology; and traditional ecological knowledge, among others [85], which can find commercial use when bundled into appropriate innovations or products. Regarding leveraging indigenous knowledge, participants mentioned that:

“And what we’ve seen as a trend, is like going back to your roots, you know, using some of the indigenous concepts that you grew up with . . . we need then the mindsets, the mind shift change, to say, can we try the African angle to say this is what your [grandmother] used to do and maybe build on it”. (P10.BM)

“And that, of course, leads us to a very fundamental principle for South Africa. We have indigenous knowledge that’s been there for thousands of years. And some of us are arrogant to think that that knowledge is not important . . . in fact, at least ten big ideas have been commercialised to a very, very big extent. Hoodia for example is indigenous knowledge which became a very big product, I was working with scelletium at one stage . . . sutherlandia, all these indigenous knowledge things. So, I think what needs to happen now is that universities need to start to lift the level of the technological capability of these things”. (P12.SF)

Jauhiainen and Hooli [84] found that indigenous knowledge bundled with external technologies contextualised innovations to suit local contexts in Namibia while encouraging the development of inclusive innovations. However, there is a paucity of literature around the use of indigenous knowledge as an enabler of disruptive innovations in emerging economies. As noted by Shava and Togo [86], indigenous knowledge in many economic spheres is largely unrecognised and underrated. These findings imply that developing a disruptive innovation capability in BoP environments depends on identifying and tar-

getting consumer pain points and the market needs that will be fulfilled. Contextualising innovations to the target population will lead to higher chances of adoption and market success. This supports proposition P₂ of the conceptual framework where we proposed that achieving success with a disruptive innovation depends on the rate of adoption of the innovation by the target market.

4.2. Ecosystem Environment Factors

All 20 interviewees cited various challenges in the entrepreneurial ecosystem that constrained disruptive innovation capability. The entrepreneurial ecosystem is composed of socio-technical institutions that taken together allow entrepreneurial action to play out [55]. The challenges cited by the participants included a lack of capabilities within the ecosystem, poor access to enabling technologies, poor access to funding, weak support structures, and ecosystem fragmentation.

4.2.1. Lack of Capabilities

Inadequate support within the ecosystem was highlighted as one of the factors that hampered the innovation capability of NTBFs in the South African environment. This was mentioned particularly with respect to a lack of capabilities of ecosystem role players. One of the participants said

“The challenge is when you are talking about innovation we also need to innovate around the various systems. How do we fund our start-ups? Are we going to try to adopt the Barclays Bank template and score them for funding? And this is where you find that we are a bit lazy, particularly in the government sector where we just rely on templates that are coming from the corporate world . . . There is a need for massive education among the government workers or those that are in the policy or promotion of the innovation arena”. (P13.IE)

Public sector employees who are supposed to assist SMMEs, such as investment portfolio managers, need training on the realities facing start-ups and how they operate with the understanding that start-ups are fragile and need fast turnaround times in terms of information, financing, and other support mechanisms. This indicates to the researchers that continuous training of public administrators in the start-up support environment is much needed. Additionally, the performance of public sector employees involved in the start-up ecosystem needs to be measured on key indicators such as commercialisation success rates of supported enterprises and other metrics such as the number of companies given funding or the number of applications processed. This will ensure that start-ups are given adequate support on time. The challenge of a lack of competencies by public sector employees in the small business development sector has also been highlighted previously by Ndabeni [65], who found that institutional role players that are supposed to support SMMEs in South Africa lack business skills due to low levels of education and technical capacity.

4.2.2. Ecosystem Fragmentation

A highly fragmented ecosystem was cited by 15 of the 20 participants as one of the reasons why ecosystem support failed to have the intended outcomes. A fragmented ecosystem was blamed for duplication of efforts among ecosystem role players leading to inefficient support for entrepreneurs. This was expressed by participants as follows:

“And also, in terms of creating an ecosystem, I just think that we’re doing things in our little pockets . . . we need to coordinate this SMME development ecosystem so that people know where to go and for what . . . that’s a big one”. (P10.BM)

“What I find is often a challenge is that sometimes people innovate in isolation. You know, you have the innovators and then you have the people who need innovations . . . [A] lot of [innovators] would come up with issues in the townships like water leakages

and other things and how they could help. But you'll never find a municipality using that innovation". (P7.BM)

These inefficiencies speak of a disjointed institutional framework. Disjointed institutional frameworks are not unique to South Africa but have been cited as an obstacle to business growth in many emerging economies [66]. According to Manzini [86], the South African NSI framework emphasises institutions without due regard to the systems linkages and learning processes. Ecosystem integration among actors such as academia, governmental organisations, corporations, and private investors is requisite since a fragmented ecosystem makes it difficult for entrepreneurs to obtain the resources they need for sustainability. Collaboration of various actors such as incubators, research centres, commercialisation agents, and universities, among others, creates an environment where open innovation can occur in support of innovative SMMEs [60].

Fragmented ecosystems create disjointed networks, separate rules and practices entrepreneurs need to follow, parallel processes, and imperfect informational flows [87]. To facilitate ecosystem integration in the South African context, an independent body to oversee and coordinate ecosystem actors is necessary, particularly in the government-funded support sector where most of the fragmentation and duplication of efforts seems to occur. This approach has been found to be useful in open innovation literature through the intermediated network approach where specific intermediaries provide a supportive role for collaboration within an entrepreneurial ecosystem, which promotes better entrepreneurial innovation outcomes [57].

4.2.3. Access to Information

Poor access to information at various points in the innovating or entrepreneurship process was cited as a challenge by 16 of the 20 participants. Poor access to information was a pervasive and multi-faceted challenge that seemed to permeate most of the other challenges experienced by entrepreneurs. Some of the participants said:

"But then, I mean, for me, to be able to run my company to the fullest, I need to be well informed. You know, I think we're lacking a whole lot of information as location hustlers (township entrepreneurs) ... we don't really know where to go, as in which doors to knock, which people to talk to in order to get the proper assistance ... there is too little information out there, hence why we are struggling in our businesses". (P18.SF)

"But the challenge also is, is everybody privy to these regulations? ... So, information around that must be available publicly, but you also need the entrepreneur to understand them ... [W]ho is writing that information [on funding requirements]? What knowledge does he or she have in communication? You may find that it's a lawyer or an investment analyst. We need somebody who knows communication [to] scale down the information to the level that is required ... ". (P13.IE)

Given the finding of a fragmented ecosystem, it is unsurprising that a challenge cited by the majority of the participants is poor access to information in the operating environment. Poor institutional quality has been found to influence informational flows and magnify informational asymmetry [88]. This finding is also not unique to the South African environment, as Simanis and Duke [24] in a study of Indian, Kenyan, and Sri Lankan enterprises, and Ge et al. [89] in a study of Chinese enterprises have noted inefficient informational flows as one of the challenges faced by entrepreneurs navigating institutional voids that characterise emerging market operating environments.

New and small ventures arguably cannot compete using economies of scale and must rely on the development of innovative products and processes for their competitive advantage. This ability is reliant on obtaining accurate market and customer information [90]. Therefore, in the absence of the requisite information, entrepreneurs would struggle to innovate as the availability of information shapes opportunity identification [91]. Manzini [92] asserts that the strength of an innovation system is dependent on the quality of information flows among its actors. This highlights the necessity for creating formal and informal

knowledge networks to assist NTBFs to overcome knowledge and information gaps. These networks could undertake market research and collate compliance and regulatory information for the collective and disseminate it to its members.

4.2.4. Market Access

Fourteen of the twenty participants regarded market access as a major challenge to innovation success. Entrepreneurs felt locked out of markets. Some of the start-up founders stated that:

“Unfortunately, in South Africa, it seems to be a [big] problem because I think the World Bank even raised that it’s sort of a cartel. Once a company is in the market, it prevents other companies from coming into that space. The laws are very relaxed on this anti-competitive behaviour . . . if you go to a supermarket, you find just a few brands represented . . . You cannot have one company dominating the whole country!” (P14.SF)

“ . . . it’s incredibly difficult to form part of the supply chain for, you know, your pet food and animal feed manufacturers. And, you know, in order to be able to enter that market, you need massive economies of scale, which we are too small to have”. (P9.SF)

The South African operating environment was perceived to be dominated by large diversified incumbent corporations who acted in a monopoly-like fashion and blocked access to markets for small enterprises through anti-competitive behaviours. In South Africa, large companies dominate value chains, and efforts by the government through policy initiatives to encourage large companies to purchase and form linkages with emerging small enterprises from previously disadvantaged groups have had a minimal effect [93]. Sokol and Van der Veer [94] suggest that small entrants in emerging economies may need special regulatory protection in markets dominated by large incumbents or state-owned enterprises to avoid monopoly-like situations. The government needs to be seen to act on addressing anti-competitive behaviour by large dominant corporations. The Competition Act [95] was promulgated for precisely such purposes. The act seeks to prevent anti-competitive behaviour by dominant companies and ensure that new and small ventures have an equitable chance of participation in the economy, among other directives. However, as Rogerson [93] notes, the South African government often struggles to implement its policy initiatives.

4.2.5. Funding

The findings indicate that funding was also a multi-faceted challenge constraining the innovative capability of NTBFs. All the participants (20 of 20) perceived access to funding, to some extent, as a challenge hampering the growth and sustainability of innovators. Participants indicated that even when funding was available, there were inefficiencies around its disbursement that negatively impacted entrepreneurial activities. These views were expressed as follows:

“I remember we applied for funding in January and eventually got the funding, I think, the deposit was made into our account in November. So in between those months what was the company supposed to be doing? The company could have failed. So, you see, there is that disconnect . . . They should not just keep you waiting, and you don’t know what is happening”. (P14.SF)

“Of course, government has made funds available for start-ups because of this drive towards small business development and entrepreneurship, but the only issue is the administering of these funds and the inefficiencies around that. So, a lot more efforts have to go into properly administering and disbursing public sector funds earmarked for small businesses if you want to have the anticipated impact”. (P20.IE)

The problem with incompetence around the administration and disbursement of government funds further highlights that the ecosystem is composed of key actors who do not have the skills or competencies to create an enabling environment for innovators to succeed.

Manimala and Wasdani [66] have cited the challenge of underdeveloped and inconsistent education systems in emerging economies leading to low levels of technical capabilities that weaken institutional frameworks. The issue of a poor-quality public education system might be what is leading to the low levels of capabilities of some ecosystem role players in South Africa.

Some participants remarked that the process of applying for funding is often too complicated for some entrepreneurs. Therefore, some of the participants believed that there were ample funding instruments in the ecosystem, but entrepreneurs may not know how to access them. One of the industry experts said

“I would say there are enough channels for [innovators] to access funding . . . [W]ithin the innovation space, the Small Enterprise Funding Agency (SEFA) has recently introduced an innovation fund . . . And then there’s your other agencies . . . whether it’s through your IDC (Industrial Development Corporation), your DTI (Department of Trade and Industry), TIA (Technology Innovation Agency) or whoever else. I think like I said, I think there’s enough money . . . Perhaps the entrepreneurs need to be taught about where to look”. (P11.IE)

Lack of access to sources of financing is regularly cited as a significant obstacle to innovativeness in start-ups [96]. Prior studies have found access to funding to be a substantial challenge to entrepreneurial growth in the South African context [97,98]. Moreover, technology-based start-ups typically require significant amounts of financial capital to sustain their growth [99]. Most entrepreneurs in South Africa end up bootstrapping their ventures by using personal funds and money borrowed from friends and family [97]. Bootstrapping may result in lower rates of innovativeness in South Africa compared to other emerging economies because the majority of entrepreneurs in South Africa typically come from previously disadvantaged backgrounds and thus have fewer resources in terms of property, savings, investments, and access to capital [65]. In the absence of adequate financing, entrepreneurs will find it hard to explore innovative solutions, leading to challenges with scaling their businesses.

Our findings suggest that entrepreneurs would need training on how to apply for the various funding options available. This concurs with findings by Iwu [98], who suggests that the funding application processes in South Africa need to be simplified to accommodate the reality of the South African context, which is that entrepreneurs may have low levels of education and business skills, as well as little or no collateral. We further suggest that funding in the form of government grants should be streamlined to remove inefficiencies and improve its effectiveness if the funds allocated by the government are to have the anticipated outcome.

4.2.6. Access to Technology

Fifteen of the twenty participants cited poor access to technology as a challenge in the operating environment. Either the required technologies were simply non-existent or if they were available, then they were very expensive to procure. Two participants detailed the challenges as follows:

“Access to technology, I think is the biggest thing, you know. We’re essentially building all our own technical and production systems. It would have been great if we could just, you know, pick something off-the-shelf in order to produce this”. (P9.SF)

“So [access to technology] is one of our shortcomings . . . Now, most of the hardware is, for example, still imported. And we’re not doing enough local manufacturing of these things. So, you become dependent upon international suppliers ultimately . . . ”. (P11.IE)

Enabling technologies, such as ICTs, drive disruptive innovation capability by allowing small entrants better reach customers and facilitating a cost-effective scaling up of business models [11,100,101]. The findings of this study point to poor access to enabling technologies in the South African operating environment by NTBFs. Participants suggested that there

is a deficit in current technologies such as the internet of things (IoT) and other technical systems to support production systems. A shortage of enabling technologies appears to be one reason why South Africa may be lagging when compared with emerging economy counterparts such as India and China in developing disruptive concepts [10]. Entrepreneurs typically need to leverage existing technologies to bring innovative products or business models to market [13] as they often cannot develop these technologies themselves due to resource constraints [102].

4.3. Macro Environment Factors

4.3.1. Regulations and Legislative Environment

The macroeconomic environment was also perceived to present challenges that hampered the innovativeness of NTBFs in the South African operating environment. These challenges included the regulatory and legislative environment and the education system. Regulatory and legislative concerns were perceived as stifling innovativeness and entrepreneurship by 16 of the 20 participants. This is recounted by participants in the quotes below:

“We applied for registration with the Department of Agriculture, Forestry and Fisheries in 2017. They said it takes 12 months, so by 2018, we should have got it. This is three years later, and [our innovation] is still not registered. And [the retailers] told us, look guys if you’re not registered then we can’t take your product . . . [I]n South Africa the regulations actually support big businesses and make it impossible for small businesses”. (P14.SF)

“ . . . thus far, our clients have mainly been government based. It’s then the PFMA (Public Finance Management Act) rules, right? So that’s one of the things we’re struggling with [because as] the legislation stands currently, it does not make provision for innovations and procurement of innovations”. (P11.IE)

The South African government is the single largest procurer of goods and services in the country [103]. However, participants in the study felt that the government only paid lip service to providing market access opportunities to SMMEs as it failed to implement its policies around procurement. Regulations such as the Public Finance Management Act (PFMA) [104] were seen to actively stifle the procurement of innovations developed by small local enterprises. The directives of PFMA seek to promote uniformity in bid and procurement procedures, as well as standardisation and transparency of supply chain management issues [105]. The PFMA does not make any express provision for the procurement of new innovations. Its directives make it easier to address the purchase of off-the-shelf goods that are already available on the market but not innovative products that may not currently be on the market or in existence. These findings agree with Bolton [103], who found that owing to a lack of skills and capabilities, public sector administrators fail to correctly interpret the provisions of the act and are therefore unable to drive innovation procurement in the country.

Continued training of procurement personnel on how to procure innovations within the confines of the act is suggested to open up the public sector market to small entrepreneurs with innovative concepts. Additionally, continued training of ecosystem role players to address inefficiencies within the regulatory environment is also recommended.

4.3.2. National Education System

Participants highlighted shortcomings in the national education system as constraining the innovative capacity of NTBFS. Entrepreneurs felt that they often lacked the business acumen to run successful businesses or innovate successfully. This was expressed by some of the participants as follows:

“I think it’s a tragedy that our education system does not incorporate entrepreneurship into the curriculum. So, you’re literally trained to look for a job . . . I had to learn a lot of things within the first maybe two years with the Innovation Hub . . . I think we lack that

business acumen simply because we have not incorporated it into our learning system. So, to me, that's the biggest challenge ... I knew nothing about business". (P15.SF)

"Everyone has the approach of let's solve our problems ourselves and let's develop our own technologies, but the whole academic system is still very much about getting educated to get a job ... We should start moving now towards innovation and entrepreneurship at schools so that everyone is doing it ... ". (P7.BM)

Participants felt that the country's educational system did not adequately prepare most for a career in entrepreneurship. As a result, many of them struggled to get their bearings once they had started their businesses. An inadequate educational background may partly explain the continued low new business sustainability rates in South Africa, as cited in the Global Entrepreneurship Monitor South Africa 2019/2020 report [3]. This finding concurs with studies by Nabi et al. [106] and Gundry et al. [107], who found that tertiary level entrepreneurship education enhances start-up intentions and improves new venture performance, with low levels of business acumen hampering innovativeness.

For a country that is focused on economic growth through mass entrepreneurship [1], more emphasis needs to be placed on vocational entrepreneurship training. This is particularly so in institutions of higher education where participants noted that they received elementary entrepreneurship education, if they received any at all, that did not adequately prepare them for the realities of entrepreneurship in the field. As observed by Nabi et al. [106], the course content of entrepreneurship courses makes a difference in intended outcomes. Educational institutions offering such courses, therefore, need to re-examine their instructive approaches to entrepreneurship education and assess them for impact. Courses provided need to be in-depth and address the specific operating context of South Africa.

Taken together, the findings on the ecosystem environment and the macro environment support proposition P₃ of our conceptual framework where we proposed that a robust entrepreneurial ecosystem in terms of enabling policies, funding, enabling technologies, supporting institutions, and knowledge transfers facilitates the disruptive innovation capability of NTBFs in BoP environments. The following section presents a holistic understanding of what our findings mean for disruptive innovation capability in the context of the South African operating environment by integrating our findings into a cohesive whole.

5. Discussion

The findings presented highlight that overall, institutions that should support the growth of innovative small enterprises exist in the South African operating environment. However, due to inconsistent and unclear policies, lack of capabilities, inadequate governance, and fragmented efforts by ecosystem role players, there are institutional voids that result in bureaucratic inefficiencies, dysfunctional competition, and information asymmetries [10,108]. The institutional environment falls short of providing a nurturing environment for the innovative capacity of NTBFs.

The research findings led to a reconceptualisation of our preliminary framework on the contextual factors that influence disruptive innovations in the South African BoP environment and how entrepreneurs in this environment organise for disruptive innovation capability. Our final framework of disruptive innovation capability is presented in Figure 3.

We identified three separate contextual environments that influence disruptive innovation capability in South Africa's BoP environment. These are the demand, ecosystem, and macro environments. These environments have relationships and linkages amongst themselves that are reciprocal in nature and influence how each of the other components performs and, ultimately, how NTBFs perform in trying to develop disruptive innovations in this environment.

Our research findings show that the institutional frameworks in the demand, ecosystem, and macro environments that can enable the disruptive innovation capability of NTBFs in South Africa are present. However, there are poor quality linkages and relationships among the identified institutional environments. This is shown by the information, tech-

nology, capabilities, skills, implementation, and other support gaps within the framework. The disjointed linkages lead to an overall environment that does not support the successful development of disruptive innovations by NTBFs in South Africa’s BoP environment.

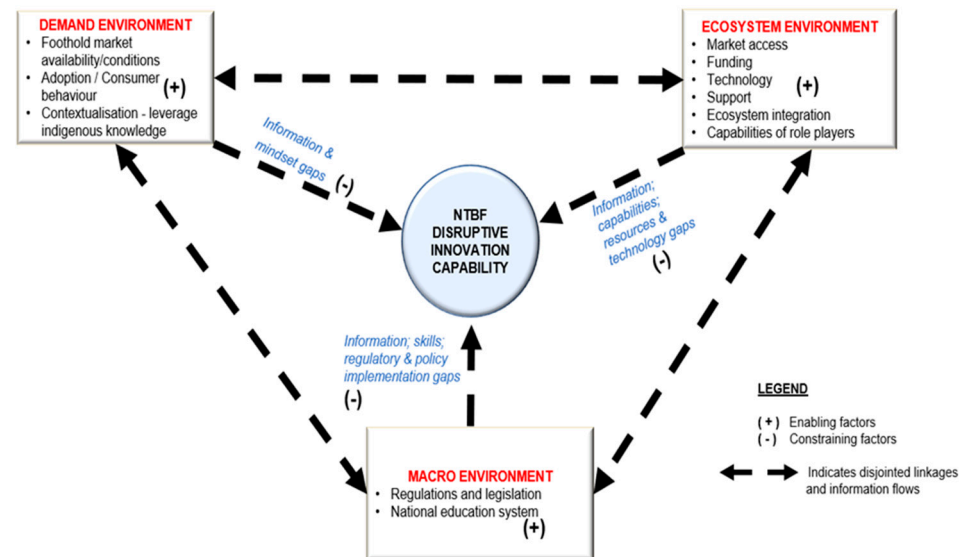


Figure 3. Framework for disruptive innovation capability in BoP environments (synthesised by the researchers).

Congruent with a grounded theory methodology whose aim is to produce substantive theory, the analysis and synthesis of our findings led us to develop the core category of “NEGOTIATING THE MISSING LINKS”. The core category is a theoretical explanation that describes how the categories in the findings relate to each other and highlights their logical connections to facilitate the emergence of theory [75,77]. In this study, the core category explains how entrepreneurs in the South African BoP environment strategize for disruptive innovation capability.

The word ‘negotiating’ evokes the acts of overcoming, surmounting, and working things out. From the findings of this study, it appears that South African NTBFs are in a state of continually attempting to overcome challenges in the operating environment to develop a disruptive innovation capability. Challenges exist in the contextual environment where entrepreneurs face weak demand for their products, poor market access, competitive markets, challenges with funding, weak support mechanisms, a fragmented ecosystem, poor quality national educational system, and an inconsistent regulatory and policy environment. The enterprises’ survival then becomes an innovative exploit, as much effort is expended in working out and overcoming the obstacles presenting in the operating environment. Therefore, an NTBF’s ability to develop a successful disruptive innovation in South Africa’s BoP context is dependent on the venture’s ability to work things out and negotiate external constraints. This was summed up poignantly by a start-up founder who said

“... you’re also yourself resource-limited, you literally don’t have money ... You have to keep the business going despite the fact that you’re kind of locked out of the market. You come in with no money and very little information and try to get past regulations and policies and all those things ... and you don’t have experience ... So, then the word hustling comes in ... it’s about you going to the shop and taking the milk, going to another shop, taking the sugar, you know, and making muffins ...”. (P15.SF)

6. Conclusions

This research began with a need to understand the contextual factors that influence the disruptive innovation capability of NTBFs in the South African BoP environment, as

well as how given the contextual environment, NTBFs organise for disruptive innovation capability. Our findings show that while the South African operating environment is endowed with the requisite external factors and institutional structures to enable disruptive innovation capability, the quality of linkages between and among the institutions and the operating environment is weak. Developing a successful disruptive innovation capability in South Africa's BoP then becomes dependent on the NTBF successfully negotiating various missing linkages in the operating environment.

The study adds to the body of literature on disruptive innovations. In particular, it highlights the contextual factors that influence the development of disruptive innovations in differently configured emerging economy environments. Our findings also add to and extend the literature on NSI, specifically as they emphasise the role of the quality of linkages in emerging economy innovation systems and their importance to the performance of the innovation capability of small and new enterprises. Additionally, the theory-building approach taken by applying the lens of NSI and the use of the grounded theory approach to investigate the disruptive innovation capability of NTBFs has produced a holistic understanding of how small innovative enterprises organise for innovation capability in emerging market contexts.

We investigated disruptive innovation capability in the very under-researched African context. However, the sample for our survey was taken wholly from a South African population and, thus, our research findings may have limited generalisability beyond our specific research setting. While the findings shed light on the innovative processes in developing and emerging economy contexts, a comparative study among BRICS (Brazil, Russia, India, China, South Africa) economies to identify the reasons why some emerging economies such as India and China support the emergence of highly successful disruptors, while other economies do not, would add value to the literature on disruptive innovations in low-income contexts.

Additionally, our findings highlight that contextualisation and adoption of innovations were a significant challenge for would-be disruptors. Future work in this area could investigate the strategic formulations that lead to successful new product development in BoP environments. It would also be worthwhile to conduct a study to determine the causal reasons why some NTBFs might develop a disruptive innovation capability in BoP environments, with their myriad resource constraints, while others do not.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Interview Protocol

Q1: Broad area of inquiry: Contextual enablers of disruptive innovation (definition of disruptive innovation discussed) in South Africa's BoP environment and factors that influence adoption of innovations

1.1 Are there any features in the South African environment, such as perceived strength or weakness of the economy, changing consumer lifestyles, technological changes, etc. that are likely to encourage or discourage disruptive innovations?

*Probe: How so?

1.2 In your experience how has been the adoption of cost innovations introduced by local start-ups into the low-income market segments in the past?

1.3 How do small businesses operating in low-income environments leverage technology to bring their products to market?

Q2: Broad area of inquiry: Ecosystem factors and other challenges

2.1 Do you feel that the South African legal and regulatory environment is favourable to technology start-ups trying to commercialise low-cost innovations such as disruptive innovations?

2.2 In terms of the South African business operating environment in general, would you consider a disruptive strategy to be more, or less risky to follow in terms of bringing products to market, and why?

2.3 In your experience, do start-ups with disruptive concepts find it more, or less difficult to:

(a) obtain funding?

(b) obtain support from supporting institutions such as business mentorship programmes, incubators, academia for knowledge transfer, etc.?

2.4 What are the challenges that technology-based start-ups operating in low-income market segments face?

*Probes:

(a) from a competitive point of view?

(b) consumer attitudes and preferences?

(c) technology access and availability?

(d) product development?

(e) any other _____?

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