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Anticipating the Impact of Disruptive Technologies on SMEs in Kwazulu-Natal: A Case Study

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This article investigates a range of disruptive technologies which have been identified as being disruptive or potentially disruptive to the current SME business models. By not being cognizant of the possible effect that these modern technologies may have on a variety of business sectors, SMEs run the risk of either losing business opportunities or not being able to participate in new business ventures in future so the competitive edge is lost. The impact of disruptive technologies is rapidly gaining momentum on a world-wide scale. Three complimentary disruptive technologies, associated with the 4th Industrial Revolution (4IR) have been selected for this study viz. Big Data, Internet of Things (IoT), and Artificial Intelligence (AI). A single case study following the qualitative method was considered suitable to explore, probe and gain a clear understanding from a SME perspective, whether these three disruptive technologies have the potential to influence the business either positively or negatively. The focus of the questioning was directed at how SMEs intend to go about either engaging with, or choosing to delay, the implementation of Big Data, IoT and AI; and the possible impact such strategic decisions may have on the business. Data was collected from a sample of senior managers and supervisors as well as a focus group of employees. Semi-structured interviews were scheduled using face-to-face recorded interviews as well as a recoded conversation with a focus group. The findings indicated that senior managers are aware of some aspects of disruptive technology and have been thinking proactively about adopting new technologies, however, there was significant room for greater integration and implementation so as to become a market leader. Failure to engage with new technologies in the very near future could result in a SME becoming obsolete and less competitive while possible new entrants to the market may become the new 'winners'. Strategic decisions in terms of the likely impact of disruptive technologies on SMEs, requires innovative approaches to speed up implementation. The impact of Covid-19 has highlighted the urgency of SMEs to embrace disruptive technologies with immediate effect.

Keywords: *SME, disruptive technologies, disruptive innovation, IoT, Big Data, AI, strategic planning, competitive advantage, Covid-19*

JEL Classification: *O30, O33, M10*

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1. Introduction

Considering the empirical findings from a recent investigation of strategies employed by successful Small and Medium size Enterprises (SMEs) in KwaZulu-Natal (Chapman, 2019), there was confirmation that small enterprises in particular, do not develop formal strategic plans in the traditional ways of planning while medium size enterprises did. Advancing this perspective to the challenges that are likely to emerge for SME owners and managers, there needs to be greater awareness of disruptive technology (Christensen et al., 2015) and the potential impact on SMEs (Xu et al., 2018).

New technologies which are suitable for entrepreneurs to innovate are emerging on a fairly regular basis (Rayport and Jaworski, 2004). The South African digital 'footprint' has changed at a rapid pace as new technological improvements have ushered in mobile broadband 3G, 4G, and soon 5G, smartphones, and high-speed fibre connectivity to enable SMEs to innovate and become more competitive – if they choose to adopt such technologies into their businesses (Fourie, 2019).

This study was conducted at a time in South African history where the economy was not only in a depressed state but the Covid-19 pandemic increased pressure on all businesses in unprecedented ways that were unplanned and unimaginable, resulting in total economic disruption (Fisher, 2018; Bishop, 2020; Bisseker, 2020). Never before has there been such a need for SMEs to rapidly adopt new technologies, especially during lockdown of the country. High unemployment rates that existed (pre-lockdown) in South Africa, have further negatively impacted on SMEs who now struggle for business survival (Magubane and Omarjee, 2020; Sameulsson, 2020).

The focus of this study was to engage from a strategic planning and operational level using a single case study in order to make SME owners and managers aware of the potential challenges that could be caused by 'disruptive technologies'. As new technologies may be implemented to replace people in certain repetitive-type jobs where robots (or bots) could be engaged, many SMEs could be 'disrupted' in the short to medium term (Roe, 2019; Towers-Clark, 2019; Marr, 2019). SME owners need to prepare for a range of 21st century disruptive technologies that pose both challenges and opportunities for businesses world-wide.

Focusing on limiting the wide array of possible disruptive technologies that have become more evident in very recent years, this study explores fundamental ways in which SMEs could adjust their strategic focus to begin to engage with three selected disruptive technologies viz. Big Data, Internet of Things (IoT) and Artificial Intelligence (AI).

These three technologies are currently available to SMEs and work well together having the potential to disrupt the *status quo*. Big data – is ALL the information that connected devices gather over time. Internet-of-Things – is an Information Technology network of devices (including smartphones), where each device is fitted with sensors that collect large amounts of data. Artificial Intelligence – for data to be useful it must be analysed, and AI provides a solution by applying algorithms to analyse the data created by devices in the Internet of Things and used to mimic human actions (Seriun.co.uk, 2017). The summary is, IoT needs Big-data to work and IoT allows AI to function by placing sensors in strategic positions or places.

Thus, for this article, the following research questions will be considered:

1. To what extent is there an awareness of IoT, Big Data and AI disruptive technologies within the company?
2. What is the perceived impact of these three disruptive technologies on the competitiveness of the company?
3. How can the company take strategic decisions to gain competitive advantage over similar companies by adopting IoT, Big Data and AI disruptive technologies?

2. Literature Review

Small and Medium Size Enterprises (SMEs) in South Africa

The focus of this research is on the Small and Medium size enterprises (SMEs) located in South Africa. These enterprises are considered integral to help with economic upliftment and job creation (SEDA, 2017). SMEs vary in size and annual turnover. Small enterprises in South Africa are fewer than 50 employees and an annual turnover of R13 million up to R32 million, depending on the type of industry. Medium enterprises employ up to 200 staff and have an annual turnover of R50 – R65 Million (National Small Business Amendment Act, 2003).

It is therefore very important for all SMEs to be able to integrate the new technologies like (Big data, IoT, AI) into their business models and strategic plans as technology shapes business strategy (Raskino, 2017).

Bennett (2019) suggests "the adoption of technology – it's a new way of thinking that embraces disruption and technology to drive innovation and new processes".

More recently, the term Industry 4.0 has been used to conceptualise the next step in industrial technology that includes robotics, IoT and enhanced machine algorithms (Towers-Clark, 2019) while some writers call it the 4th industrial revolution (4IR) (Erasmus et al., 2019). Such digital transformation challenges impact on business performance and how a company delivers value. For this reason, some companies in South Africa are hesitant to start their digital transformation journey (Bennett, 2019).

Disruptive Technology Perspectives

The theoretical seminal work of Professor Clayton Christensen, first published in his book, *"The innovator's dilemma"* (1997), has attracted wide comment from other critics like (Daneels, 2004; Markides, 2006) who proposed alternate versions of Christensen's business disruption theory. Christensen's seminal work focused attention on disruptive technologies and the likely impact on firms in the future.

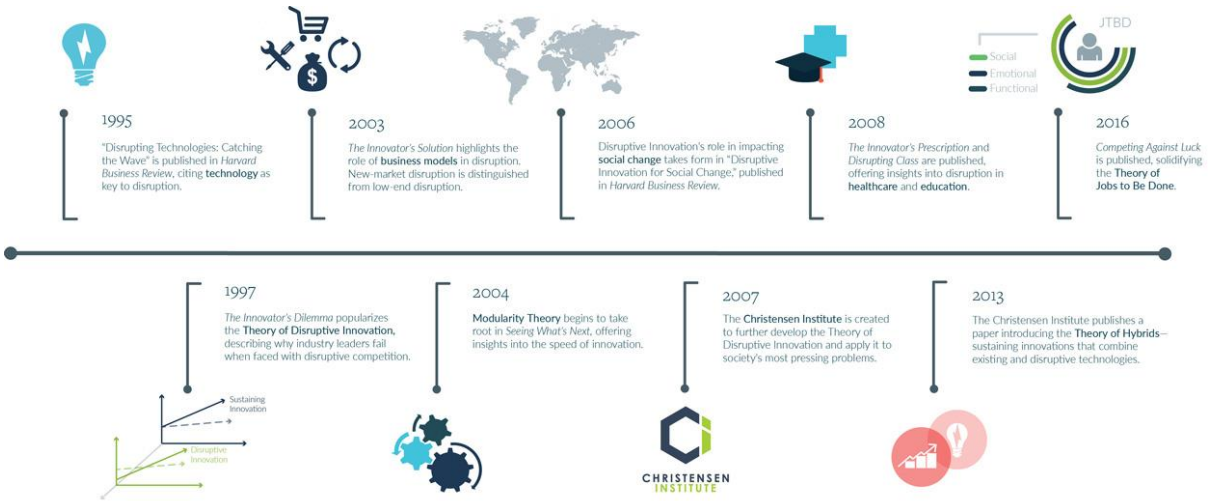

Figure 1. *The disruptive technology development timeline*
Source: Christensen Institute - Disruptive Innovations (n.d.).

Definition of disruptive technology: The starting point is to establish a clear definition of disruptive technology which refers to "any enhanced or completely new technology that replaces and disrupts an existing technology, rendering it obsolete. Disruptive technology applies to hardware, software, networks and combined technologies" (Techopedia, 2019c). Examples of disruptive technologies in the world include - Artificial Intelligence, Internet of Things, Space Colonisation (i.e. outer space), 3D Printing, Medical Innovations, High-speed travel, Robotics, Blockchain, Advanced virtual reality, and Renewable energy (Cag, 2020). For this study, only three disruptive technologies have been selected viz. Big data, Internet of Things (IoT) and Artificial Intelligence (AI) because they are integrated technologies that are commonly used by businesses world-wide and are therefore relevant to South African SMEs (GetSmarter, 2019a; Guedez, 2018).

Defining Big Data: Bernard Marr (2017) writes …."big data is used to better understand customers and their behaviours and preferences. Companies are keen to expand their traditional data sets with social media data, browser logs as well as text analytics and sensor data to get a more complete picture of their customers…… to create predictive models".

Defining Internet of Things (IoT): Balami (2017) writes: "IoT is the senses, Big Data is the fuel, and artificial Intelligence is the brain to realise the future of a smart connected world." IoT is about devices, data, and connectivity. IoT describes a world where just about anything can be connected in order to communicate in an intelligent fashion (Technopedia, 2019a.).

Defining Artificial Intelligence (AI): Artificial intelligence is a branch of computer science that aims to create intelligent machines. It has become an essential part of the technology industry. Using artificial intelligence includes programming computers for certain traits such as: Knowledge, Reasoning, Problem solving, Perception, Learning, Planning, Ability to manipulate and move objects (Techopedia, 2019b).

How These Three Technologies Are Inter-Connected

Misauer (2017) reports that Big data is fuelled by the Internet of Things (IoT) is a powerful 'tool' and so is Artificial Intelligence (AI), but when combined they become like a perfect 'superhero' team. IoT is helpless without big data analytics and AI needs big data to generate meaningful results.

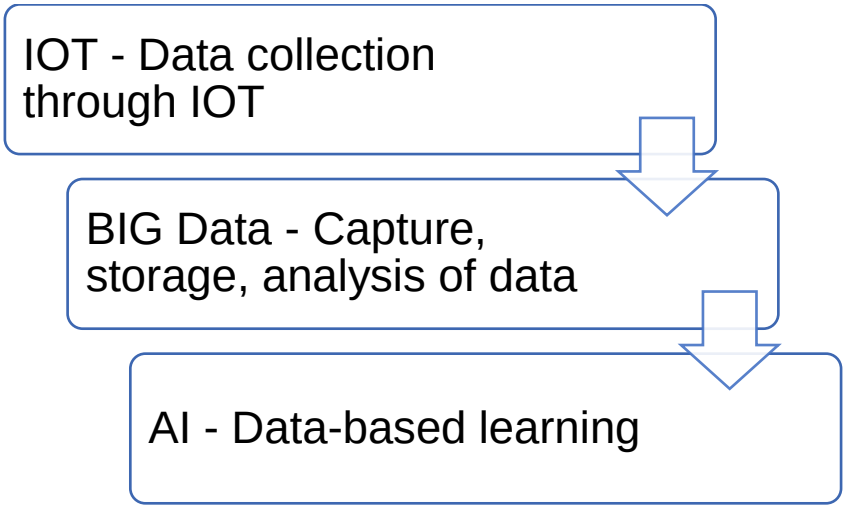

Figure 2. *The three essential future technologies*
Source: (I-ON communication blog - Misauer, 2017).

Making the Case for Disruptive Technology in Business

Harvard Business School Professor, Clayton Christensen (1997) introduced the term, disruptive technology, after he studied the disk-drive industry and noted that when a new innovation emerged that improved performance, on dimensions previously valued by customers. Clayton's argument was that 'disruption' describes a process whereby a small company with less resources is enabled to challenge a larger, well establish company. In essence, the smaller company directs attention towards improving their products and services for their most profitable customers. In so doing, they manage to exceed the needs of certain market segments while at the same time, choosing to ignore other customer or market needs. Typically, new market entrants initiate disruption by successfully targeting the over-looked markets, and establish a position of strength by delivering products or services with more-suitable functionality at a lower price while existing firms languish behind (Christensen et al., 2015, p.46; Christensen et al., 2018, p.1047).

Importantly, to implement digital technologies into an enterprise and bring about desired changes requires good leadership (Patki, 2006). AI, for example, is reshaping the way in which work is managed as it allows for improved and more efficient allocation of resources. To enable AI to function will necessitate that new high-value jobs will need to be created with increased technical skills, robotics, network engineering, web-design and programming, especially in the retail sector (Mehr, 2017).

Benefits of Big Data, Internet-of-Things (IoT) and Artificial Intelligence (AI) for Improved Competitive Advantage

In most industries, existing competitors and new entrants will make use of strategies resulting from analysed data to compete, innovate and capture value. Using the three disruptive technologies selected for this case study, Big data, for example, can help an organisation create new growth opportunities based on information about the products and services after buyers, suppliers and consumer preferences are captured and analysed. Retailers can optimise stock based on predictive models generated from social media data, web searches, trends and weather forecasts (Anurag, 2017). If one considers advantages of the Internet-of-things, Cag (2020) suggests by equipping all objects with machine readable identifiers could change lives, for example, monitoring air pollution, routine maintenance, perimeter and home security, intelligent shopping, water leak detection. Imagine retailers, wholesalers or SMEs making use of smart labels that could stick on practically anything indicating not only where an 'item' is but also the temperature, the moisture level and whether or not it's in transit (Marr, 2017).

The application of artificial intelligence is used where machines copy the cognitive functions of the human brain in learning and solving problems (Cag, 2020). As a marketing application, a customer can make a purchase by simply snapping a photo of the item off the internet. Other applications are in banking,

agriculture for crop production and health care to prevent a patient from having a stroke, and 'chatbots' like Siri and Cortana who can also control home appliances remotely (Lateef, 2019; Marr, 2019).

Disruptive Innovation

A new term of disruptive innovation (2003) replaced the earlier version called disruptive technology, apparently to broaden the theory's applicability (Daneels, 2004, p.250). The new term is therefore an extension of the earlier theory supporting the notion that disruptive technologies abound in different forms and are all identifiable. Businesses have the option to either implement new technology or hire additional workers. The employers' perspective is that labour-related issues are reduced thus encouraging new technologies for the workplace (Gulbranson, 2018). Unfortunately for workers, it could lead to retrenchments. So, while these are very useful technologies, each have the power to disrupt the *status quo*.

A South African Perspective

An IoT driven business transforms the physical business processes into efficient digital processes, as IoT enables businesses to digitise, sell, and deliver physical assets more virtually (Brody and Pureswaran, 2015; Maseko, 2019). Using IoT can improve business process efficiencies, reduce the cost of warehouse logistics and supports service industries (Murray et al., 2016). Retailers in the South African environment do have the potential to enable automation and improve efficiencies in the supply chain never imagined a few years ago. AI could be useful for reducing poverty and improving education, it can be applied to healthcare to be used to combat deadly diseases (like Covid-19 for example), and extended into the area of farming for increased food and crop production to support the growing demand in South Africa (Access Partnership/Univ. of Pretoria, 2017, p.8). However, there seems to be a reluctance by SMEs in South Africa to engage these technologies to maximise their full potential.

Critical (theoretical) Reviews of Disruptive Technology / Disruptive Innovation Theory

The disruptive innovation theory has been widely criticised by Daneels (2004) and later by Markides (2006). Daneels (2004) accepted the Christensen (1997) explanation of disruptive technology. While disruptive technologies initially underperform against established ones while serving the mainstream market, these new technologies eventually displace the established ones. Daneels' definition of disruptive technology is "a technology that changes the bases of competition by changing the performance metrics along which firms compete" (2004, p.249). Meanwhile, Markides (2006), advanced the argument that not all disruptive innovations have the same effect on a company; although agreed that they are all disruptive in nature.

Christensen et al. (2015) responded to the earlier criticisms of the disruptive technology / innovation proposals and acknowledged that the theory of disruption does not explain everything there is to know about business success as there are many other 'influencers' that come into the prediction of future success.

Possible Social Impact of Disruption?

Millar, Lockett and Ladd (2018) advise that little research has been engaged to examine the social impact of disruptive innovation especially on societies or eco-systems. They advocate that attention needs to be paid to context and prediction. Context, they suggest, is the positioning of disruptive innovation in the context of how markets and entrepreneurial activity develop and co-evolve within the societies in which they exist. Prediction is explored by identifying the essential characteristics of situations in which an innovation could be expected to be disruptive and yet successful.

Disruptive innovation examples are explained by Marr (2017), who uses the case of Uber that has disrupted taxi services world-wide, and retailers using social media to track buyer preferences while smart watches and tags are used for personal training, body temperature and motion. Other examples of disruptive innovation include electric cars, driverless vehicles and smart city management to manage traffic flows. Such innovations are solutions to social factors like pollution of the ozone, aging populations and traffic congestion in inner cities. However, there are also disadvantages like, resistance to change whereby both internal staff members and customers may have some reservations about adopting new technologies and ways of working, cost of new technology, connectivity and data, and also the hacking of personal and sensitive data (Serrao, 2017).

The agility of SMEs to respond to digital disruptive innovation was explored by Chan et al. (2018) and they reported on the work of Neirotti and Raguseo (2017) who noted positive results for those SMEs who managed to achieve agility as they also achieved higher profits when compared with larger organisations. In a study conducted in China, findings suggest that disruptive innovation in SMEs enabled them to surpass some of the large companies (Chen et al., 2017).

Strategic Decision-Making Approach to Innovation

Applying a disruptive innovation lens can reveal that when a new technology is developed, disruption theory does not dictate what managers should do. Instead it helps them to make a strategic choice between taking a sustaining path or taking a disruptive one (Christensen et al., 2015).

Strategic planning has been emphasised as being important for SMEs from both a financial and performance perspective (Gomera et al.,2018) so business owners have to make a conscious choice on the strategy to employ – either to adapt to new changes, or to innovate in order to establish new business opportunities. Some SME owners/managers may also decide to do nothing and just maintain the *status quo*. Raskino (2017) advises that technology shapes strategy although market, political and financial factors still prevail, while Matthews (2018) informs that operational efficiency can be improved through the use of new technologies.

Innovation for SMEs

Innovation is regarded as an essential aspect when considering the competitive environments of SMEs (Pierre and Fernandez, 2018) and innovation strategy and planning focus attention on *inter alia* the competitive environment, resources and competencies (Pierre and Fernandez, 2018 citing Teece et al., 2007). The fourth industrial revolution (4IR) has popularised new opportunities for SMEs by advocating that entrepreneurs 'run' with new ideas by utilising new technologies (Xu, David, Kim, 2018:92).

Recent research conducted by Ricoh South Africa revealed that small and medium sized enterprises (SMEs) are in danger of failing if they don't adopt the digital disruption, regulatory requirements and the economic shift that are fundamentally changing their markets. These shifts will require capital investment so SMEs must be strategic in how they approach digital disruption with the resources available so adopting a funding partner could be a useful consideration (Laithwaite, 2019). Research on the innovative capacity of a business was conducted by Pierre and Fernandez (2018) while Chan et al. (2018) suggests focus on innovative capabilities where "SMEs development of innovative capabilities is underpinned by their organisational adaptability that allows them to reconfigure not just their product and service offerings but their internal organising structure to support these changes". However, Street et al. (2017) does advise that due to SMEs having less resources than large companies, may negatively influence the SMEs ability to adapt to digital disruptive innovation. While inadequate skills may also hinder adoption of disruptive technologies, new business models are available (Sousa and Rocha, 2019).

Innovation that Disrupts a Business Model

Disruption does not occur in isolation (Christensen et al., 2015). Business models are important factors contributing to performance and some types of business models were found to outperform others (Foss and Saebi, 2016, p.202). Conceptual models for understanding the order of magnitude of disruptive technologies explain that the first order of disruption disturbs the local commercial markets. The second disruption has wider influence by affecting many industries and changing societal norms (Schuelke-Leech, 2018), concluding that a holistic perspective of the socio-technical ecosystem is required.

Constraints for SMEs may also include the application of big data analytics necessary for the vast volume of data generated by the IoT as well as analytical applications that help to transform processes and improve productivity (Alansari et al., 2018a; Alansari et al., 2018b).

Specifically focusing on South Africa, only since improvements over the past few years in the digital and technological infrastructure, has internet connectivity allowed South African SMEs the possibility of engaging in the world of disruptive technologies. Noteworthy are the problems with Eskom power utility where load-shedding has caused disruption to all disruptive technologies that need electricity to function (Hartley and Mills, 2019). However, Maffeo (2019) points out that SMEs must adopt new technologies as soon as possible in order to gain advantage over competitors while (Marwala, 2020) goes one step further suggesting incentivising the use of 4IR technologies to improve South African business competitiveness.

3. Research Methodology

The study adopts an interpretive philosophy in order to probe into current understanding and issues about disruptive technology and disruptive innovation. The qualitative method was adopted for this study in order to extract rich deposits of information from participants in a single case study (Harrison et al., 2017; Mills et al., 2010) using an interview schedule and focus group as the research instruments to collect data (Antwi and Hamza, 2015). This methodology was considered appropriate to answer the research questions (Babbie and Mouton, 2012; Cresswell, 2012). The interviews were semi-structured in an attempt to explore

whether there are any strategic plans / intentions to engage with the three disruptive technologies specifically identified for this study (Saunders et al., 2019). A focus group (Nyumba et al., 2017), with operational employees at the case study company were used to check the value and potential of adopting any of the selected new technologies.

The sample for data collection was from one (SME) company that manufactures and processes consumable liquid products for the South African market as well as renting of machines that make the liquid product. KwaZulu-Natal is the hub of the company while smaller operations are located in Gauteng. There are also links with overseas companies. A non-probability sample comprising of the chairperson of the company and 2 Senior managers, was followed by a focus group of three other workers consisting of 1 Service technician, and 2 supervisors – total sample was 6 persons all employed within the case study company in KwaZulu-Natal. The selection of respondents was based on first-hand knowledge and experience of the phenomenon under study while the focus group interview, allowed for the operational employees to freely express their opinions to understand how they make sense of the research issues (Cameron and Price, 2009:403). A pilot study using 3 other persons (who did not form part of the study), was conducted. Slight adjustments to two of the interview questions were made to ensure better comprehension and improved alignment with research questions and objectives for the study (Saunders, Lewis and Thornhill, 2015).

Trustworthiness remains the fundamental element that reflects the quality of a research project (Mills et al., 2010:438). The following quality measures were applied (Saunders, Lewis and Thornhill, 2015): Credibility: the study findings are congruent with reality as described by participants; Dependability: the study adopted a thematic approach to analyse the data that was reported and observed during the interview sessions. The raw data was recorded, transcribed, cleaned and codified. Transferability: findings are limited by a single case but useful to support other companies with strategic planning to adopt new disruptive technologies, and finally, Confirmability: the recorded data which was transcribed, coded, and arranged into suitable themes.

Limitation of the study lies in the isolated nature of single case study research conducted in KwaZulu-Natal, so generalisation beyond this case is not possible (Mills et al., 2010, p.893), however, one can extract similarities from the findings and verify whether such findings hold true for similar SMEs (Harrison et al., 2017).

4. Data Analysis

Thematic analysis is a useful method to organise and describe collected data (Braun and Clark, 2006; Cresswell, 2012). Analysis of the cleaned transcribed data was firstly checked and then coded using an Excel spreadsheet to check for words, themes and dispositions (Cameron and Price, 2009) and to establish links between participant opinions. Four themes emerged inductively, from data collection to general coding and then themes highlighting interesting and key features within the data sets in order to answer the research questions (Cresswell, 2012, p.238). Using the layout of the interview schedule to create a framework for the report, the following four categories were used: (1) profile, (2) awareness, (3) impact, and (4) strategic application of the three selected disruptive technologies in a single case study.

Theme 1: Profile of the Company

The company has been in business in KwaZulu-Natal for 5 years and is a small company who employ less than 50 people but has a unique operating model as complimentary partners actively participate in this venture. The company has outlets in two other provinces and global links with similar types of companies. The company does have a strategic plan that is shared from technician level upwards.

Theme 2: Awareness.

There was mixed reaction to questions on whether big data, IoT and AI were concepts that they may have heard about before the interview and results were as follows:

Table 1. *Current awareness of the three disruptive technologies.*

Disruptive technology	Was known before interview session	Was not known before interview session
Big-data	16%	83%
IoT	83%	16%
AI	66%	33%

There are limited uses of these 3 disruptive technologies at present but some attempts have been made during the normal course of the business, not necessarily motivated by anything in particular.

Theme 3: Impact of 3 Disruptive Technologies

Sub-theme: Impact on labour – the three technologies were recognised in a negative light as leading to job losses. However, following a discussion, it emerged that there could also be the advantage of new skills being required for the future where people are still needed to support IoT, and AI technologies. Re-skilling through training will be required. A model for management focusing on leadership skills, innovation skills and management skills will greatly assist managers to adjust to digital technologies and to rethink the company strategies (Sousa and Rocha, 2019). It was suggested that lower level staff will need to be introduced in a more 'gentle' way to operate new technologies efficiently.

Sub-theme: Impact on operational efficiency – all respondents were positive that they could improve general efficiency in all aspects of their business if new technologies were to be added in future, especially to survive and thrive in this market. There was overall optimism that the 3 technologies could improve the business in operational-processing, technical, marketing and packaging/processing of products.

Sub-theme: Impact on competitiveness – the company could become more competitive as they consider themselves to be a market leader and not a follower. Improvements like faster processing of orders, quicker processing of their products through greater mechanisation of processes. A bonus for the technicians would be to insert a diagnostic 'chip' (IoT) inside each rental machine to improve response times as well as customer down-time. Also, improvements on the packaging side could speed up the order processing and the preparation of larger volumes of their products. From a marketing perspective, they could drive towards greater market share both locally and internationally using new technology. One senior manager alluded to them being a market leader in a niche' market as their products are essential for all humans to consume. Competitiveness for SMEs who correctly assess the short-term risks and costs of IoT implementation (for example), will outperform their peers in the long run (Maffeo, 2019).

Theme 4: Strategic Application

Sub-theme: Strategic planning – as a means to forward plan and how best to integrate current business with disruptive technologies in a strategic way. While all the senior staff were aware of a strategic plan (or business plan) being available (83% confirmed), one of the packing area supervisors (16%) was unaware of such a plan. While the fundamentals of traditional strategic planning were not evident, a business plan for current and 3 – 6 month time horizon was understood by most staff members. The chairperson was also attuned to developments internationally within the industry. The product made by the company and the use of rental machines to any business enterprise contain consumable products essential for human survival making them somewhat product leaders within KwaZulu-Natal and surrounding areas.

Sub-theme: Timing of new technologies – there was good support from senior managers for an 'as soon as possible' introduction of the 3 new technologies to benefit the company. The packaging team who were part of the focus group were less optimistic but did considered the introduction of new technologies as being favourable. All respondents supported the idea of adopting new disruptive technologies sooner rather than later.

Sub-theme: Competitive advantage - could be improved if new technologies were implemented (cost versus time and results). All staff were aware that efficiencies could be improved and were excited about the prospects. While some of the concepts were unclear to some of the staff, everyone interviewed identified some merit in introducing innovative technologies for both production and maintenance of machines.

Sub-theme: Adoption of new technologies – all SME industry leaders must embrace change and adopt new technologies. This aspect was well supported and was considered to be a high priority. This necessitates that SMEs embrace change even under weak economic conditions which currently prevail in South Africa. AI, for example, consists of a number of technologies that are used to increase the capacity of machines to act with higher levels of intelligence and mimic human abilities to sense, comprehend and act (Access partnership/Univ. of Pretoria, 2017) – thus streamlining business processes.

Sub-theme: Upskilling staff – too be competent to engage with, and recognise opportunities going forward. Also how to set up the new technologies to benefit the company over rivals. While staff academic qualifications were, in general, not at a post Grade 12 level, there was adequate competence among the staff members to know what needed to be done at all levels of the business. The chairperson of the company also has global market exposure in this industry. For new disruptive technologies to be implemented, a great deal of upskilling would need to be undertaken to ensure efficient operating measures are attained. Upskilling in this case negated the possible loss of jobs which often detracts from the benefits of introducing disruptive technologies.

Sub-theme: Innovation - Innovation emerged as a surprise addition to the interviews. Recognition that innovation supports the strategic intent of the company also supports the idea of being sustainable and

providing quality products and services. SMEs must avoid the trap of thinking a company can make money indefinitely by following their traditional business model as it runs the risk of losing out to more flexible competitors (Strategy+Business, 2017) – which in essence supports the argument put forward by Christensen (1997).

The chairperson was mindful of innovation and change but this should not disrupt the current mode of operation. Supported by comments from the two senior managers who suggested changes to monitoring of rental equipment, social media marketing advances to their current platform, and improvements in the bottling and packaging processes, the only downside reported related to financing of new innovative technologies.

5. Conclusion and Recommendations

The findings are regarded as setting a framework for further investigation because it is obvious that the benefits of adopting new disruptive technologies far out-weight the possible negative images one may have. The case study method allowed a glimpse into the entrepreneurial world of a small company with big aspirations who also have a global focus. The theoretical debate has been raging for many years but only in the recent past few years has there been a significant drive for change to adopt new technologies in South Africa inspired by the 4th Industrial Revolution (4IR). During 2019, many conferences, books, online articles emerged, all presenting a view of the future and directing attention towards 4IR and investment opportunities in South Africa (Erasmus et al., 2019; Getsmarter, 2019). So, it is safe to say that the government was aware of the need to support entrepreneurs, to engage in new technologies outlined by 4IR and possibly to incentivise digital adoption in SMEs (Naude', 2017; Mawala, 2020). The speed and measures of change are not to be ignored (Xu et al., 2018; Laithwaite, 2019).

5.1. Recommendations

The following recommendation may be made to help in developing a strategic approach for small firms to ensure sustainability within a disruptive technology environment following the collection of rich qualitative data from a single case study:

SMEs must prepare to adopt new disruptive technologies – now!: In order to avoid a sudden reactionary approach to digital disruptive technologies that may occur from some SME owners, setting out a strategic plan of action is highly recommended albeit a loosely structured plan of action (Chapman, 2019). This study recommends that SMEs be prepared for disruptive change in order to bring about a better trajectory into embracing new technologies for the purpose of improving the state of business. Failure to do so could mean that the entrepreneur becomes a follower within an industry that he/she previously dominated (Christensen,1997; Christensen and Raynor, 2003).

Information sharing on Big-data, IoT, AI for SMEs: There must be some strategy whereby suitable information about new disruptive technologies is brought to the attention of the owner entrepreneur and the staff members who may be skilled or unskilled workers. Social media could be one of the avenues to popularise the use of these new technologies.

Re-skilling staff to avoid loss of jobs: The case study pointed out that one of the negative aspects of disruptive technology is that there are likely to be job losses. There will need to be re-skilling of workers to allow them to engage constructively in the new technologies. While there will be future cost implications for the entrepreneur, some jobs will be lost and new jobs will emerge.

Strategic planning to integrate disruptive technologies into the business model: Planning ahead to embrace disruptive technology is necessary for two reasons, one is a matter of survival and the second is to keep ahead of the competitors. Integrating existing practices with new technology is a vital future step to take for SMEs in KwaZulu-Natal.

The benefits of implementing disruptive technologies now (without further delay), could improve efficiencies and overall business performance. Improvements can be made to all areas of business (Cag, 2020; Lateef, 2019, Matthews, 2018). It is no longer a case of 'business as usual' for SMEs in KwaZulu-Natal, rather that they embrace disruptive technologies as soon as possible to become more competitive.

Quo vadis* – unforeseen changes to the *status quo.

Soon after collecting the case study data, the Covid-19 pandemic arrived in South Africa and a country-wide lockdown was declared in March 2020. This action forced all businesses to go into an online or virtual

mode of operation or remain in isolation as the economy ground to a halt during stage 5 of the lockdown with only essential services being allowed to operate (Moodley, 2020). Rapid attention was directed towards medical solutions for the deadly Corona virus sweeping through South Africa and across the world. All SMEs were forced to stop operations unless they formed part of essential services (BusinessTech, 2020) affecting 525 000 businesses and 6,6 million employees. Policy makers had to make the unprecedented trade-off between ensuring public health and the economic survival of SMEs. Significant adaptation of the capabilities of 3D printers also ensued in the manufacture of hospital face shields for frontline medical workers (IoL News, 2020). Noteworthy was the fact that all such applications require big data to function. All of these 'forced' changes supported the purpose of the study and emphasised the need for SMEs to digitise their operations as soon as financially possible.

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