DURBAN UNIVERSITY OF TECHNOLOGY

ADOPTION OF BUSINESS INTELLIGENCE BY MICRO-SMALL APPAREL BUSINESSES IN THE GREAT ETHEKWINI REGION

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ADOPTION OF BUSINESS INTELLIGENCE BY MICRO-SMALL APPAREL BUSINESSES IN THE GREAT ETHEKWINI REGION

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DECLARATION

I hereby declare that, except where noted, this dissertation represents my own work, and that all references, to the best of my knowledge are accurately reported.

15 August 2023

…… ……..

WINISWA MAVUTHA DATE

DEDICATIONS

In loving memory of my brother, Mongezi '***MOTION***" Mpoto, this one is for you Khwetshube kaXhanga. Your ambition and passion for education will forever remain in my heart. You always pushed us to reach for the stars and only wanted the best for us, that is something I will forever cherish. You were the best big brother anyone could ever ask for; I want to assure you that I will always be in ***MOTION*** to reach for the stars. The sky is not even the limit, there are footprints on the moon.

May your loving soul continue to Rest In Power!

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Thank you for being my biggest cheerleader!!

Lastly, I would like to dedicate this piece of work to the small town/village girl with global dreams. For the girl who might have lost hope but has a burning passion in her heart. May you never stop dreaming, never stop believing in yourself even when nobody else believes in you. Remember you are not where you come from, your background is just a part of your story. Never forget that you are your own superpower, only you can save yourself.

The future is female and we are here to take ownership and change the narrative!

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ABSTRACT

The increasing pressure of costs in the Small Medium Micro Enterprise (SMME) sector produces the need to continually improve management efficiency. This requires the use of different approaches, methods and tools. One method is the use of a digital business analytical tools, such as those related to business intelligence (BI). BI assists businesses with the analysis of information to make better decisions to improve business performance.

The objective of this study was to determine factors influencing the adoption of BI in micro-small apparel retail businesses in the eThekwini region. This was a cross-sectional study conducted among 161 apparel business owners who were selected using non-probability purposive sampling. Data was collected using an anonymous questionnaire. Multiple linear regression was conducted to determine the influencing factors for business intelligence adoption. The conceptual framework used for this study was the technology-organisation-environment (TOE) framework. The results from this study found that the factors that significantly influence the adoption of BI in micro-small apparel businesses in the eThekwini region are perceived relative advantage, organisational readiness, management support and organisational data environment. The results of this study have also indicated that there are not sufficient government incentives offered for technological innovations such as BI , particularly for micro-small businesses. While there are a number of government funding opportunities and business support mechanisms, the respondents indicated that government incentives do not support the adoption of BI and all the factors needed to be considered during the adoption process. The adoption and use of BI in the South African context could contribute greatly to the country's GDP and generally create growth opportunities for South African SMMEs in the global market. Government support for such an initiative would help decrease the high unemployment rate in South Africa as more jobs would be created around the country through these projects.

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ACRONYMS

ATASA	- Apparel and Textile Association of South Africa
BI	- Business Intelligence
BIS	- Business Intelligence Systems/Solutions
CRM	- Client Relationship Management
DFF	- Durban Fashion Fair
DOI	- Diffusion of Innovation
DTI	- Department of Trade & Industry
ERP	- Enterprise Resource Planning
IT	- Information Technology
IS	- Information Systems
KZNFC	- Kwa-Zulu Natal Fashion Council
NBC – CI	- National Bargaining Council for the Clothing Industry
NQF	- National Qualifications Framework
OLAP	- Online Analytical Processing
POS	- Point of Sale
ROI	- Return On Investment
SACTWU	- Southern African Clothing and Textile Workers Union
SEDA	- Small Enterprise Development Agency
SEFA	- Small Enterprise Finance Agency
SME	- Small Medium Enterprises
SMME	- Small Medium Micro Enterprise
SETA	- Sector Education and Training Authority
SPPSS	- Statistical Package for the Social Sciences
TAM	- Technology Acceptance Model
TOE	- Technological Organisational Environmental

CHAPTER 1:INTRODUCTION

1.1 Introduction

According to Ain, Vaia, DeLone and Waheed, (2019), a Business Intelligence (BI) system is a collection of technological tools that enables organizations to gather, consolidate, and analyze large amounts of data to gain insights into their strengths, weaknesses, and opportunities. Business Intelligence (BI) is an information system that aids in decision-making processes by enabling the aggregation, systematic integration, and management of both structured and unstructured data. It is designed to handle large volumes of data, including "Big Data," and provides end-users with enhanced processing capabilities to uncover new insights. BI also offers analytical solutions, ad hoc queries, reporting, and forecasting functionalities.

In addition, Bordeleau, Mosconi, and de Santa-Eulalia (2020), stated that business objectives are the driving force behind technological initiatives, which may include the development of new data-based services or the implementation of more efficient processes through autonomous cyber-physical systems. Moreover, the prevalence of big data technologies has a significant impact on the management of operations.

The increasing use of information technology (IT) resulted in an increase in competition and associated expansion in the range of products available to consumers. Hence, enterprises are functioning within dynamic and intricate contexts, necessitating the vital role of a Business Intelligence System (BIS).

According to Yiu et al. (2021), the implementation of business intelligence (BI) systems has proven to be beneficial for businesses by facilitating profit growth and improving overall productivity. The advancements in innovation and information technology (IT) have given rise to heightened competition among providers, leading to a wide array of options available for customers to select from. Choi et al. (2022) assert that contemporary businesses are confronted with intricate and ever-changing operational landscapes, necessitating the incorporation of essential innovation mechanisms like business intelligence systems (BIS). Business Intelligence (BI) refers to the systematic process of gathering, organising, and evaluating data in order to extract valuable insights that can be effectively applied to enhance decision-making within a business

context. The proficient management, retrieval, and analysis of large quantities of data are imperative for making informed business decisions. Failure to do so can lead to missed business prospects and, more significantly, the potential loss of valuable learning experiences.

The primary aim of Business Intelligence (BI) is to furnish business managers and analysts with the essential tools and resources to proficiently carry out comprehensive business analysis (Passlick et al., 2023). Additionally, smaller businesses often face challenges in utilising business intelligence (BI) due to their limited technical expertise in transforming data into actionable information for effective decision-making in business operations. According to Choi et al. (2022), it is crucial for businesses of all sizes to adopt Business Intelligence (BI) as a means to enhance decision-making processes through the acquisition of comprehensive information. Business Intelligence (BI) plays a pivotal role in improving business performance, increasing profitability, and gaining a sustainable competitive advantage, while simultaneously meeting customer satisfaction.

In addition to a variety of limiting factors, small, medium, and micro enterprises (SMMEs) frequently face challenges in establishing a sustainable competitive advantage (Mkhize, 2022). One potential solution for smaller businesses is the advent of innovative technologies specifically developed to support and enhance business operations, thereby increasing their competitiveness. The higher the level of effectiveness exhibited by an innovation, such as Business Intelligence (BI), the greater the probability of successfully addressing challenges within businesses. Consequently, this increases the likelihood of the adoption of such innovations. A recent study conducted within the eThekwini municipality examined the incorporation of management accounting practises as innovative strategies that have the potential to enhance the sustainability of small, medium, and micro enterprises (SMMEs) (Msomi et al., 2020). Inquiries pertaining to the generalizability of the findings derived from the study conducted by Msomi et al. (2020) prompted an examination into the uptake of innovative technologies such as Business Intelligence (BI) systems. The researchers were particularly interested in the potential of these innovations to have a positive impact on the sustainability of small, medium, and micro enterprises (SMMEs).

Furthermore, the researchers Muhwati et al. (2021) have shown a lack of attention towards small, medium, and micro enterprises (SMMEs) operating in the apparel sector. This has sparked the interest of the researcher.

Several recent publications have put forth a series of recommendations endorsing the allocation of resources towards business intelligence (BI) by small, medium, and micro enterprises (SMMEs). The study's findings indicate that experts strongly advocate for the implementation of a more agile approach when considering investments of this nature. Furthermore, Llave et al (2018) proposed a study to examine the preparedness and capabilities of small and medium enterprises (SMEs) in the context of business intelligence (BI). Becerra-Godínez et al (2020) emphasised the absence of a definitive strategy for small and medium-sized enterprises (SMEs) in adopting business intelligence (BI), as a significant number of businesses in this sector have not yet capitalised on these innovative technologies. Presently, there exists a scarcity of scholarly studies pertaining to the area of business intelligence (BI) and analytics within the context of Small and Medium Enterprises (SMEs) (Llave, et al., 2018). Nevertheless, there is a noticeable dearth of research concerning the implementation of business intelligence (BI) tools within the small, medium, and micro enterprises (SMMEs) operating in the apparel sector. Consequently, this has prompted an investigation into the adoption of BI tools among SMMEs in the apparel retail industry.

1.2 Structure of the chapter

The first chapter of this dissertation is divided into nine sections, which will cover the background to the study, the problem statement, overall aims and objectives of the study are stated once the problem has been identified. This is followed by a summary of the research design and methodology applied as well as the limitations and possible delimitations of the study. To conclude a study format will be presented showing the summary of content in each of the chapters within this study.

1.3 Background to the study

According to Kikawa, Kalema, and Carol, (2019), the prioritization of small and medium-sized enterprises (SMEs) by the South African government is attributed to their potential for employment generation, which is particularly significant in light of the

country's elevated unemployment levels. The adoption of Business Intelligence (BI) tools is imperative for Small and Medium Enterprises (SMEs) to operate at their optimal level. The categorization of BI tools is based on their approach to providing information, their ability for generating reports, and their capacity for statistical, ad-hoc, or predictive analysis. Moreover, the selection of an appropriate Business Intelligence (BI) tool that can integrate multiple disparate business and financial systems is a feasible undertaking, as it facilitates the provision of a unified perspective of the organization's overall performance.

The management and protection of data, information, and knowledge are essential for businesses as these elements constitute the fundamental components that define and comprise an organization. The increasing reliance on real-time data and advanced technology has compelled businesses to function in intricate and ever-changing settings, wherein the issue of data overload may arise as a potential challenge (Luciano *et al*. 2018).

The adoption of business intelligence systems has the potential to address the issue of information imbalance that is commonly encountered by small, micro, and medium-sized enterprises (SMMEs). This challenge arises from the absence of effective tools and strategies for managing information, as noted by Hussain *et al*. (2018). Hence, it is crucial to identify the determinants that will impact the adoption of business intelligence among small and medium-sized enterprises to effectively leverage business intelligence tools and applications (Cokins, 2017).

Small and medium-sized enterprises (SMEs) commonly encounter technological uncertainty when determining which cloud service to implement and which cloud service providers (CSPs) to enlist, particularly in light of the growing prevalence of cybersecurity threats, Chavan and Sonawane (2017) add that the efficacy of small and medium-sized enterprises (SMEs) in transferring data from on-premises information systems to cloud-based platforms is contingent upon their capacity to choose secure Cloud Business Intelligence (BI) solutions that align with their business requirements, in addition to selecting dependable Cloud Service Providers (CSPs). Small and medium-sized enterprises (SMEs), especially those located in small towns, encounter

numerous obstacles in this regard due to their operations being concentrated in regions where the availability of information technology (IT) experts is significantly restricted. Consequently, the responsibility of assessing cloud services falls upon small and medium enterprise (SME) owners and managers who may lack the necessary technical knowledge in the field of information technology.

According to Beswick (2016), there is great competition amongst apparel retail businesses, due to the unpredictability of seasonal trends. They often have to either increase or decrease their inventory according to market demands. There are certain things that can be controlled and others that cannot. For example, if winter has not been as cold as predicted, apparel businesses have to adjust to that by marking down their products and reducing their forecast to let go of stock that is not selling. In other instances, retailers might find themselves running out of best sellers too quickly. However, BI can assist businesses in this regard. Beswick (2016) agrees that without the appropriate software systems in place, managing the above can be problematic for small apparel businesses that do not have a BI in their organisations.

SMMEs make a significant contribution to a country's economic development and growth. However, there are quite a number of challenging factors that affect the growth and sustainability of SMMEs. In addition, to various limiting factors, SMMEs end up failing to build a sustainable competitive advantage (Dladla 2016).

In South Africa out that only two out of every five businesses established will survive for six or more years, and only a small number will accomplish considerable growth during the first four years. As if that is not enough, China and India have improved their manufacturing sector through their low-priced manufactured products, creating a highly competitive environment (Terziovski 2010 as cited in Dladla 2016).

Turton and Herrington (2012) as cited in Dladla (2016) suggest business performance has been identified as the main cause of failure for SMMEs, particularly those in the manufacturing sector, which results in consistent low success rate of SMMEs in South Africa.

According to Tutunea and Rus (2012), it is necessary for businesses to adopt BI for informed business decision making processes, no matter what the size of the business or the country. BI is an essential tool to improve business performance, increase profit and create a sustainable competitive advantage while also meeting customer satisfaction.

Chon and Chan (2012) identified the three stages used in innovation diffusion as follows: evaluation (also known as the assessment stage), adoption, and implementation (usage). When an innovation is considered to take place in an organisation, it first has be evaluated. This is where the owner/managers of the businesses need to identify their business needs and determine all the problems they are dealing with, so they can find a suitable BI system to assist in this regard. The better the innovation (such as BI) can solve the challenges in the businesses, the more likely it is for it to be adopted. The next stage in the adoption process which involves the training of staff and appointing a person who will head up the project in the organisation in order to prepare for the last stage, which is the implementation stage, also known as usage.

1.4 Problem statement

Due to organisational characteristics and limited resources, understanding and fully adopting BI can be an intimidating exercise for SMMEs, as even large company managers have limited understanding of these systems. Llave (2017) states that there are no studies found on literature reviewing research on BI and analytics in SMMEs. Llave (2017) points out that although there is a shortage of literature on SMMEs, various BI tools are often adopted by large organisations, therefore research on BI has been conducted on these organisations and not necessarily on SMMEs.

The adoption of business intelligence systems has the potential to address the issue of information imbalance that is commonly encountered by small, micro, and medium-sized enterprises (SMMEs). This challenge arises from the absence of effective tools and strategies for managing information, as noted by Hussain *et al*. (2018). Hence, it is crucial to identify the determinants that will impact the adoption of business intelligence among small and medium-sized enterprises to effectively leverage business intelligence tools and applications (Cokins, 2017).

Small, Medium and Micro Enterprises (SMMEs) are significant drivers of the future economy, playing a pivotal role in fostering innovation and promoting the development of new products and socio-economic growth (Kikawa, Kalema, and Carol, 2019). Consequently, Bordeleau, *et al*. (2020), stated that there exists a significant imperative to increase the growth, transmission of information, and competitiveness of SMMEs. Historically, Ain, *et al*. (2019) mentioned that business intelligence solutions and tools were primarily designed to cater to the needs of large enterprises, rendering them unattainable and inadequate for small, medium, and micro-sized enterprises (SMMEs).

Therefore, small, medium and micro enterprises (SMMEs) had limited options when it came to alternative business intelligence (BI) solutions. In the current landscape of fiercely competitive business, small and medium-sized enterprises (SMEs) have developed customized solutions to meet their unique needs. Regrettably, the adoption of these customized solutions to enhance their socio-economic performance remains elusive. The adoption of Business Intelligence (BI) in Small and Medium Enterprises (SMEs) has the capacity to enhance or revolutionize the management of data, leading to augmented profitability, competitive edge, and the establishment of refined business procedures (Kikawa, Kalema, and Carol, 2019)

According to Moyo and Loock (2021), although cloud services offer numerous benefits, factors such as cybersecurity threats, privacy concerns, and trust and reliability issues with cloud service providers (CSPs) have been identified as significant barriers to the adoption and utilization of Cloud BI applications by SMEs. In this context, the assessment of cloud services and applications assumes a significant role for small and medium-sized enterprises (SMEs) in their endeavour to embrace and utilize Cloud Business Intelligence (BI) applications.

Additionally, Kalidas, Magwentshu and Rajagopaul (2020) stated that there is a dearth of research on the evaluation and selection process of appropriate Cloud BI applications and other cloud services for South African SMEs, as existing studies on the subject matter fail to provide any insights in this regard. Amidst the COVID-19

pandemic, small and medium-sized enterprises (SMEs) were compelled to expeditiously adjust to the evolving work milieu and sustain their operations. Consequently, they had to make numerous concessions by utilizing cloud services and other web-based applications to facilitate their business activities.

1.5 Objective of the study

The main objective of the study was to understand the factors that influence the adoption of BI in micro-small apparel businesses in the greater eThekwini region.

1.6 Sub-objectives of the study

1. Establish the factors that influence the evaluation of BI in micro-small apparel businesses.
2. Establish the factors that influence the adoption of BI in micro-small apparel businesses.
3. Establish the factors that influence the use of BI in the micro-small apparel sector.

1.7 Research questions

- What are the perceived relative advantages of BI adoption?
- Is the business currently using BI or considering to adopt it in the near future?
- If BI has been evaluated but not yet adopted, what are the hindering factors for adoption?
- Can the businesses afford to adopt BI?
- Are the businesses getting any support from the government?

1.8 Significance of the study

This study is significant in that businesses in the micro-small apparel sector will be exposed to the benefits of adopting and using BI in their organisations for managing their data in order to improve business decisions with regards to business performance, while maintaining customer satisfaction and retention. Sabherwal and Fernandez (2011) stated that BI solutions also help improve the quality of customer

service provided by the organisation and BI systems can help organisations to anticipate the consequences of changes in customer-oriented processes.

When BI is used well and detailed analysis of data is conducted, the performance of the company is likely to change for the better which will lead to sustainable business growth and profitability. BI enables businesses to access data such as inefficient business processes and hidden patterns as well identify strengths and weaknesses.

The apparel sector is one of the fastest growing sectors in South Africa. It offers both employment growth and small business opportunities, mainly due to low barriers to entry. However, one cannot disregard the hard work and skill needed to become a successful sustainable business. BI is critical to assist with the potential success factors.

1.9 Research methodology

Research methodology is about maintaining consistency across purpose, design and implementation of the research methods used. The research methodology for this study is quantitative research because it is suitable for business research because this method numerical data that is then statistically examined to find trends and patterns (dos Santos *et al.* 2021).

1.9.1 Study type

The design for this research was a quantitative cross-sectional study which involves analysing information about a population at a particular point in time. This study made use of both analytical and descriptive cross-sectional designs. Analytical cross-sectional studies look into the relationship between two variables. Descriptive cross-sectional studies determine the frequency, extent or severity of a particular trait across a given demography (Simkus 2021).

1.9.2 Sampling

The researcher employed non-probability sampling for this investigation. Non-probability sampling contains six distinct sample types, according to dos Santos et al. (2021), including quota sampling, purposive sampling, convenience sampling, theoretical sampling, opportunistic sampling, and snowball sampling.

Purposive sampling was chosen from among these many sample techniques for this study. Purposive sampling, according to McCombes (2019), is described as judgmental sampling, in which the researcher uses their experience to choose a sample that will be most helpful to their study goals.

1.9.3 Data collection

A quantitative survey, with the use of a questionnaire, was carried out. A questionnaire from a study conducted by Puklavec, Oliveira and Popic in 2018 was adapted and used as a guideline for the questionnaire. Data was collected by means of structured questionnaires set in a Likert scale format. In order to test content and face validity from the research questionnaire, a pilot study was conducted. Thereafter, any questions that were seen to be unclear, deceiving or indefinite were removed.

The researcher personally walked into various micro-small apparel business owners in the greater eThekwini region. The selection of the visited business was judgemental, based on accessibility, safety and convenience.

1.9.4 Data analysis

The data was analysed and shown in the form of frequency tabulations and cross tabulations. Data was analysed using the Statistical Package for Social Sciences (SPSS) Version 13.0 with the following tests:

- Descriptive analysis – requires the use of means and standard deviations. Frequencies are displayed in tables or graphs. A technique for accurately describing the type and scope of sensory attributes is descriptive analysis. Through the ability to generate objective, statistically valid, and statistically interpretable data, it was designed to represent a substantial advancement that

gave sensory evaluation a scientific foundation (Munoz, Kemp, Hollowood and Hort, 2018).

- The chi-square goodness-of-fit test – A categorical variable is subjected to a univariate test to determine whether response alternatives are significantly more/less frequently chosen than the others. The null hypothesis makes the assumption that every response was chosen equally.
- Regression analysis – In a regression analysis, one or more independent variables are chosen to best predict the value of the dependent variable, and a linear regression is used to determine the coefficients of the linear equation.
- One sample t-test: Tests whether a mean score is significantly different from a scalar value.

1.9.5 Delimitations

The following delimitations were applicable to the study:

- The study was be delimited to the greater eThekwini region only.
- It was also delimited to the list of SMMEs as per the KZNFC.

The above two delimitations have been applied due to budgetary and time constraints. Because of this, generalisation should be approached with caution.

1.9.6 Limitations

The major limitation to the study was lack of literature of research conducted on the exact same context. The majority of the research that has been reviewed in this study has been conducted in other regions of around the globe, mostly in manufacturing SMMEs, and e-commerce SMMEs. Research in micro-small businesses, particularly those operating in the apparel retail sector was still lagging. Other research studies conducted in the South African context have focused on SMMEs in general, there has not been much research conducted on BI adoption for micro-small businesses holistically. This resulted in some of the sources used from similar studies dating from more than 5 years ago.

The majority of the respondents did not know or understand what BI is, therefore the researcher had to first explain what BI is and how it relates to the context of their businesses. After experiencing this with a few respondents, the researcher added the

definitions to the questionnaire. There also seemed to be a misinterpretation of a few other terms in the questionnaire, like feasibility, data management, and financial reporting. Therefore, the researcher had to constantly explain these terms. Judging from the results of the study, it is possible that there could have been a lot of confusion within the respondents which will have impacted the findings.

The Covid-19 pandemic had a huge impact during the data collection stage. Due to the lockdown regulations it was difficult for the researcher to conduct the research in person by doing walk-ins to the various businesses. Therefore, the researcher had to send the questionnaires via different social media platforms, such as WhatsApp, Facebook Messenger and Instagram Messenger. This was extremely difficult as data expenses are a huge obstacle for the majority of the people. The response rate was very slow, people would respond after multiple messages and reminders to participate in the questionnaire.

Some people did not respond, which meant more businesses owner/managers had to be approached which was quite time consuming. After months of waiting, there was eventually enough responses to analyse the data. However, the data was quite fragmented and therefore could not be used for the research. Fortunately, the regulations had been amended and things were back to normal for the researcher to conduct the questionnaire in person as initially intended. The results from this were then used for the study and analysed accordingly.

1.9.7 Validity

In order to test how valid the various constructs are in the questionnaire, an exploratory factor analysis was carried out in order to decide if each individual question contributes towards the main constructs in the questionnaire (Wiid and Diggines 2013). For this study, face validity was ensured by selecting scale items that have previously met the requirements of measuring the construct of research. Face validity checks whether the questions are clear and understandable. A pilot study was conducted to test these items. In order to check the accuracy of the questionnaire, the researcher consulted with various research experts.

1.9.8 Reliability

When different measurements produce consistent results, a measure is said to be reliable. Reliable statements are assumed to be stable and consistent. Cronbach's alpha was used to determine the reliability of the composite measure. The coefficient for Cronbach's alpha lies between 0 and 1, with any value that is below 0.6 considered to represent less than satisfactory internal consistency and hence reliability. Ideally, values that are above 0.7 can be stated to indicate that statements in a group are internally consistent with each other (Saunders, Lewis and Thornhill 2019).

1.9.9 Ethical issues related to the research

Ethical clearance for this study was granted by the Durban University of Technology's (DUT) ethics committee.

At the beginning of this study, the participants received a letter of information (Annexure B) and a letter of consent (Annexure C). Every participant received a detailed explanation of the study's purpose. that the participants were assured of anonymity and confidentiality.

1.10 Format of the study

- **Chapter 1: Introduction**

The context of the study, the problem statement, the aims and objectives, the main research questions, and the significance of the study were all covered in this chapter. The study format is also shown, with a description of the material in each chapter of this dissertation.

- **Chapter 2: Literature review**

The chapter starts by defining of adoption within innovation diffusion then proceeds to discussing the different types of innovation theories. This chapter surveys the literature related to BI and SMMEs, and the challenges and barriers faced by SMMEs in SA. A brief overview of the South African apparel sector as well as the apparel sector in the eThekwini region is presented.

- **Chapter 3: Research methodology**

This chapter discusses various research methods, sampling size and strategy, limitations, reliability and validity of the study.

- **Chapter 4: Analysis of results**

The results and findings of the study are discussed in this chapter.

- **Chapter 5: Discussion of results**

This chapter discusses the results in relation to past research findings.

- **Chapter 6: Conclusion and recommendations**

This chapter outlines the overall conclusions, implications, recommendations as well as possible future studies arising from this study.

1.11 Conclusion

This chapter introduced the study by beginning with outlining the background and problem statements, followed by the objectives and research questions. A motivation was provided to justify the reasons for conducting the research. The following chapter provides a thorough analysis of the literature sources in the diffusion of innovations, business intelligence and SMMEs in South Africa as well the micro-small apparel sector in SA and in the eThekwini region.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

In order to comprehend the influencing factors regarding the adoption and user acceptance of BI, two theoretical foundations that have been used by researchers and practitioners in both larger and small enterprises stand out (Puklavec, Oliveira and Popovič 2018. These are known as the diffusion of innovation (DOI) theory and the technology-organisation-environment (TOE) framework. The DOI theory and TOE framework are usually applied as the underlying theory bases for various organisational investigations and theories (Chong et al., 2009).

A constant improvement in management efficiency is required due to the growing pressure on costs in the SMME sector. To achieve these needs, it is necessary to apply a variety of strategies, techniques, and equipment. Utilising tools for business analysis, such as BI, is one such strategy (Olexová 2014). BI is described as "the process of integrating data from various internal and external data sources, applying analysis tools and methodologies to comprehend the information within the data, and making conclusions and taking decisions based on this gained insight" (Gangadharan and Swami, 2004:140). In simple terms, BI assists businesses with the analysis of information to make better decisions to improve business performance.

Global organisations have been compelled to employ BI technologies as the challenges of making quick and accurate business decisions in highly competitive marketplaces have increased. SMEs continue to lag behind large firms in the use of BI. BI can be used by all organisations, regardless of size, to compile, organise, and analyse data for aided decision-making that increases profitability (Boonsiritomachai, McGrath and Burgess 2016). Llave (2018) stated that the question remains as to why most businesses (particularly SMMEs) have not yet adopted BI. Few studies have examined the variables influencing BI in the context of SMMEs (Boonsiritomachai, McGrath and Burgess 2016). Hence, the motivation to conduct this study.

This chapter discusses literature on the theories behind BI adoption by SMMEs (such as the DOI theory and the TOE framework), SMMEs in South Africa, and the factors influencing BI adoption as well as the challenges and barriers of BI adoption by

SMMEs in South Africa. The literature will also discuss the South African apparel sector and the eThekwini apparel sector. Thereafter, BI and its impact on SMMEs will be discussed followed by user acceptance of BI amongst SMMEs. The last section of the literature will be the conceptual framework of the study.

2.2 Theoretical background

According to Puklavec, Oliveira, and Popovič (2018), a variety of theories, systems, and models have shaped the field of innovation selection over the past few decades. These include the DOI theory, the theory of planned behaviour, the theory of the technology acceptance model (TAM), and the technology-organisation-enhancement model.

2.2.1 The diffusion of innovations theory

The gradual diffusion of an innovation through a social system is described by the DOI theory. An innovation's adoption is seen as a component of the larger diffusion process. The DOI hypothesis takes into account a number of variables, including how a potential adopter's psychological or personal characteristics and their views of technology may affect the diffusion or adoption process (Trott 2012). Schiffman and Wisenblit (2019) define the diffusion of innovations as a macro process that occurs over time as members of a social system come to accept an innovation (i.e., a new product, a new service, a new idea, or a new practice).

The DOI hypothesis aims to explain how and why new concepts and methods spread out across potentially lengthy timescales. The DOI theory was initially proposed by Rogers (1983) with the initial goal of defining the factors that have an impact on the process of innovation dissemination and adoption (Boonsiritomachai, McGrath and Burgess 2016).

2.2.1.1 Five factors for acceptance of Innovation

According to this theory, prospective users evaluate innovations based on their perceptions and determine whether to adopt them if they exhibit one or more of five general characteristics: relative advantage, complexity, compatibility, trialability, and observability. The five factors that influence the adopter’s perceptions are discussed below:

- **Relative advantage** - Relative advantage reveals how much potential adopters view an invention as superior to older methods of carrying out the same activity. However, they found that despite the benefits that BI brings, organisations that supply BI do not necessarily elaborate and demonstrate its benefits to SMMEs, which is one of the reasons that inhibits them from adopting BI applications (Kikawa, Kalema, Carol 2019).

- **Compatibility** - The degree to which potential users see an innovation as being compatible with their current needs, values, and behaviours is known as compatibility (Rogers, 1995). According to Schiffman and Wisenblit (2019), compatibility also refers to the innovation as being compatible with the infrastructure required to support it. As a result, a company may have to spend more time and money to transfer its data. In turn, this could result in inhibiting the adoption of BI, as SMMEs with insufficient funds are less likely to accept a non-compatible and costly innovation (Kikawa, Kalema, Carol 2019).

- **Trialability** - The DOI hypothesis defines trialability, a factor of adoption, as the extent to which an idea may be tested on a limited basis (Rogers 2003), or on a small scale (Schiffman and Wisenblit 2019). The more opportunities there are for people to test out new products, the simpler it is for them to assess the technology and ultimately embrace it. Real experimentation and evaluation of exploratory results are also essential requirements for adoption. Additionally, risk avoidance behaviour is said to take precedence over perceived benefits in high-risk situations. However, trialing may help them decide to adopt (Banerjee, Wei and Ma 2012).
- **Observability** - The degree to which potential users of an innovation may see the outcomes of utilising it from users who have already accepted it is known as observability. Observability has been found as a quality that significantly affects adoption, much like trialability (Schiffman and Wisenblit 2019). Additionally, Kikawa, Kalema and Carol (2019) discovered that potential adopters' perceptions can shift if an innovation's results are obvious.

2.2.1.2 Three stages of diffusion of innovation

Traditionally the DOI theory has five stages, namely, knowledge, evaluation (persuasion stage), adoption (decision stage), use (implementation stage), and confirmation. However, the evaluation (persuasion stage), adoption (decision stage), and use (implementation stage) are the only three that are typically examined in studies on innovation diffusion (Chong and Cha, 2012). In line with the literature on innovation diffusion, a firm's evaluation of the innovation is the first step in the adoption of an innovation. This initial phase focuses on identifying requirements and concerns, prioritising them, and investigating the surroundings of the organisation for innovations that could be useful in solving difficulties for the organisation (Rogers 1995).

According to the potential of BI to improve a firm’s performance in its business operations may be a crucial motivation for the firm to receive BI. According to Chong and Chan (cited in Puklavec, Oliveira, and Popovič 2018, the three stages mostly used in innovation diffusion, are as follows: evaluation, adoption, and use.

The evaluation stage can be described as the persuasive (pre-adoption) stage. The integration of the innovation begins when the business evaluates the innovation. This stage focuses on the identification and emphasising the needs and issues the business is faced with. In this instance, the evaluation would consider whether a BI tool could assist (Puklavec, Oliveira, and Popovič 2018. For example, BIS evaluation could be defined as the assessment of the importance of utilising BIS in the organisation to improve business operations with regards to cost reduction and market development. The activities associated with identifying a need and looking for answers are reflected in this; stage, gaining knowledge of or understanding of already-existing innovation, developing a first impression of it, and advocating for adoption (Rogers 1995, Hameed, Counsell, and Swift 2012).

Choosing to implement (adopt) the suggested concept entails evaluating the desired solution from a practical, strategic, financial, and/or technical perspective and assigning resources for its application (Hameed, Counsell and Swift 2012). According to Puklavec, Oliveria and Popovic (2018) top managers evaluate an innovation at this stage to determine whether it will aid in the formulation of organisational goals and

objectives. During the adoption stage a decision is made on whether the problems faced by a business could be solved by the innovation (in this case BI). In other words, BI adoption is making the choice to use the BI for improved business performance. BI adoption decisions are found to create critical contrasts between adopters and non-adopters in terms of internal resources and external environments The adoption stage is regarded as an essential step towards widespread usage of technology (Hameed, Counsell and Swift 2012; Puklavec, Oliveria and Popovic 2018).

Usage is described as acceptance, adjustment for and usage of the innovation within the firm (Zhu, Kraemer and Xu 2006). This suggests that adoption and usage are two distinct stages in the DOI theory. In this case, BI would be broadly used as an essential part of the company's operational performance. This stage focuses on tasks connected to, adapting to, and getting the organisation ready for the innovation's widespread use. Additionally, it performs a trial to verify and demonstrate the acceptance of an invention by an organisation and its personnel (Rogers 1995; Hameed, Counsell and Swift 2012).

However, DOI theory has been censured for placing more attention on the technological component of the adoption process. According to Pichlak (2015), the understanding of the critical determinants that arise during the phases of the adoption process is inhibited by a number of limitations, indicating the need for further research. In addition, Pichlak (2015) suggested that other variables that need to be included are structural factors such as administrative intensity, internal and external integration, and organisational factors such as technical knowledge resources and lastly characteristics of top managers (Boonsiritomachai, McGrath and Burgess 2016).

These factors are not covered in the DOI theory, hence several researchers have adapted the TOE framework, because it focuses on all the critical factors that influence innovation adoption, particularly BI. Pichlak (2015) suggested that future research should explore the relationships between the technological, organisational, environmental factors as critical determining factors of the adoption of innovation process in different contexts, industries and cultures in other developing economies.

2.2.2 The TOE framework

The TOE framework, which Tornatzky and Fleischer (1990) first developed in 1990, can be seen as an extension of the DOI theory to enhance what has typically been ignored: the organisational and environmental variables that contribute both opportunities and restrictions to the decision to adopt a technology (Pukalavec, Oliveira, Popovic 2018).

The TOE framework offers a valuable analytical framework for examining how various forms of IT innovation are adopted in a variety of technological, organisational, and external situations (Oliveria and Martins cited by Pukalavec, Oliveira, Popovic 2018).

Due to BI technology's increasing affordability and organisations' desire to make decisions quickly, the use of BI technology to help enterprises has increased. Therefore, SMMEs today need BI just as much as large businesses do. However, SMME adoption is still lagging behind in comparison to larger organisation companies. In light of their low adoption rate, SMMEs may find it harder to compete with larger businesses and maintain their competitive edge (Chaudhuri, Dayal, and Narasayya cited by Pukalavec, Oliveira, Popovic 2018).

With regards to the TOE framework, the innovations and technological readiness make up the technological context. The organisational context comprises formal and informal structures, teamwork, resource accessibility, and management perceptions of technology acceptability. The technological support infrastructure, industry features, market structure, and governmental laws are all part of the environmental context (Puklavec, Oliveira, and Popovič 2018. These factors are illustrated in Figure 1.

The TOE framework is used to identify and describe the perceived relative advantage in the adoption of a new technology. The framework is also used to identify the compatibility of the new technology, as well as the complexity of the innovation. The owner/managers' impression of the capabilities of BI in supporting their core company activities depends heavily on these innovation features. This competence has been highlighted as a factor that persuades business owners and managers to adopt BI technology, allowing for the development of improved techniques for planning,

assessing, and forecasting how users of new technology would react (Puklavec, Oliveira and Popovič 2014). According to Hameed *et al*. (2012), the TOE framework is used to research potential enabling factors that may have an impact on how technological innovation is adopted.

Maduku, Mpinganjira and Duh (2016) claim that potential adopters' behavioural intentions are influenced by how easily they view innovation. Regarding the adoption of innovations at the individual level, the literature has extensively demonstrated the relationship between complexity and behavioural intention. However, this relationship towards innovation adoption is seldom investigated at the organisational level. Figure 1 illustrates the factors that should be considered in the TOE framework according to Hatta *et al.* 2015).

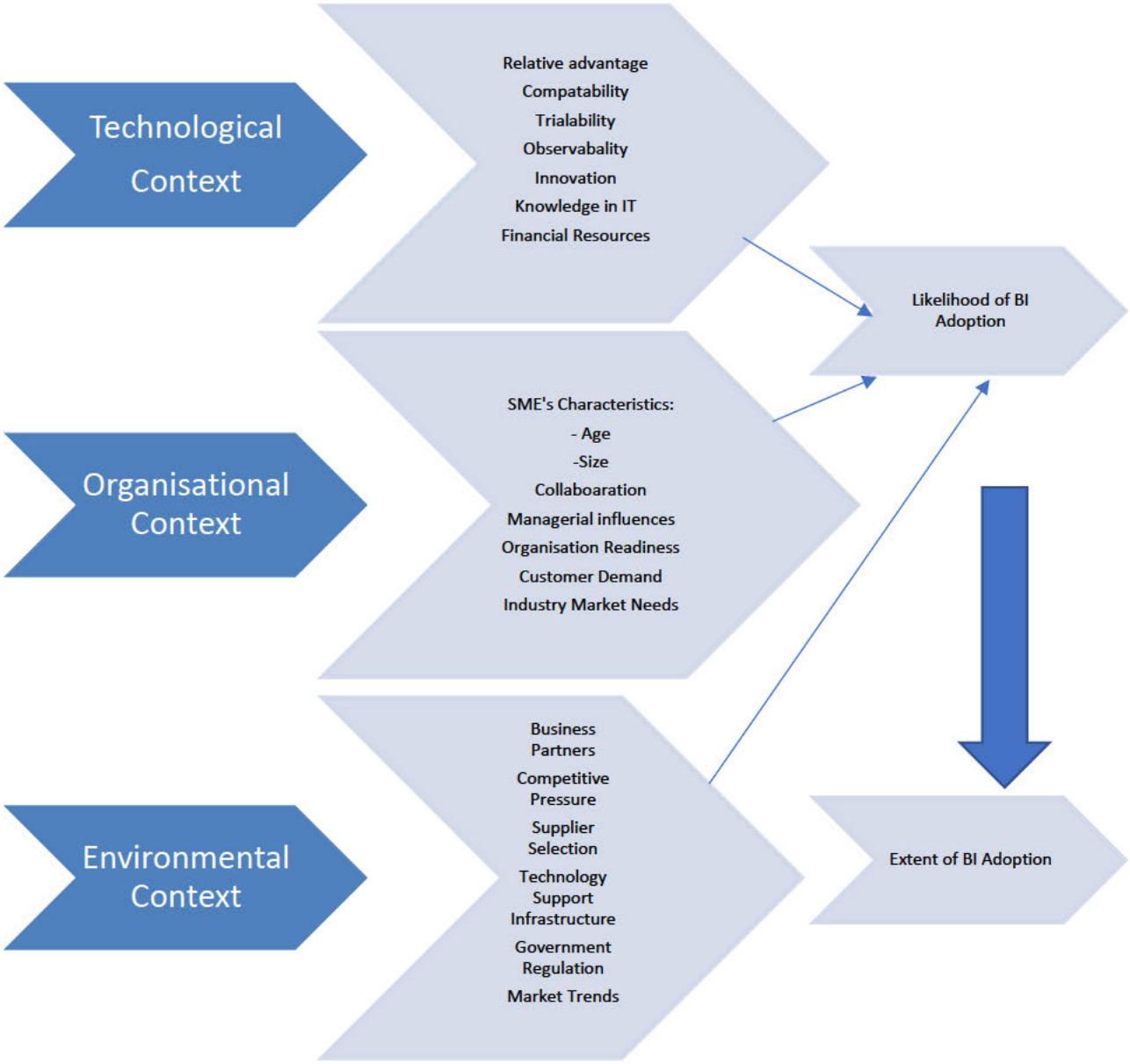


Figure 1: TOE Framework
Source: Hatta *et al.* (2015).

2.2.2.1 Technological impact on the adoption of BI

The main purpose of a BI system is to provide real-time and valuable information to assist owner/managers to make accurate business decisions in order to be more competitive. Hung *et al.* (2016) state that technical characteristics are key factors that affect the adoption of BI in a business. With regards to innovation characteristics and innovation adoption-implementation, Hung *et al.* (2016) add that relative advantage, compatibility and complexity have a significant influence on the adoption of BI in a small business. Therefore, a technological innovation is more likely to be adopted for

supporting the activities of an SMME depending on the degree with which the system will add value to the business through solving the challenges the business is faced with. Other factors to be considered within the technological context include the respective measures and procedures to be followed when implementing a new technology. According to Ifinedo (2011), organisations will be more likely to adopt new technology if they believe it has a competitive edge over their current procedures and systems.

Another obstacle to the acceptance of innovations is complexity. Less complexity in a technology leads to greater adoption benefits, so business managers and owners may be reluctant to use BI due to its high level of complexity. According to Voicu, Zirra and Ciocirlan cited by Puklavec, Oliveira and Popovic (2014), BI models are frequently very complex since they incorporate mathematical functions to forecast patterns in business performance and offer solutions for various problems the company can encounter. The complexity of BI has a big impact on how widely it is used by SMMEs. The validity of the compatibility factor in predicting organisational adoption of technology has been demonstrated by some studies. Therefore, if the systems that are present are not compatible with BI technology, considerable additional investment will have to be made in order to integrate data (Boonsiritomachai, McGrath and Burgess 2016).

Raj, Wong and Beaumont (2016) agree that SMMES can benefit from BI adoption by getting easy access to data and improved data validation, leading to the generating of high-quality reports. They further state that improvements in decision-making support assists in decision-making. In addition, Ali, Miah and Khan (2018), stated that skilled personnel seem to be important for the selection and use of new technology, as well as producing meaningful information to assist the decision-making process. SMMEs seem to be perceived to have less capabilities, with most owner/managers either semi-skilled or lacking in technological skills. This would therefore require the outsourcing of skilled personnel for the implementation of the innovation.

Technology evaluation (TE), defined by Afolayan and de la Harpe (2019:699 as "the process spanning from having no knowledge of the technology, to the scenario where the SMME understands and is able to describe how technology fits the business plan," is the first stage of the adoption process. It should describe the advantages of technology in gaining a competitive edge and making clear how simply changes brought about by technology may be incorporated into existing company procedures. According to Halicka (2017), when a new technology is not adequately assessed, it becomes difficult to determine its relevance and suitability, which results in activities that jeopardise the firm. An organisation's adoption of new technology necessitates a thorough decision-making process that impacts stakeholders as well as individuals.

Govender and Pretorious (2015) claim that the motivation nowadays for adopting technology is centred on the strategic function the technology will play moving forward rather than perceptions like cost-saving, simplicity of use, or the degree of usefulness in an organisation. Environmental, political, cultural, and organisational variables are examples of external factors that should be considered (Landt, Damstrup and Pederson 2013). The evaluation needs to be well researched and recorded to illustrate the advantages and disadvantages of the potential technology. The TE must also determine how the technology will affect the business over a specified time frame (Halicka 2017).

2.2.2.2 Organisational impact on the adoption of BI

One of the key factors influencing SMMEs' adoption of BI is the organisational impact. Hoque, Albar and Bao (2016) emphasise that one of the crucial elements influencing the adoption of BI in an SMME is the support and dedication of owner/managers. The assistance enables the associated software engineering activities to access to physical resources, such as the contribution of skilled labour and capital funding, resource allocation, or the reduction of potential resistance brought on by the modification to the internal organisational structure of the company (Hung *et al.* 2016). Brinkhues, Maçada, and Casalinho (2014) point out that organisations need to assign the necessary support for BI implementation in SMMEs in addition to giving firms the tools and training they need for effective information management. Consequently, a connection between organisational capability, information management capability, and BI implementation is needed for BI implementation in SMMEs.

BI is a source of flexibility and adaptability that can influence organisational agility. The organisational impact on SMMEs adopting BI is determined by the basic capabilities to comprehend the consequences of various changes in business performance, to discern competitive needs, and to make decisions that will help increase competitive advantage (Harraf *et al.* 2015). The success of using innovative technologies, such as BI, can be greatly influenced by a company's size. The integration of knowledge from other departments, data modification, and operational objectives adjustment are some of the aspects that make BI deployment more expensive (Hung *et al.* 2016). The size of the organisation and its capacity for knowledge integration, therefore, has a significant impact on the level of BI deployment.

There are different needs for different organisations based on how big or small the business is, a business intelligence system/solution (BIS) for a large enterprise will not be the same as a BIS for an SMME. Hence, BI implementation differs to meet the business needs according to size, industry, and businesses operations. Ali, Miah and Khan (2017) suggested that organisational adaptability is influenced by the organisation’s capability with respect to information management and BI implementation. This seems to be a leading determining factor of BI adoption in SMMEs as it integrates a business’s resources and insights.

2.2.2.3 Environmental Impact on the Adoption of BI.

The adoption of BI by SMMEs is significantly influenced by the environmental setting, which includes customer demand, the competitive environment, and the regulatory environment. For instance, a significant environmental aspect influencing an organisation's adoption of technology is the regulatory environment (Al Bar and Hoque 2015). Furthermore, with regards to the competitive environment, the speed of technological advancement leads to the emergence of new rivals, markets, products, and business strategies over a wider network.

For businesses, the rapid rate at which technology evolves is a cause of uncertainty and intense competition. Changes in consumer preferences, market needs, pricing, and supply chain management present both possibilities and challenges. Possibilities include flexibility, inexpensive networking, cost savings, and quick communication.

Challenges include information security and the loss of business order (Ali, Miah and Khan 2017).

BI adoption in a business is influenced by a variety of external factors, which are the subject of environmental contexts. Customers, competition, market structure, industry characteristics, and governmental laws are some of these elements (Hatta *et al*. 2015). Strong competition can push a company to consider innovative business strategies, but imitation of strategies from other similar organisations might make a company gradually adapt and resemble other companies in the marketplace over time. Therefore, it is crucial that each company have its own distinct competitive edge (Ifinedo 2011). Customers within the environmental context represent both the firm's own ambition to improve customer services through the use of BI and the demand from clients to embrace a BI technology (Boonsiritomachai, McGrath and Burgess 2016). Market and industry characteristics are environmental factors that have an impact on how technology is adopted. These factors include market complexity demands that are linked to industry association initiatives to announce standards for innovation and promote adoption. Expectations of market trends are environmental adoption variables that might compel businesses to adopt innovations (like competitive pressure) (Chong *et al.* 2009).

Business partners can benefit from new technology by enhancing their interactions and transactions, which is why they might occasionally have an impact on how innovations are adopted (Ifinedo 2011). Another issue in BI adoption is rational trust, which is the belief held by one company that another will not take advantage of its vulnerabilities if given the chance to do so. Regulations are highlighted as additional environment-related drivers that affect adoption through legal restrictions (Puklavec, Oliveira, and Popovič 2014).

Lack of regulations leaves companies vulnerable to external fraud and cyberattacks, which can prevent the adoption of new technologies. Government support, which is defined as "help offered by the authority to foster the development of BI technologies in firms," is another factor that is relevant to this industry (Ifinedo 2011). If SMMEs have sufficient vendor or outside backing for the innovation, they are also more willing

to take a chance and try it. The highest predictors of BI adoption are vendor support and government assistance (Basole, Seuss and Rouse 2013).

2.3 Conceptual framework

Puklavec, Oliveira, and Popovič (2018) state that the adoption factors and processes regarding BI in SMMEs are still understudied. The majority of the existing BI adoption research concentrated on the adoption of BI in large-sized organisations, seeking to pinpoint organisational factors that were unique to SMMEs that would influence the creation and testing of a framework for BI adoption in the setting of SMMEs. The literature seems to support the use of the TOE theory which expands on the claims made by the DOI theory. As such, further investigations into the subject of innovation adoption may be grounded in the TOE theory. Figure 2 illustrates all the factors to be considered for each of the three contexts in the TOE framework, derived from a study conducted by Puklavec Oliveira, and Popovič (2018).

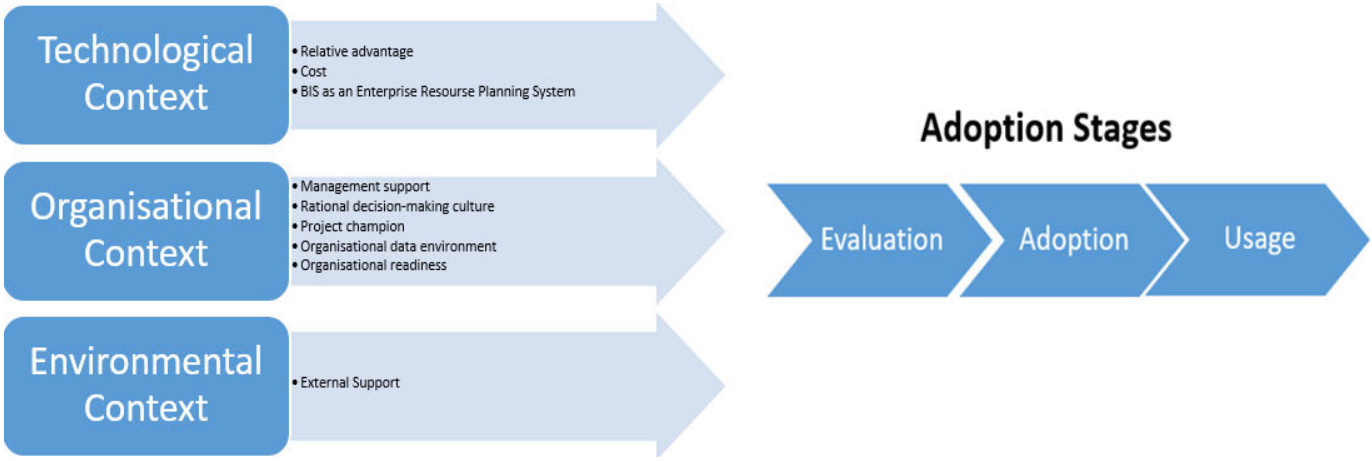


Figure 2: Conceptual Framework
Source: Adapted from Puklavec Oliveira, and Popovič (2018)

2.3.1 The technological context

According to Hatta *et al*. (2015), the technological context is made up of the elements that have an impact on the actual invention and its advantages. According to the TOE theory, this emphasises relative advantage, compatibility, trialability, and observability and then adds information technology skills and financial resources to enable adoption of the technology. To illustrate the adoption of BI in SMMEs and the significance benefits of enhancing business performance, Puklavec, Oliveira and Popovič (2014)

used the factors of relative advantage, cost, and BIS as part of enterprise resource planning in their model.

The degree to which a technology, like BI, is seen as be efficient is known as relative advantage. The framework has shown that one of the predictors most frequently utilised in information systems (IS) adoption study is the relative advantage of BI (Premkumar and Roberts, 1999; Oliveira, Thomas and Espadanal 2014; Thong, 1999; Tsai, Lee and Wu 2010 cited by Puklavec, Oliveira, and Popovič 2018). Positive impressions of the benefits of BI affect how much software is adopted by SMMEs. Given that business owner/managers need proof of BI's advantages before considering its adoption, a positive influence on BI adoption in this situation ought to have been noted during the evaluation stage. However, the study conducted by Puklavec, Oliveira, and Popovič (2018) rejected their hypothesis that relative advantage predicts BIS adoption in the adoption phases.

Cost is still a major barrier to adoption of BIS (Hameed et al. 2012), and organisations have to weigh the costs and benefits (Puklavec, Oliveira, and Popovič 2014), and long-term benefits of their BI investment compared to short-term costs (Chong and Chan, 2012). However, Puklavec, Oliveira, and Popovič 2018 observed that, based on their understanding of the factors that influence the phases of BI system adoption for SMEs, the premise that cost is a predictor of BIS adoption is denied. While they had proposed a positive association between cost and all phases of adoption, they discovered that cost is not statistically significant in explaining BI evaluations and use and has a significant but negative relationship to adoption.

2.3.2 Organisational context

The understanding of a management support factor in this context is when top managers' exercise distinct encouragement towards the introduction of advanced technological innovation. Thus, the adoption of a BIS is positively correlated with management support. Since members of the senior management team frequently make decisions in SMMEs, the adoption of a BIS should have their unwavering support. Additional studies support the idea that management support could be a significant factor in BI adoption since management support secures priceless

resources for the adoption of the new innovation (Premkumar and Roberts, 1999; Hwang *et al.* 2004; Ramamurthy *et al*. 2008; Tsai, Lee and Wu 2010).

The idea that management support is important to the successful adoption and application of innovations in SMMEs is also experimentally supported by prior research, as managers act as change operators during the adoption process (Ifinedo 2011). If management is not convinced of a BI, it is likely that the innovation will not be adopted. Chan and Chong (2012) emphasise that management support may be a key factor in all three stages of BI adoption with regard to the various adoption process stages. Puklavec, Oliveira, and Popovič (2014) concurred by proposing that "management support has a positive impact on BIS evaluation, adoption, and use." However, Puklavec, Oliveira, and Popovič (2014) indicated that in an SME context management support is related to evaluation and use in both a significant and positive way. However, the relationship with adoption was found to not be significant.

An organisation-wide regard for measuring, testing, and assessing quantitative data in decision processes is a sign of a rational decision-making culture. Such a culture promotes the use of data and information to support work processes and conduct analysis (Kulkarni, Robles-Flores and Popovič 2017). According to earlier research, corporate culture has a significant beneficial influence on how quickly a BIS is adopted (Gu, Cao and Duan 2012). Popovic *et al.* (2012) examined the significant impact of fact-based decision-making culture on BIS use, while Frambach and Schillewaert (2002) found that during the evaluation stage of the adoption process, SMMES become aware of technological innovations and subsequently form an approach to evaluate it. Puklavec Oliveira, and Popovič (2018) therefore anticipated that the culture of rational decision-making within organisations contributes to the evaluation stage in a beneficial way. However this indicated that rational decision-making culture has a significant and negative relationship to evaluation and non-significant relationship to adoption and use.

Existing research shows that the presence of a project champion may be a significant variable in the successful adoption of BI, which influences all adoption process stages (Bose and Luo, 2011). A champion is an individual who is "the face" of an

implementation effort, one “who dedicates themselves to supporting, marketing, and driving through an implementation, overcoming indifference or resistance that the intervention may provoke in an organisation”. This person is the only one who fosters mindfulness and a favourable perception of an IT innovation (Gu, Cao and Duan 2012). A project champion, according to Owusu *et al.* (2017), supports the innovation by disseminating knowledge, raising awareness, mobilising material resources, securing political support, and securing organisational acceptance—all of which are essential for the innovation's successful adoption and implementation. Higher adoption rates in organisations are typically brought about by the presence of project champions with backgrounds linked to the innovation under consideration.

The data environment that has been established inside the firm is another crucial factor in an organisation. An organisation's access to information on the quality, availability, and loading of data related to the process of producing input data for BIS is referred to as having an organisational data environment (Puklavec, Oliveira and Popovič 2018). Understanding data resource management, which can provide some advantages, is necessary for the environment of organisational data (e.g., reducing costs, expanding the capacity to access previously inaccessible data, interpret and share information over IT applications). Accessibility, quality, integrity, security, and information standards issues are all related to poorly managed data environments. When a company considers implementing BIS, a poorly managed data environment could encounter significant difficulties (Popovic *et al.* 2012). This is because BIS heavily depends on the integration of various data sources. According to Puklavec, Oliveira and Popovič (2018), the use of the organisational data environment is important and favourable, but evaluation and adoption are not.

Organisational preparedness is a term used to characterise the availability of organisational resources needed for the adoption of innovation (Lacovou *et al*. 1995). In addition to BI expertise and proficiency inside the recipient business, Puklavec Oliveira, and Popovič (2014) examined this variable utilising the accessibility of financial, technological, and other relevant resources (Grandon and Pearson 2004; Ifinedo 2011).

Organisational readiness may be a key factor in determining the BI adoption behaviour of SMMEs, not just during the adoption stage but also during the assessment stage (Ifinedo 2011; Grandon and Pearson 2004; Quaddus and Hofmeyer 2007). This is due to better prepared SMMEs being less threatened by the BIS. Furthermore, within the implementation stage, businesses that can afford more advanced BIS are more likely to experience greater benefits from use of BI (Puklavec Oliveira, and Popovič 2014).

2.3.3 Environmental context

External support is acknowledged as a crucial factor for BI adoption in the environmental context. The term external supportdescribes the support that is required when adopting and making use of technological innovation. (Premkumar and Roberts 1999; Quaddus and Hofmeyer 2007). As organisations become more prepared for the risks of introducing new technologies if an appropriate vendor or third-party assistance for the innovation is available, outsourcing and third-party support are found to have a significant impact on the adoption of BI (Premkumar and Roberts 1999). The more SMMEs are convinced to use BI, the more external support they receive. Due to the lack of internal IT specialists within SMMEs is a significant barrier to the adoption of sophisticated BI in SMMEs. Not only is adoption of BI supported by external support, but also its implementation and use. According to Puklavec Oliveira, and Popovič (2018), none of the three phases of adoption connected to external assistance are significant in the context of the environment.

The next section will discuss BI, and the role of BI to improve business operations for SMMEs, BI adoption determinants and user acceptance amongst SMMEs.

2.4 Business intelligence and its impact on SMMEs

The process of obtaining, managing, analysing, and exchanging data in order to gain insights that can be applied to better decision-making is referred to as BI. The primary goal of BI is to equip business managers and analysts with the tools needed to undertake business analysis (Rostek, Winśniewski, Kucharska, 2012). Business owners and academics alike are interested in BI tools. While numerous studies on the need for BI in SMEs have been undertaken, they have primarily focused on performance and adoption and offer insights and methodologies that are adequate for large-scale organisations but unsuitable for SMMEs (Kikawa, Kalema and Carol

2019). In this section the researcher will discuss BI and its impact on SMMES, the factors that lead to successful BI adoption, adoption determinants and user acceptance within SMMEs.

2.4.1 The Importance of BI

Since data, information, and knowledge are the most crucial elements that identify and comprise a business, it is imperative for firms to manage and preserve these resources. Businesses are obliged to operate in increasingly complex and dynamic situations as a result of the development and reliance on real-time data and modern technology; one difficulty they may encounter is data overload (Luciano *et al*. 2018). Businesses must comprehend and analyse a wide range of data to meet these difficulties. One dynamic application that generates competitive advantage is BI, which obtains central data and presents and manipulates it into information that may be utilised for managerial decision-support by highlighting areas that need attention (Hatta *et al*. 2015). The alignment of the business and BI initiatives put in place for better performance can lead to business transformation.

According to Boonsiritomachai, McGrath and Burgess (2016), Thong (1999) was the first to develop an IS adoption model for small businesses because existing organisational theories or practices that were appropriate to large organisations did not always fit the SMME setting.

The owner-personal manager's enthusiasm and inventiveness is a major determining element in whether a business may implement BI. According to Dubravac and Bevanda (2015), integrated information systems give firms fresh insights into what motivates their operations and show them how to optimise those operations in order to achieve their strategic goals and objectives. Past studies from (Rostek, Winśniewski, Kucharska, 2012; Kikawa, Kalema and Carol 2019; Luciano *et al*. 2018). state that businesses utilise BI to improve their organisational agility, which helps them to respond to the demands of the competitive and quick-paced market of today. Since the early 1990s, BI applications have seen a significant evolution, and businesses now have a wealth of options for utilising their data assets for process improvement, operational reporting, and decision support (Puklavec, Oliveira and Popovic 2018).

Regardless of the size of the company, during the past few years, businesses have created large amounts of data from both internal and external sources. Making business decisions requires the ability to manage, access, and analyse huge volumes of data effectively. Otherwise, economic opportunities can be lost and crucial lessons might not be learnt. However, Raj, Wong, and Beaumont (2016) note that SMMEs typically lack the technical know-how necessary to transform data into information in order to support an educated corporate decision-making process.

Therefore, SMMEs are reluctant to invest in the adoption of BI solutions due to a lack of knowledge of the advantages of BI. Additionally, one of the key elements that has favourably affected the development of SMMEs in the nation is technical innovation. It is thought that BI has the power to alter not only the SMME sector but also other sectors. However, only a small number of SMMEs have been successful in implementing a technological and analytical framework to take advantage of the multiple benefits linked to the use of big data analytics, including BI (Rajabion 2018). Investigating the use of such technologies by SMMEs has therefore attracted a lot of attention.

2.4.2 Factors that lead to the successful adoption of BI

Işık, Jones and Sidorova et al. (2013) assert that an organisation’s success with BI is correlated with the value it derives from its BI investment. Depending on the advantages anticipated from the BI programme, various organisations perceive the success of BI differently. According to Işık, Jones and Sidorova (2013), the accomplishment of advantages like increased profitability, decreased costs, and increased efficiency constitutes successful BI. Reduced operating expenses, better customer service, better market knowledge, and improved relationships with trading partners, according to Bharati and Chaudhury (2006), are additional aspects that contribute to the effective adoption of BI by SMMEs. While some try to quantify concrete benefits and use simple metrics like return on investment (ROI), increases in operational efficiency, or enhanced organisation profitability, many firms find it difficult to gauge the effectiveness of BIS adoption. According to Işık, Jones and Sidorova (2013) several organisations have determined that BI is successful if "costs are acceptable in relation to the benefits accumulating".

The study and improvement of business processes and operational efficiency of an organisation are two variables that contribute to the level of customer satisfaction as well as the effectiveness of business practices and the identification of other factors. especially by sharing information and experience that arise during the launch of new goods and by imparting understanding of particular business procedures (Olszak 2016). Different organisations (and even different BI implementations within one organisation) use different specific BI success metrics. For instance, one company might adopt BI to improve supply chain management, while another might do so to enhance customer service. Businesses who have used BI successfully have made an effort to align their BI with their overall corporate business objectives. The alignment of BI with business goals is key to BI success (Işık, Jones and Sidorova 2013).

Afolayan and de la Harpe (2019) assert that SMMEs must find and invest in technologies that can help boost the effectiveness and development of business processes like BI. They continue by saying that factors like profitability, efficiency, market value, productivity, quality, and competitive advantages make the impact of technology on organisational performance apparent. When BI is implemented in a company, it is thought to solve an issue and improve the environment for making decisions. The success of BI in a business depends on this match. Studies indicate that many organisations have not yet seen this success, and that users do not always understand the relationship between their BI capabilities and the decision environment (Işık, Jones and Sidorova 2013). BI capabilities are essential tools that aid an organisation in enhancing both its performance and ability to respond to change. However, some organisations do not succeed in using BI. In addition to increasing competitive advantage, BI fosters an environment for efficient business decision-making, business processes, and strategic thinking. BI is also geared to support decision-making at all management levels (Olszak 2016).

2.4.3 Business intelligence adoption determinants for SMMEs

SMMEs are important to the economies of nations because they foster innovation and job growth. Because of this, information technology is crucial for sustaining, facilitating, and advancing the internal and external business activities of SMMEs (Afolayan and de la Harpe 2019).

SMMEs must be in line with business procedures in order to realise the positive effects of BIS (Palvalin, Lönnqvist and Vuolle 2013). The business's functionality is enhanced by the alignment between the business and TE, the initial step in the adoption process. Increased earnings and sustainability derive from improved business functionality (Love *et al.* 2013).

SMMEs are adopting BI systems slowly. According to a study by Mittal *et al.* (2018), there is little interest in adopting smart technologies like BI software in the United States of America (USA). According to Eze *et al.* (2018), comparable decision-making issues were encountered in the UK, which were mostly impacted by the fear and uncertainty of obtaining BI. This problem results from BI considerations that lack forethought and review (Reynolds, Fourie and Erasmus 2019). SMMEs need to plan and analyse BI against their business strategy and business processes, and use the innovation as a strategy to bridge the technology gap and sustain competitiveness (Afolayan and de la Harpe 2019).

According to a study by Tutunea and Rus (2012), all entrepreneurs, regardless of the sector they work in, the size of the business they manage, or their country of origin, recognise the need to embrace some solutions for decision making and the utilisation of BI tools. Additionally, businesses must take into account a number of internal variables that are typically the main barriers to SMMEs adopting BI when choosing a decision support solution and using BI tools. However, Antoniadis Tsiakiris and Tsopology (2015) discovered that the main barriers to BI system adoption were largely financial in nature. Costs involve the price of initial setup and support, as well as the cost and amount of time needed for staff employees to receive system handling training.

According to Ali, Miah and Khan (2017), BI identifies challenges with decision-making through the management of information to produce high-quality decisions. Business entities and perspectives on BI performance vary, nevertheless. The same BI should not, thus, include the same applications for SMMEs and major industries. The organisational standards of SMMEs, which differ from those of large organisations, should be accommodated by BI developments as well.

Popovic *et al.,* 2012 claim that it might be challenging to match the capabilities of the BI system to users' evolving demands, expectations, and preferred working methods. Therefore, it is crucial for firms to assess their operational procedures and use BI software that is tailored to their specific requirements. In addition, it is reasonable to assume that the owner/perceived manager's results and appreciation of the use of BI will be reinforced if they have a positive perception of the usage of BI and how it can fit into the organisational work environment. Furthermore, an individual will have a stronger view of BI adoption if there is greater organisational support, management incentives, visibility of BI, and peer support (Popovic *et al.,* 2012).

2.5 User acceptance of BI amongst SMMEs

User acceptance is "The demonstrable readiness within a user group to engage information technology for the tasks it is designed to enable". Organisational culture and information culture have been identified in the literature as factors influencing BI acceptability. Transparency in information, accurate reporting, and the acknowledgment of weaknesses and failures are all aspects of information culture (Grublješič and Jaklič, 2015). Accepting that data is an asset and ensuring that it is available when required in the correct format ensures that decision-makers will have access to intelligence rather than just more information. These are appropriate goals for establishing an information culture (Mulani 2013).

Various authors have defined the phrase "data-driven" as the influence of data availability and as a questions-based approach that prioritises the business question before employing data. A data-driven BI culture, according to Cao and Duang 2014 cited by Skyrius *et al*. (2016), involves managerial decisions that depend more heavily on data-based insights.

Skyrius *et al*. 2016 define "data-driven culture" as "A pattern of behaviours and activities by a group of individuals who share a view that having, interpreting, and applying particular kinds of data and information plays a significant role in the success of their organisation" is what is referred to as a "data-driven culture". Because of the numerous types of data sets available, analysis of these data may reveal previously

unrecognised information that can aid in the development of insights and decision-making.

The research demonstrates that the perceived ease of us and perceived usefulness of BI have a significant impact on people's intentions to utilise it and their perceptions of its overall acceptability. While perceived ease of use is defined as "the degree an individual believes that utilising a specific system would be free of effort," perceived usefulness is defined as "the degree an individual believes that using a particular system would boost his or her productivity" (Davis 1989 cited by Skyrius *et al*).

2.5.1 Organisational challenges regarding BI User acceptance by SMMEs

According to Skyrius *et al.* (2016) the attitudes, norms and values of owner/managers as well as employees in an organisation play a role in user acceptance of a technology such as BI. There are various challenges that are experienced by owner/managers when it comes accepting and implementing BI. These challenges are discussed in Table 1.

Table 1: Organisational challenges regarding BI user acceptance

Organisational Challenges	Relation to BI Acceptance
Top management often initiates BI, while the rest of the employees that should be the main users of a BI system are not completely aware of the value that BI might contribute to the business. This hinders the process of BI implementation.	When users do not relate the BI project to their actual needs, projects become isolated.
Microsoft Excel is still used by most SMMEs, where employees extract data from various operational systems, then manipulate it which leads to the duplication of information.	Users not sharing insights from extracted data amongst each other for improved analysis due to disjointed and contrary results.
Systems that are based on incomplete, incorrect or doubtful data cannot be used for real management tasks which reduces trust from the users.	Data quality is still inadequate within users.

A BI system is not a static reporting tool for lifetime use. Business Intelligence systems must evolve according to changing business needs.	Users are required to be prepared for the change that comes with a BI system for the business.
SMMEs tend to reduce cost and time by outsourcing the implementation of BI to an external organisation, this results in a BI system of poor quality of data.	When BI is outsourced it defeats the whole purpose of implementing BI as a strategic function for the business.
The absence of a consistent, detailed and documented intelligence strategy causes a lot of uncertainty and misconceptions.	The company will lack direction without a specified strategic objective which could lead to a set of unrelated data that will not be of great benefit to the business.

Source: Skyrius *et al*. (2016)

According to research by Nguyen, Newby and Macaulay (2013), adoption rates are low because of risk and uncertainty. Understanding the risk connected to cloud-based technological breakthroughs, their dynamic nature, and the complexity of such technological advancements as BI, is difficult. According to Mittal *et al.* (2018), SMMEs adopt a conventional mindset due to their view of the unproven technology and its risk aspects.

SMMEs encounter a number of obstacles when it comes to implementing BI, some of which include a lack of understanding and the inability to perform enough research on the new technology. They are unaware of the consequences of using the wrong technology or avoiding using one that could be useful (Afolamayan and Harpe 2019). Adoption decisions are often based on perceptions and assumptions that derive from individual experience and judgements.

2.5.2 Evaluation and decision-making challenges of BI by SMMES

Technology evaluation has been discussed in the previous section of the literature review, as it is always a concern and plays a major role in the adoption processes of BI. However, due to uncertainty and lack of knowledge by SMMEs, further discussion is warranted. For users to fully adopt and accept new technological systems such as BI in their businesses, they need to undergo an evaluation and decision-making process that takes place at several different stages of the adoption process.

A study conducted by Afolayan and de la Harp (2019) had two major research questions based on the adoption processes of new technologies. Question 1 was “What are the challenges of SMMEs in terms of evaluation of the new technology?”

Question 2 was “How does the evaluation of new technology affect the strategic decision-making of SMMEs to adopt new technology?” Table 2 is a summary of the major findings from that study.

Table 2: BI Evaluation and Decision-Making Challenges in SMMEs

Evaluation Challenges	• The nature of improbability regarding the ROI made on BI in SMMEs is their biggest inhibitor for business managers because they are unable to distinguish the possibility and weight of risks involved. • SMMEs have a reserved attitude toward BI because of their perceptions of new technological advancements and the risk factors associated. • The capacity of SMMEs to assess and use BI to help the business is constrained by a lack of awareness of the technology.
Decision Making Challenges	• SMMEs lack a formalised method or process for determining business requirements, ensuring that they are aware of how the new technology can help them achieve their goals. • Despite the advantages and success factors BI offers firms. Due to the considerable information and hasty decisions that must be made when investing in BI, SMMEs frequently fail. This is a result of the system’s incapacity to be critically assessed in order to satisfy the necessary business requirements.

2.6 SMMEs in South Africa

The National Small Business Act of 1996 as amended in 2003 and 2004 defines an SMME in South Africa as: “A separate and distinct business entity, including co-operative enterprises and non-governmental organisations, managed by one owner or more which, including its branches or subsidiaries, if any, is primarily carried on in any sector or sub-sector of the economy and which can be classified as micro, a very small, a medium-sized, or a large business”. The National Small Business Act of 1996 (as amended in 2003 and 2004) distinctly groups SMMEs into categories. These include survivalist, micro, very small, small, and medium micro-enterprises. Specifically, the National Small Business Act of 1996 (as amended in 2003 and 2004) provide the classifications that follow for SMMEs in South Africa.

- **Medium Enterprises** – Businesses having fewer than 200 employees, a gross asset worth of under 18 million rands, and a turnover of under 40 million rands annually.
- **Small Enterprises** – Businesses having less than 50 employees, a total annual turnover under 25 million rands, and a gross asset worth below 4 million rands.
- **Very Small Enterprises** – Less than 10 employees, less than 4 million rands in annual revenue, and less than 1.8 million rands in gross asset worth are considered to be “very tiny” businesses.
- **Micro Enterprises** – Micro enterprises are defined as those having less than five employees, a yearly revenue of less than 0.15 million rands, and gross assets worth less than 0.1 million rands. Businesses owned by survivalists are those without paid staff, with income below the federal minimum, with low asset values, or with income below the poverty line.

SMMEs include formal, job-creating businesses as well as informal, own-account enterprises. Own-account SMMEs nearly always have a survivalist mindset and are informal in character. These businesses frequently struggle merely to stay in operation and require significant help if they are to ever expand and become employers. On the other hand, official SMMEs may have the internal resources to compete but may experience competition from larger businesses due to these obstacles (Bhorat *et al*. 2018).

SMMEs as are crucial element for fostering inclusive growth and development in South Africa. Government officials acknowledge how valuable these companies are in terms of innovation, competitiveness, and the creation of employment in the NDP. The ultimate objective is to have South African SMMEs become responsible for 90% of all new jobs by 2030. SMMEs are crucial to South Africa, particularly from a socioeconomic perspective (Manete 2018).

SMMEs in South Africa are thought to contribute roughly 50% to the country’s gross domestic product, while also providing a conservative estimate of 60% of the labour force job options (Taljaard and Van Der Walt 2018). SMMEs have made a significant

socioeconomic contribution to South Africa, but it is alarming to see that these companies have some of the worst sustainability rates in the world (Bruwer 2020)

The unemployment rate is low in many developing nations because the majority of the low-skilled labour force is employed in the informal sector, primarily in survivalist businesses. Additionally, formal SMMEs have high median owner incomes that are more than four times higher than those of business owners in the informal sector. Given that SMMEs are underrepresented among formal sector business owners, these sorts of enterprises may have higher entrance barriers for workers with worse labour market results, such as females, youth, Africans, and the less skilled. Rural areas are where informal sector SMMEs are most likely to be found, and their owners' typical monthly wages are extremely low, at only R2426 (Bhorat *et al.* 2018).

According to the Labour Markets Dynamics South Africa report from 2018, "Informal small enterprises seem to represent survivalist firms, whose owners have few options for employment and whose welfare may thus be significantly dependent on the revenue from their business". Therefore, informal company owners represent members of the labour force who encounter major obstacles while trying to become formal sector entrepreneurs.

2.6.1 Challenges and barriers faced by SMMEs in South Africa

An estimated 75% of SMMEs in South Africa fail in the first three years of operation (Cant 2016). Government support has been identified as a major contributor to the sustainability of SMMEs, particularly regarding financial support. The government has a number of campaigns available in the form of support agencies and funding institutions. Another contributing factor to the failure of SMMEs is the tough South African economic landscape regarding high interest rates, high inflation rates, high levels of crime, volatile market conditions, weak public service delivery, shortage of skills and limited access to finance (Scott, Wingard and Van Biljon 2016).

South African SMME management is understood to lack knowledge regarding their organisation's financial performances and/or financial position, often only relying on bank statements when making business decisions (Kemp, Hollowood and Hort 2015).

Yahya and Elsayed (2012) added that SMME owners and managers struggle with stock control, financial reporting, costing, production planning and communication. Furthermore, owners and managers of SMMEs do not often understand their financial statements, which makes it difficult to calculate their ROI and possible losses. Business performance can be measured using both financial (sales growth, profitability) and non-financial (market share, new products, product quality, market effectiveness and value added) measures (Veliu and Manxhari 2017).

2.6.2 Factors Influencing sustainability within SMMEs in South Africa

Dladla (2016) found that SMMEs in the apparel sector adopt innovative processes in their businesses within the eThekwini district. However, SMMEs access to government financial incentive schemes has been identified as one of the inhibiting factors for growth and development. SMMEs in the study by Dladla (2016) agreed that assistance from government schemes can improve business performance.

Taking this into consideration, the question is: if SMMEs in this sector are not aware of relevant financial schemes, will they be aware of relevant technological innovations to improve their business operations? Innovativeness in business allows managers to manage resources and helps them to focus on the requirements arising from new ideas and activities. If innovation is to add value to the business, managers first have to comprehend the principles of innovation along with developing the approach, attitude and knowledge of where, when and how the innovation will emerge so as to find new solutions (Reckhenrich, Kupp and Anderson 2009).

Technological innovation requires significant investment regarding the management of time and money. An important characteristic of innovation is creating a flexible innovation environment within organisations. Despite the advantages of technological innovation, it can still be perceived as a major risk, particularly in an SMMEs environment. There are quite a few challenges that SMMEs experience when it comes to implementing a technological innovation (Pisano 2015).

The apparel sector is product driven; this means the technological innovation must be product driven to maximise profits and satisfy the end consumer. However, one of the biggest challenges found in this sector is the management and control of inventory.

Operating with poor forecasting and planning systems and operating with long cycle periods have become a habit for many SMMEs (Singh, Garg and Deshmukh 2008 cited by Dladla 2016).

Furthermore, apparel SMMEs experience issues with undependable inventory control systems, with no stock tracing and poor cost control. This can result in surplus outdated stock and corrosion of customer service levels (Dladla 2016). However, SMMEs have been found to be flexible and open to fresh concepts and methods, but they do nonetheless encounter restrictions in acquiring and applying new systems due to the absence of human and monetary resources (Metaxiotis 2009). These, then, affect the execution of innovative projects.

Nedelko and Potocan (2013) highlighted several challenges that are experienced when implementing innovative projects in the SMME sector. These include:

- The unavailability of a leader who is supposed to be working closely with the staff ensuring satisfaction and acceptance of the innovative process.
- The lack of organisational challenge that inspires business to implement innovative processes.
- The lack of understanding the nature of the innovative project to be executed.
- Implementing innovative projects is quite costly and requires a lot of time to be invested.
- Old-fashioned values/culture/ethics/norms of business members, and particularly those of management.
- Absence of innovative culture.
- Negative attitudes towards risk and reluctance to take risk.
- One-sided comprehension of innovativeness.
- Immature service sector and public administration.
- Little efficacy of investments in research and development.
- Weak cooperation between private/public sector businesses and research institutions.

Access to finance is a fundamental element for growth and development of SMMEs. The absence of finance can limit cash flow and affect businesses' existing forecasts.

Furthermore, funding innovative SMMEs might be extremely dangerous and indeterminate, making it challenging to come up with a jointly amenable funding agreement (Vasilescu 2014). The absence of understanding the requirements of financial control along with uncertainty of the business environment normally results in SMMEs encountering serious difficulties concerning financial and total performances, which can even threaten the existence of the business (Karadag 2015). Financial control is the core of the whole controlling process in a small business.

Several SMMEs in disadvantaged areas in South Africa find it difficult to get capital and assured earnings (Mbonyane and Ladzani 2011 cited by Dladla 2016). This results in poor credit records, which result in poor cash flow. Oriaku (2012) argues that small businesses have thus far not considered the necessity to completely incorporate financial and capital measures with their daily business operational procedures. Therefore, finances for innovative projects are not a priority so they become isolated which results in lack of innovation.

2.7 South African apparel sector

South Africa's formerly flourishing clothing manufacturing industry has been destroyed by global manufacturers since 1994. However, great progress has made regarding competition in the multi-billion-rand industry, and the sector continues to create more jobs.

In 2018 there was an estimated 800 clothing manufacturers operating in South Africa. These created a revenue of approximately R19 billion, while the ensuing sales in the retail sector of clothing, footwear and textiles resulted in a figure of more than R175 billion. Furthermore, the "Made in South Africa" initiative has been steadily gaining ground. Wearing locally-made clothing at the state of the nation address (2018), the South Africa President emphasised the partnerships that government has formed with various stakeholders to promote strategic planning for industries that exhibit high growth potential, one of these being the clothing sector. This sector has grown significantly over the past two decades, creating more than 200,000 jobs (South African Government: State of the Nation Address 2018).

According to Huhn (2020;10), “the industry has begun to show signs of recovery especially from a retail perspective with revenues generated from the sales of textiles, clothing, footwear, and leather goods in South Africa, expected to increase from 11.5 billion in 2016 to over 17.5 billion in 2023.” This retail and wholesale recovery has been greatly aided by an incentive scheme that the nation’s Department of Trade and Industry launched in 2009 to boost domestic textile and apparel industry competitiveness.

According to the Department of Trade, Industry and Competition (DTIC), clothing products have benefited from duty-free access to the US market under the AGOA trade deal. Exports accounted for R1,4 billion for apparel and R2,5 billion for textiles, mostly to the US and European markets, but there is enormous potential for exports to the rest of the African continent as trade barriers fall and regional integration takes hold (DTIC Report 2019).

The clothing, footwear, leather and textiles industry contributed 7.2% towards employment in South Africa. However, it has an income rate of 2,3% which is the lowest income rate when compared to other industries (Statistics South Africa 2019). This is due to cheap clothing imports and the fact that the clothing industry has one of the lowest barriers to entry, with minimal education and skill requirements specifically in the SMME sector.

The South African government is actively promoting the apparel industry as one of the primary sectors of local manufacture as part of the “Made in South Africa” programme. Retailers have also started to help regional producers, which enables them to react to shifting market trends more swiftly. Economic Development and Growth (2018) in eThekwini found that SMMEs in the apparel manufacturing industry in this region frequently struggle with innovation because they lack access to financial services, which also causes businesses to fail.

2.7.1 Overview of the eThekwini micro-small apparel sector

There are many organisations which have been developed to assist micro-small apparel manufacture retail businesses with the necessary resources before and after

establishment of the business. Organisations such as the Small Enterprise Development Agency (SEDA) assist in skills development and training small businesses. The Small Enterprise Finance Agency (SEFA) provides start-up capital for businesses in this sector.

The eThekwini Micro Enterprise Support launched the Informal Economy Support Programme (IESP) (a first for South Africa). This can be described as a specialised business support initiative supporting micro and informal enterprises (MIEs) in innovative and cost efficient ways, thereby realising the potential for enterprise growth and job creation. This is created by offering customised business support services and other structured interventions across a variety of sectors (e.g. manufacturing, services, retail, food and beverage, and agriculture). The IESP is strategically important because, although it is acknowledged that the informal economy is vital in overcoming joblessness and economic growth, there has been a lack of much needed support for MIEs up to now. The IESP has created 719 new permanent jobs and has trained 339 people in appropriate skills since it first launched in 2013. The main team consists of a programme manager, three in-house MIE support specialists and a panel of outsourced specialists. Collaborations have been set up with various municipal departments, private sector companies and external service providers. The IESP has been funded by the Jobs Fund, eThekwini Municipality and the Department of Small Business Development (eThekwini Micro Enterprise Support 2022).

According to eThekwini Micro Enterprise Support (2022), the micro-small business sector contributes significantly to long term economic growth, job creation and improved livelihoods security. This includes large numbers of micro-manufacturers, retailers, street traders and crafters. In addition, it is reported that the national priority on small and micro businesses is reflected in the NDP and by the establishment of a dedicated National Department of Small Business Development (DSBD).

Government’s current economic recovery strategies recognise MIEs as key with regards to supporting locally-produced goods and services. Nevertheless, there is a understanding of the informal economy is still lacking, in particular with regards as to how to support them. Support is critical for overall economic growth, poverty, inequality

and joblessness to be rectified. The IESP is uniquely positioned with regards to these strategies, thereby creating an important contribution to rebuilding the economy and improving the employment rate (eThekwini Micro Enterprise Support 2022).

One of the major economic drivers providing support to businesses in the micro-small apparel sector in the eThekwini Region is the Durban Fashion Fair (DFF). The DFF started out in 2012 as part of the Durban Business Fair. This was an attempt to re-ignite the clothing industry in eThekwini, which had succumbed to pressure from much cheaper imports, and met with a great deal of scepticism (Durban Fashion Fair 2022).

According to report by The Durban Fashion Fair (2022), the organisation has developed a retail programme for its designers, where pop-up shops were established in three different shopping centres in Durban, namely, The Pavillion, The Workshop and Umlazi Megacity. The Pavilion and the eThekwini Municipality's Durban Fashion Fair set up "The Pavilion's Designers Emporium' pop-up fashion store", which offers growth opportunity for young designers to get experience working in the retail space. This initiative is mainly to assist local fashion designers to gain global competitive advantage. The eThekwini Municipality has also launched a retail space at one of Durban's famous shopping centres, Mega City in uMlazi, to showcase designs from emerging small local designers to the market (Durban Fashion Fair Report 2022).

The Department of Trade and Industry (DTI) monitors and assists all sectors of the South African Economy. The DTI is important to the clothing and textile sector as it focuses on increasing levels of international trade, foreign direct investment and economic co-operation on regional, continental and international levels. Trade Export and Investment in South Africa focuses on encouraging global competitiveness of exports and beneficiation of products, expanding market access and developing programmes to encourage trade and investment activities. The National Bargaining Council for the Clothing Industry (NBC-CI) acts as a regulating body for the formal clothing industry; it deals with matters such as registration of all clothing manufacturers, monitoring of employment statistics, the negotiations around the main agreement which governs the clothing industry and the collection of levies due.

The NBC-CI acts as a bridge between the Southern African Clothing and Textile Workers Union (SACTWU), the trade union which represents employees in the manufacturing sector, and the employer associations. The largest of these employer associations is Apparel and Textile Association of South Africa (ATASA) which is based in Durban. ATASA and SACTWU have a vested interest in the growth and sustainability of the micro-small sector, as some businesses will grow to be part of the small medium enterprise (SME) sector.

Trade and Investment KwaZulu-Natal (2021), describes the clothing and textile sector as one of KZN's biggest employers of skills across the spectrum. Most SME factories are located in the KZN rural towns of Ladysmith, Isithebe, Newcastle, and Port Shepstone as well as eThekwini. The KZN government in partnership with the National Department of Trade and Industry have also engaged in the development of a clothing and textile special economic zone in the uThukela region. This development is a catalyst for the corridor development of the sector linking the Western region including uMgungundlovu region with eThekwini and the industrial sites north of eThekwini.

The clothing sector is a significant employer within KZN's manufacturing sector. This is due to low barriers to entry, which make it a highly strategic industry with regards to economic development. However, this study focuses on micro-small apparel businesses within the eThekwini region in KZN.

From the literature discussion on SMMEs, it is evident that technological innovation is not something SMMEs seem to be financially invested in. According to the literature, the main reasons for this are the perceived risk factors, as well as the lack of financial support and training resources for owner managers. However, articles on the use of technological innovations such as BI in the SMME apparel sector have not been found in the literature.

2.8 Conclusion

Considering the literature that has been presented, it is not yet evident how SMMEs in South Africa perceive the usefulness of BI and it is also unclear how they prefer to adopt certain cloud-based services. Most SMMEs do not have the financial basis

which is needed to conduct an evaluation process prior to the adoption of a new technology in order to be able to project the estimated costs and benefits, return on investment and management. A security evaluation also is also necessary to assist SMMEs to identify cloud based security threats, vulnerabilities, and risks associated with the technology they intend to adopt and use (Moyo and Loock, 2018). These findings further motivate the reason to conduct the study to determine the factors influencing BI adoption amongst South African SMMEs, particularly in the apparel sector. There is also the question of what systems are currently being used by businesses in this sector to measure business operations. The other question is whether owner managers in this sector are aware of BI and its benefits. This highlights the need for this study.

SMMEs are open to the idea of innovation, but not too eager to learn about new technologies; this is often due to how most SMMEs are low skill entry industries and education is not seen as a major requirement to own and manage a small business specifically in the apparel sector.

However, lack of education and the lack of necessary systems in place has contributed to the high percentage of business failure. The biggest contributing factor to business failure has been found to be financial constraints. It is difficult for businesses to survive without any financial management education nor any supporting systems in place to assist with general business management such as BI which streamlines the core business operations to improve business performance. Most of the literature found was on BI adoption by SMMEs in various industries.

In conclusion, there was not much literature found that focused particularly on the apparel SMME sector. Despite not much research being done regarding the adoption of BI in apparel SMMEs, BI is one of the most frequently used tools by larger enterprises to measure business performance in the apparel industry and in every other industry. Many studies have found that BI is as important for SMMEs as it is for macro enterprises. Therefore, this study is justified in order to fulfil the objective to determine the factors that influence the adoption of BI in micro-small apparel businesses.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

Previous chapters described the theoretical foundation supporting this study and defined the variables used in it. This chapter discusses the research strategy that made it possible to gather the necessary data and analyse it in a way that allowed the researcher to find solutions to the issue. According to Denicolo and Becker (2012) research methodology is about maintaining consistency across purpose, design and implementation of the research methods. In order to achieve that, this chapter will outline the population of the study, sampling methods, data collection and analysis, as well as the delimitations and limitations of the study. It will also describe how issues of validity and reliability will be addressed as well as the ethical issues related to the research.

The prescribed methodology was promulgated in order to address a number of objectives and sub-objectives.

The main objective of the study was to understand the factors that influence the adoption of BI in micro-small apparel businesses in the greater eThekwini region.

There were three sub-objectives for this study namely:

1. Establish the factors that influence the evaluation of BI in micro-small apparel businesses.
2. Establish the factors that influence the adoption of BI in micro-small apparel businesses.
3. Establish the factors that influence the use of BI in the micro-small apparel sector.

3.2 Research design

Dawson (2019) stated that quantitative research employs large-scale survey research techniques, such as questionnaires or structured interviews, to generate statistical data. The act of being approached by a market researcher in a public setting or completing a questionnaire received via mail constitutes an instance of quantitative research. Qualitative research, on the other hand, investigates individuals' attitudes,

behaviours, and experiences by utilizing techniques such as interviews or focus groups. The study endeavours to gather a comprehensive perspective from the respondents. Due to the significance of attitudes, behaviour, and experiences, a reduced number of individuals participate in the research. However, the duration of interaction with these individuals tends to be prolonged (Dawson, 2019).

According to Cropley's (2021), the qualitative approach diverges from the quantitative methodology in terms of the researcher's engagement with the research subject. In qualitative research, a collaborative process of knowledge development is undertaken by both parties involved. The qualitative methodology aims to comprehend phenomena, while the quantitative approach endeavours to provide explanations for them. Qualitative research clarifies the examination of individuals' perceptions, comprehension, and interpretation of their surroundings in their routine existence. The approach is often characterized by a micro-analytical perspective and a narrow focus on a particular issue within a given context, although this is not universally applicable.

In traditional quantitative research, intelligence is measured through the utilization of IQ scores and the extent of language exposure, including the length of formal education. An ex-post-facto design may involve the formation of two distinct groups: an experimental group consisting of individuals with a high level of prior formal education, and a control group consisting of individuals with a comparatively lower level of prior formal education. The hypothesis of the study would be considered to be supported if there existed a statistically significant variance in the average IQ between the groups, as stated by Clark, Foster, Bryman and Sloan (2021).

The design for this research was a quantitative cross-sectional study which involves analysing information about a population at a particular point in time. Simkus (2021) states that in analytical cross-sectional studies, researchers investigate an association between two parameters. Dos Santos *et al. (*2021) observe that the most common method of business research is quantitative research. Quantitative methods produce numerical data that is statistically examined to find trends and patterns. Descriptive cross-sectional studies are used to characterise and assess the prevalence and distribution of one or many outcomes in a defined population. The design for this

research was a quantitative cross-sectional study which involved analysing information about a population at a particular point in time. This study made use of both analytical and descriptive cross-sectional designs. Analytical cross-sectional studies look into the relationship between two variables, to describe and evaluate the frequency and distribution of one or more outcomes in a specific population using descriptive cross-sectional studies. Descriptive cross-sectional studies determine the frequency, extent or severity of a particular trait across a given demography (Simkus 2021). The reason for deciding on a cross-sectional study is because, when compared to various other types of research, cross-sectional studies are relatively cost-effective and require less time. Surveys have the potential to offer valuable insights regarding the characteristics of a given population and to identify correlations that warrant further investigation (Thomas, 2021).

3.3 Population

The total number of individuals, groups, or organisations that could be studied is referred to as the "population" (Bertram and Christiansen 2020). The population targeted in this study as well as the sampling method are discussed in this section. The population of this study is the micro-small apparel sector, which is inclusive of micro-small retail fashion boutiques as well as micro-small cut, make and trim clothing manufacturers, in the great eThekwini region.

Sampling involves making decisions about which people, settings, events or behaviours to include in the study. In doing so, researchers must consider the population from which they are sampling.

In this study the main objective was to establish factors that influence adoption of BI for micro-small apparel businesses in the eThekwini region. Therefore the sample for this study was drawn from apparel businesses within the micro-small sector in the great eThekwini region. The researcher visited various businesses in Durban central as well as surrounding shopping malls. The shopping malls that were visited were Windermere Centre, Musgrave Centre, Davenport Square, La Lucia Mall, Westwood Mall, Bluff, Montclair Mall, Mega City, KwaMnyandu Mall and Galleria.

The researcher has selected the eThekwini region as the population sample for this study due to the fact that, the eThekwini Micro Enterprise Support launched the Informal Economy Support Programme (IESP) (a first for South Africa). This can be described as a specialised business support initiative supporting micro and informal enterprises (MIEs) in innovative and cost efficient ways, thereby realising the potential for enterprise growth and job creation. Additionally, the IESP is strategically important because, although it is acknowledged that the informal economy is vital in overcoming joblessness and economic growth, there has been a lack of much needed support for MIEs up to now.

Trade and Investment KwaZulu-Natal (2021), describes the clothing and textile sector as one of KZN's biggest employers of skills across the spectrum. Most SMME factories are located in the KZN rural towns of Ladysmith, Isithebe, Newcastle, and Port Shepstone as well as eThekwini. The KZN government in partnership with the National Department of Trade and Industry have also engaged in the development of a clothing and textile special economic zone in the uThukela region. This development is a catalyst for the corridor development of the sector linking the Western region including uMgungundlovu region with eThekwini and the industrial sites north of eThekwini.

In this study the main objective was to establish factors that influence adoption of BI for micro-small apparel businesses in the eThekwini region. Therefore the sample for this study was drawn from apparel businesses within the micro-small sector in the central business district and surrounding areas within the eThekwini region

3.4 Sampling

Research is the process of using a subset of a population to represent the entire population in a research survey. By employing a smaller number of people (also known as a sample) in the population to represent the entire population, sampling enables a large-scale research project to be carried out with more realistic costs and time constraints (Qualtrics 2022).

There are two types of sampling techniques: probability sampling, which uses random selection to enable the researcher to draw robust statistical conclusions about the

population, and non-probability sampling, which uses non-random selection based on convenience or another factor (McCombes 2019). The operational dynamics of the businesses in this sector varies from business to business.

According dos Santos *et al.* (2021), non-probability sampling implies that some units in the population are more likely to be selected than others, which means human judgement impacts the selection process.

The researcher employed non-probability sampling for this investigation. Non-probability sampling contains six distinct sample types, according to dos Santos et al. (2021), including quota sampling, purposive sampling, convenience sampling, theoretical sampling, opportunistic sampling, and snowball sampling. Purposive sampling was chosen from among these many sample techniques for this study. Purposive sampling, according to McCombes (2019), is described as judgmental sampling, in which the researcher uses their experience to choose a sample that will be most helpful to their study goals.

According to Aardt *et al.* (2021), the goal of purposive sampling is to sample cases/participants in a strategic way in order to get the relevant sample to the research questions. The researcher can ensure that there is a good range of variety for the members of the sample to differ from each other with regards to their key characteristics (Aardt *et al.* 2021). To achieve this outcome, for this study the researcher went to various businesses situated in different market segments of the population to get the variation of characteristics. The businesses visited ranged from La Lucia which is more of an upmarket area to businesses situated in Umlazi which is more of a low income market area.

3.5 Sample size

According to Kibuacha (2021), sample size refers to the number of participants who are included in a research study to accurately reflect a population. The term "sample size" refers to the overall number of participants in a study, and it is frequently divided into subgroups according to factors like age, gender, and location to ensure that the final sample accurately reflects the entire population. One of the most crucial aspects

of statistical analysis is choosing the proper sample size. A sample size that is too small won't produce reliable results or accurately reflect the demographics of the group under study. However, while larger samples have reduced margins of error and are more representative, an excessively high sample size could result in a major increase in the research's cost and duration (Qualtrics 2022).

The initial proposed samplefor this study was drawn from the population frame of 200 apparel businesses that were registered at the KZNFC in 2019. The KZNFC had a register of designers and micro-small apparel manufacturers and independent retailers, however this is an informal association and therefore it was not compulsory for businesses to register their businesses. However, due to Covid19 the KZNFC had to close down. This led the researcher to draw the sample from the eThekwini Micro Enterprise Support – Informal Economy Support Programme.

In order to calculate the sample size, there are a few things that were considered about the target population and the level of accuracy needed. The first thing that was considered was the population, which is 200. Errors are unavoidable, according to Qualtrics (2022), but the question is how much is acceptable. The confidence interval, also referred to as the margin of error, is stated in terms of mean values. The amount of variation between the mean number of the sample and the mean number of the population is up to the researcher.

The confidence level must be taken into account when determining a sample size. This relates to the researcher's level of assurance regarding how the mean will change given the margin of error. The 90% and 99% confidence intervals are the two most used confidence levels. Last but not least, the researcher must take into account the standard deviation, which is an estimation of how much the replies will differ from the mean value and each other. The sample should be big enough, therefore a standard deviation of.5 is the best option.

The confidence level for this study was 95% which is a Z-score of 1.96 and a standard deviation of .5 was used with a margin error of 5%. The equation used to calculate the sample size for this study was derived from (Qualtrics 2022), which is as follows:

(1.96) 2 x 5 (.5) / (0.05)2. Therefore, a sample size of 132 respondents was deemed to be sufficient for this study. Sekaran and Bougie (2010) concur with this figure by stating that a sample size of 132 would be sufficient if the population is 200.

3.6 Data collection

A cross-sectional study was carried out where the researcher investigated participants and collected data by means of a structured questionnaire survey set in a Likert scale format. The Likert scale ranged from (1) strongly disagree, (2) disagree, (3) slightly disagree, (4) slightly agree, (5) agree and (6) strongly agree. The researcher collected the data by personally visiting various micro-small apparel business owners in the great eThekwini region. The selection of the visited business was judgemental, based on business operational measures, safety and convenience. However, the Covid-19 pandemic was at its peak during the data collection stage, with lockdown ensuing during some of this time. Due to the lockdown regulations it became difficult and sometimes impossible to conduct research in person by doing walk-ins to the various businesses.

Therefore, the researcher had to send the questionnaires via different social media platforms, such as WhatsApp, Facebook Messenger and Instagram Messenger. After months of waiting, there was eventually enough responses to analyse the data. However, some of the data was not accurate and therefore could not be used for the research. Eventually, once the restrictions were lifted, the researcher had to revisit a number of respondents in person as initially intended. The final results from this were then used for the study and analysed accordingly.

A discussion of how the data collection instrument was derived, derivation of the questionnaire, the pilot study as well data preparation follows.

3.6.1 Data collection instrument

The data was collected through a survey questionnaire. Most of the questions were in a Likert scale format, (see Appendix A). According Qualtrics (2022), the Likert scale has proven to be a useful tool for evaluating attitudes and perceptions towards a business, brand, product, or service. The utilization of Likert scale responses has the capacity to evaluate an individual's sentiment, in addition to the underlying rationale for such sentiment. One possible approach is to aggregate data using a statistical analysis tool, where responses can be sorted and filtered to determine the proportion of satisfied customers compared to dissatisfied ones. One could potentially enhance the analysis by disaggregating the percentages into subcategories, such as individuals who report a high level of satisfaction versus those who report moderate satisfaction. Utilizing a Likert scale questionnaire solely for a singular topic is crucial to avoid perplexing respondents and undermining the credibility of the research.

DeFranzo (2023) asserts that surveys are a valuable tool for delineating the attributes of a sizable populace. No other research methodology can offer such extensive capabilities, thereby ensuring a more precise sample for collecting focused outcomes, drawing inferences, and making critical decisions.

The utilization of surveys that guarantee anonymity to respondents has been shown to facilitate the provision of more candid and valid responses. In order to obtain the most precise and reliable data, it is imperative that respondents exhibit a high degree of candour and transparency in their responses. Anonymous surveys offer a means of obtaining more candid and unequivocal responses compared to alternative research methodologies, particularly when it is explicitly communicated that survey responses will be kept entirely confidential. Hence the utilisation of a survey questionnaire for this study.

A draft questionnaire was developed by making use of the information gathered during the literature review. Table 3 and 4 outline the statements that were considered and adapted prior to finalising the questionnaire, along with the sources for each group as well as the Cronbach’s alpha for each set of questions.

Table 3:Derivation of questionnaire – independent variables

IV	Det Factors	Statement	Source	Cronbach's alpha
TECHNOLOGICAL	3.1. Relative adv	3.1.1. Business intelligence systems allow companies to make right decisions and to take right actions. 3.1.2. Business intelligence systems improve the quality of decisions and actions. 3.1.3. Business intelligence systems give a greater control over a business	Ifinedo (2011), Oliveira, Thomas and Espadanal (2014)	**0.946**
	3.2. Cost	3.2.1. Business intelligence systems are more cost effective than other types of information systems. 3.2.2. Organisations can avoid unnecessary cost and time by using BIS. 3.2.3. Business intelligence systems save costs related to time and effort.	Chong and Chan (2012)	**0.919**
	3.3. BIS and ERP	Enterprise resource planning (ERP) is considered as a business management software that a company can use to collect, store, manage, and interpret data from many business activities: 3.3.1. We have BIS that is built-in in our ERP 3.3.2. Our ERP incorporates BIS. 3.3.3. Business intelligence systems was provided as an integrated part of our ERP.	(Puklavec Oliveira, and Popovič 2014)	**0.939**
ORGANISATIONAL	3.4. Management Support	3.4.1. Our management actively participates in establishing a vision and formulating strategies for utilising BIS. 3.4.2. Our management communicates its support for the use of BIS. 3.4.3. Our management is likely to take risk involves in implementing BIS.	Puklavec Oliveira, and Popovič (2018)	**0.916**
	3.5. Rational decision making culture	3.5.1. Our company encourages to make informed decisions. 3.5.2. Our company encourages to look for data/information to inform decision making. 3.5.3. Our company shows organisation-wide respect for measuring and evaluating evidence when making decisions. 3.5.4. Our company encourages decision-making processes that include quantitative/numeric analysis.	Kulkarni, Robles-Flores and Popovič (2017) Puklavec Oliveira, and Popovič (2018)	**0.959**
	3.6. Project champion	3.6.1. Business intelligence systems have strong advocates in our company 3.6.2. There are one or more people in our company who are enthusiastically pushing for BIS 3.6.3. There are one or more people in our company who are constantly praising BIS benefits.	Gu, Cao and Duan (2012)	**0.930**

	3.7. Organisational Data Environment	3.7.1. The data we currently available in our company are of high quality. 3.7.2. The data that we currently use in our company are reliable. 3.7.3. We have clear agreement on a common set of data definitions and business rules in our company. 3.7.4. Overall, information is shared openly throughout our organisation	Puklavec, Oliveira, and Popovič *et al.* 2018	**0.909**
	3.8. Organisational Readiness	3.8.1. Our company knows how information technology (IT) can be used to support our operations. 3.8.2. Our company has a good understanding of how BIS can be used in our business. 3.8.3. We have the necessary technical, managerial, and other skills to implement BIS. 3.8.4. Our business values and norms would not prevent us from adopting BIS in our operations. 3.8.5. our company possesses enough resources (financial, technological …) to adopt BIS.	Ifinedo (2011)	**0.899**
ENVIRONMENTAL	**3.8. External Support:**	3.8.1. There are businesses in the community, which provide technical support for effective use of BIS. 3.8.2. Technology vendors actively market BIS by providing incentives for adoption. 3.8.3. Technology vendors promote BIS by offering free training sessions. 3.8.4. Government regulations influence the adoption of BIS 3.8.5. Competitive pressure has an impact on the adoption of BIS in our company 3.8.6. Various market trends and customer demands have influenced us to adopt BIS.	Puklavec Oliveira, and Popovič *et al.* 2018	**0.901**

Table 4: Derivation of questionnaire – dependent variables

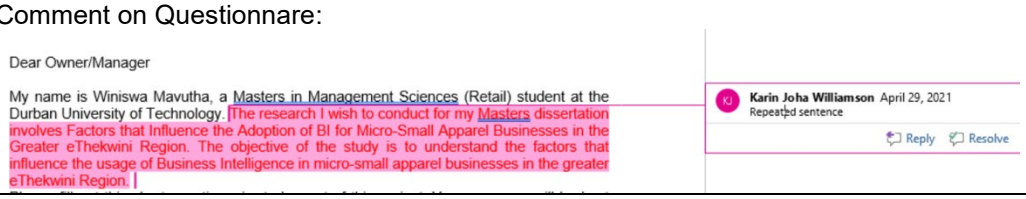
Dependent Variables	Statements	Source	Cronbach's alpha
EVALUATION	4.1. Our company collects information about BIS with the possible intention of using it. 4.2. Our company has conducted a pilot test to evaluate BIS. 4.3. Our company intends to use BIS if possible.	Chan and Chong (2013) Afolayan and de la Harpe (2019)	**0.824**
ADOPTION	4.4. At what stage of BIS adoption is your organisation currently engaged: 4.4.1. Not considering 4.4.2. Currently evaluating (e.g. in a pilot study) 4.4.3. Have evaluated, but do not plan to adopt this technology 4.4.4. Have evaluated and plan to adopt this technology. 4.4.5. Have already adopted BIS 4.5. if you're anticipating that your company will adopt BIS in the future. How soon do you think it will happen? 4.5.1. Not considering In more than 5 years 4.5.2. Between 2 and 5 years 4.5.3. Between 1 and 2 years 4.5.4. In less than 1 year 4.5.5.Have already adopted BIS	Thiesse *et al*. 2011 Afolayan and de la Harpe (2019)	**0.927**
USAGE	4.6. Our company does not use BI 4.7. Our company finds BIS to very useful and beneficial to our business needs. 4.8. We are currently experiencing some high risk factors with BIS. 4.9. Our company uses BIS for: 4.9.1. Client Relation Management 4.9.2. Financial Reporting 4.9.3. Planning 4.9.4. Forecasting 4.9.5. Inventory Control 4.6. We are not able to extract the appropriate data for our business operations.	Puklavec Oliveira, and Popovič (2018)	**0.917**

3.6.2 Pilot study

In order to ensure validity (both content and face), a pilot study took place. Firstly, a number of colleagues and associates were invited to read the questionnaire. Some of these were research specialists and/or academics. After that a few alterations were made and the researcher then sent the questionnaire to a number of potential respondents in order to test for understanding and ambiguities as well as the time that it took to be completed. Table 5 outlines the comments made by participants in the pilot study, along with the researchers responses written in italics. This was important

to ensure that the process was not too time consuming for the participants. Final revisions were made in response to feedback from the pilot respondents.

Table 5: Comments from the pilot study

NO	COMMENTS
1.*	Fashion Academic and Research Expert
	I think the questionnaire is well developed, my only real question is: will the businesses she's studying know what Business Intelligence and Business Intelligence Systems are? My knowledge of these micro brands as she's defined them is that they are generally run by fashion graduates who only sometimes have assistance from someone in administration and business etc. I think she should perhaps reword some of her questions to make them more accessible to her demographic. *Something to consider, but the reason for me to conduct the questionnaire myself by doing walk-ins is so I can explain the questions further.*
2.*	IT Expert
	Looks good to me – seems to address the various considerations I'm aware of. I mean would it be of value to enquire about the product/brand of which BI System a vendor may be using (for those already using existing systems), i.e. off the shelf Microsoft PowerBI. It's not uncommon for companies to have a mix of off the shelf solutions and internal tools as well. At BusinessOptics a lot of the stuff we did for the insurance industry (BI tools) was completely custom. I personally would want to know the split between 100% custom, 100% off the shelf and the mix that established BI users have. Could be an interesting metric for companies considering BI tools. *Definitely something to consider.*
3.	Academic
	All look good with Winnie's questionnaire. Just made a comment in the intro. I also take it that it is a very specific group that will be targeted with this questionnaire. Comment on Questionnare: 
4.*	Academic Professor and Research Expert
	Here you are Karen. Just some editing and a few queries. Can't really tell how this ties in with objectives, but assume you and Gill have checked this *Will attach the questionnaire comments from respondent.*
5. *	Fashion Retail Business Expert
	I have completed the questionnaire, very interesting study. Would love to see the results, just have a few suggestions and concerns. • Some businesses could be retailing as Omni Channel • I'm a bit confused with your statement on Evaluation 1.2, I think it should be reworded to "Our company is undergoing a consultation process with a possible BI systems supplier to evaluate a suitable system according to the needs of the business" • I think the statement on 2.6 under adoption is incorrect. The company wouldn't be training staff at this stage, we would be evaluating the systems we currently have in

	place and how we can migrate from those to the BIS which we intend to adopt, so we could be changing processes at this stage.
6.	Academic
	I have completed the pilot study, such an interesting topic. I was able to understand everything on the questionnaire, all the best with everything.
7.*	Retail Expert
	Completed, so interesting. Well done Winnie.

3.6.3 Structure of the questionnaire

The final questionnaire is available in the Appendices (Appendix A). The questionnaire began with a brief introduction explaining what the research was about. The interview began by asking the respondents if they knew what BI was. If they did not know, the interviewer explained the definition of BI along with its importance and benefits. This was necessary, as not all respondents were expected to know the meaning of BI. The questionnaire then followed with a section which included collecting biographical data from the respondents. The names of the respondents were not necessary. The following information was requested:

1. Number of years working in the retail industry
2. Number of years as a business owner
3. Number of employees
4. Highest level of education
5. Business operational strategy (business to business/ business to consumer)
6. Retail operating location (home/online/brick and mortar/omni-channel)

Section A investigated the dependent variables of the study, namely: evaluation, adoption and usage. The statements in this section were in a Likert scale format, where the respondents were expected to indicate their level of agreement or disagreement with statements provided for each independent variable in six points However, with regards to adoption, two multiple choice question were included, with Questions 4 and 5 requesting respondents to firstly select an option stating what stage of adoption of BI their businesses were currently in and secondly, question 5 asking respondents to indicate how soon they believed they might adopt BI.

Section B investigated factors connected to the independent variables of the study namely: technological-organisational-environmental factors. The statements in this section were also in a Likert scale format. Finally, the interviewer thanked the respondents for their time and willingness to participate in the study.

3.6.4 Data preparation

Prior to entering the data into SPSS for analysis, the data were entered into an Excel spreadsheet. The researcher personally carried out this task to verify the validity of each questionnaire. In this method, errors were immediately located and, whenever feasible, fixed. The statistician received the data after it had been collected, checked it again, and identified a few additional mistakes and omissions. Wherever possible, queries were documented, examined, and corrected.

3.7 Data analysis

Descriptive and inferential statistics were used in this quantitative study's analysis. Frequency and cross tabulations were used to analyse the data and present it. This section will go through how the data was prepared as well as the multiple tests that were performed in order to analyse the data.

The Statistical Package for Social Sciences (SPSS) Version 13.0 software program was used to analyse the data. To achieve the objectives outlined by the study, several tests were conducted. The results were displayed in tables and charts.

In this study the univariate analysis was carried out with descriptive statistics in order to identify the biographical information of the respondents. A frequency table was used to display nominal and ordinal variables and a histogram chart is used as a graphic representation of the data (DeCarlo, Cummings and Agnelli 2019). A variety of analyses were used, as explained below.

3.7.1 Univariate analysis

According to Sherpa (2021), in a quantitative technique known as a univariate data analysis, each variable is looked at separately to determine its distribution. Since

univariate analysis is non-relational, it cannot reveal the relationships between the variables. Instead, it examines each variable separately in an effort to comprehend them more fully.

On a categorical variable, the chi-square goodness-of-fit test was applied to determine which response alternatives were chosen considerably more/less frequently than the others. The chi-square goodness-of-fit test contrasts the actual frequencies observed in each category (cell) with the theoretically predicted frequencies. The purpose of the test is to determine whether one category for a given topic is "selected" more frequently than another, or if they are "equally picked." As a result, predicted frequencies are set to be the same in each cell (category) (Shah, 2021)

Testing therefore determines whether there is a significant discrepancy between the observed and expected frequencies. The level of significance is set at 0.05. This indicates that the null hypothesis of equal anticipated frequencies will only be incorrectly rejected 5% of the time, even if it is true and should be accepted. This study conducted the chi-square of goodness-of-fit test for question A4 and A5 to determine the levels of adoption that the respondents were on, as well as to identify when they anticipated adopting BI if they had not already adopted it.

3.7.2 Bivariate analysis

Shah (2021) asserts that a collection of statistical methods known as bivariate analysis look at the correlation between two variables. Multivariate analysis is built upon bivariate analysis. The researcher can assess the degree to which an investigation has produced a result that is likely to represent a real link rather than a chance occurrence by examining statistical significance.

A common bivariate statistical test is the t-test; this test is designed to allow for hypothesis testing and looks to see if there is a difference between the score between two variables. In this case, the one sample t-test was used to test whether a mean score was significantly different from a scalar value (Sherpa 2021). This test is a comparison of the mean of one variable from the data to an external benchmark

(DeCarlo, Cummings and Agnelli 2019). For this study the one-sample-t -test was used to determine the significance of constructs and the relationship they had with each variable for both dependent and independent variables.

3.7.3 Multivariate analysis

Multivariate analysis is defined as a process of involving multiple dependent variables resulting in one outcome. In addition, multivariate analysis encompasses all statistical techniques that are sued to analyse more than two variables at once. The objective is to find correlations between multiple variables at one time. This allows a much complex comprehension of a scenario than what is provided by a bivariate analysis (Steven 2022).

Exploratory factor analysis was used in this study to test the relations among observed variables and a small number of underlying factors. In order to get single composite measure for the dependent variables, factor analysis with promax rotation was applied to determine groupings of the items under each construct. The factor analysis was accompanied by factor loadings that were used to identify significant constructs in the study; as a result some constructs fell off after the factor loadings were done. These results are illustrated in Chapter 4. As described by Brown (2015), exploratory factor analysis is used to establish relationships between variables and represent them in terms of a reduced number of underlying factors.

3.8 Delimitations

The following delimitations will be applicable to the study:

- The study will be delimited to the greater eThekwini Region only.
- The study will be delimited to the list of SMMEs as supplied by the KZN Fashion Council.

The above two delimitations were applied due to budgetary and time constraints. Because of this, generalisation should be approached with caution.

3.9 Validity

Validity describes how appropriate the measures are that are used. Validity ensures accuracy of the results as well as generalisability of the findings (Saunders, Lewis and Thornhill 2019).

According to Wiid and Diggines (2013) face validity can be ensured by selecting scale items that have previously met the requirements of measuring the same research constructs. Face validity checks whether the questions are clear and understandable. In order to achieve this, a pilot study was conducted to check whether the questionnaire made sense. In addition, to check the accuracy of the questionnaire, the researcher also consulted with various research experts. By running a pilot test, content validity was also ensured.

In order to test the internal validity of various constructs in the questionnaire, an exploratory factor analysis was carried out to check whether each individual question contributed towards the main constructs of the questionnaire (Wiid and Diggines 2013).

3.10 Reliability

When different measurements produce consistent results, a measure is said to be reliable (Zikmund and Babin 2010). Reliable statements are assumed to be stable and consistent. Cronbach's alpha was used to determine the reliability of the composite measure. The coefficient for Cronbach's alpha lies between 0 and 1, with any value that is below 0.6 considered to represent less than satisfactory internal consistency and hence reliability. Ideally, values that are above 0.7 can be stated to indicate that statements in a group are internally consistent with each other (Saunders, Lewis and Thornhill 2019).

Reliability testing included the Kaiser-Meyer-Olkin (KMO) test for sample adequacy. This test evaluates the appropriateness of the sample for the entire model as well as each variable in the model. The statistic is a representation of how much of the variance among the variables may be common variance. The data will lend

themselves to factor analysis more readily the lower the fraction. KMO returns values ranging from 0 to 1. A general guideline for analysing the statistic is as follows:

- KMO values between 0.8 and 1 denote appropriate sampling.
- KMO readings below 0.6 point to insufficient sampling and the need for corrective action. Use your best judgment when determining values between 0.5 and 0.6 because some writers set this value at 0.5.
- KMO values close to zero means that there are large partial correlations compared to the sum of correlations. In other words, there are widespread correlations which are a large problem for factor analysis (Glen 2016).
-

3.11 Ethical issues related to the research

The ethics committee of Durban University of Technology (DUT) gave its approval for this investigation (Appendix E). At the start of the survey, the participants were sent a letter (Appendix B) requesting for permission to conduct the study in their place of business, a letter of information (Appendix C), and a letter of consent (Appendix D). Every responder received a detailed explanation of the study's purpose. Although the topic may not be controversial, the participants were made aware that anonymity and confidentiality would be assured.

3.12 Conclusion

This chapter outlined the research process of this study, from the research type to the validity of the results, which consisted of 160 valid questionnaires. There was a discussion of the data collection instrument, the derivation of questionnaires as well as the pilot study and comments regarding the questionnaire that were made in the pilot study. This chapter also outlined the population frame and sampling method used. the next chapter will discuss the analysis of the data.

CHAPTER 4: ANALYSIS OF RESULTS

4.1 Introduction

The analysis of results is divided into sections according to the structure of the questionnaire. The questionnaire began with demographics, followed by two other sections (namely Section A and B) which represented the dependent and independent variables of the study. Section A is based on information gathered from questions A1.1 – 3.6. (See Appendix A). This section investigated the three stages of BI adoption which are: evaluation, adoption and usage. Section B consisted of the dependent variables of the study which are technological, organisational, and environmental.

The results of the research begins with an initial overview of the research results. Firstly, descriptive statistics are used to identify the general profile of the respondents and the businesses that they represent. This includes means and standard deviations where applicable with regards to the demographical profile, the stages of adoption as well as the influencing factors of the sample. Frequencies and percentages are represented in tables and graphs.

4.2 Demographic profile

Descriptive statistics, according to George and Mallery (2016), are intended to reveal information about the distribution of the variables. Measures of central tendency (mean, median, mode), measures of variability around the mean (standard deviation and variance), measures of deviation from normality (skewness and kurtosis), information about the spread of the distribution (maximum, minimum, and range), and information about the stability or sampling error of certain measures, such as standard error of the mean (S.E. mean), S.E. of the kurtosis, and S.E. of the skewed distribution, fall under this (included by default when skewness and kurtosis are requested).

The study concentrated on six demographic variables relevant to the description of small apparel business owners. The variables being: number of years in business, education, age of business, number of employees, type of business and the location of the business. For this section descriptive statistics were used. The demographics of the sample are shown in Figures 3 and 4.

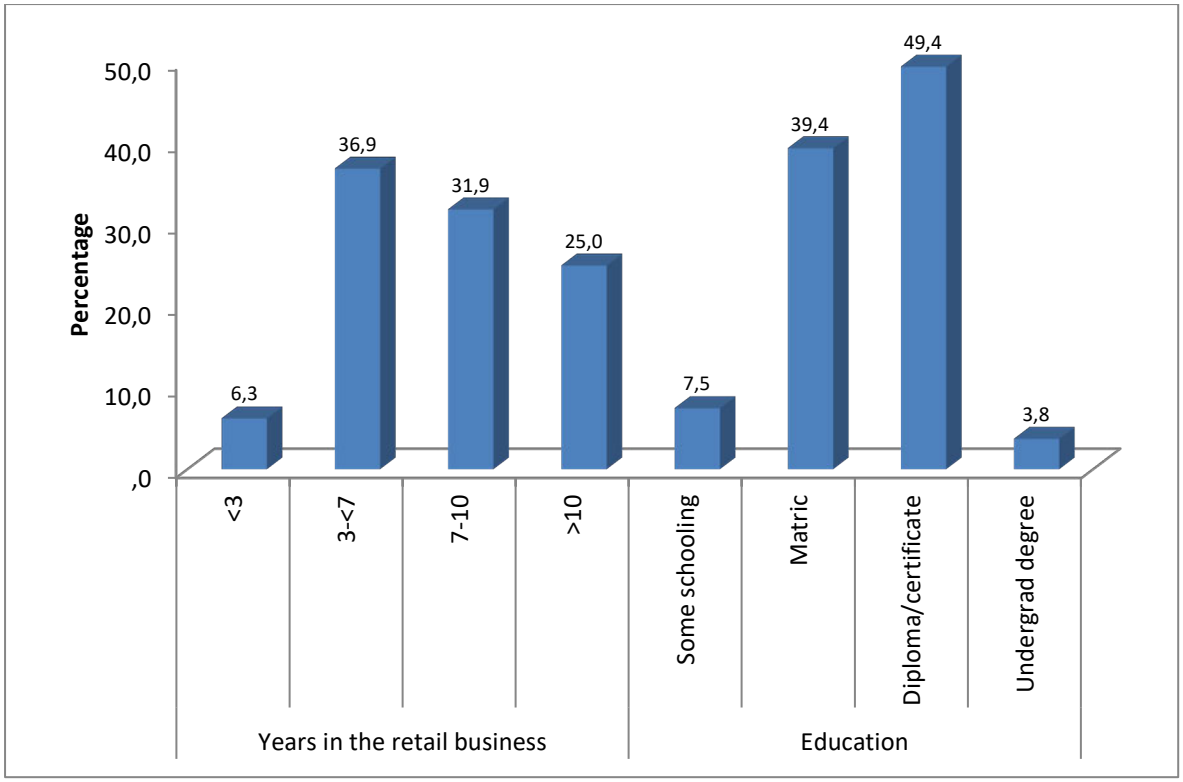


Figure 3: Demographic profile: years in retail business and education

According to Figure 3, 36.9% of the respondents have been in the retail business between 3-7 years, 31.9% between 7-10 years, 25.0% more than 10 years, and 6.3% for less than 3 years. In terms of education, 49.4% of the respondents have a diploma or certificate in higher education, 39.4% have matric, 7.5% have some schooling, and 3.8% have an undergraduate degree. The questionnaire included a post graduate degree as an option, but none of the participants indicated that they had obtained a post graduate degree.

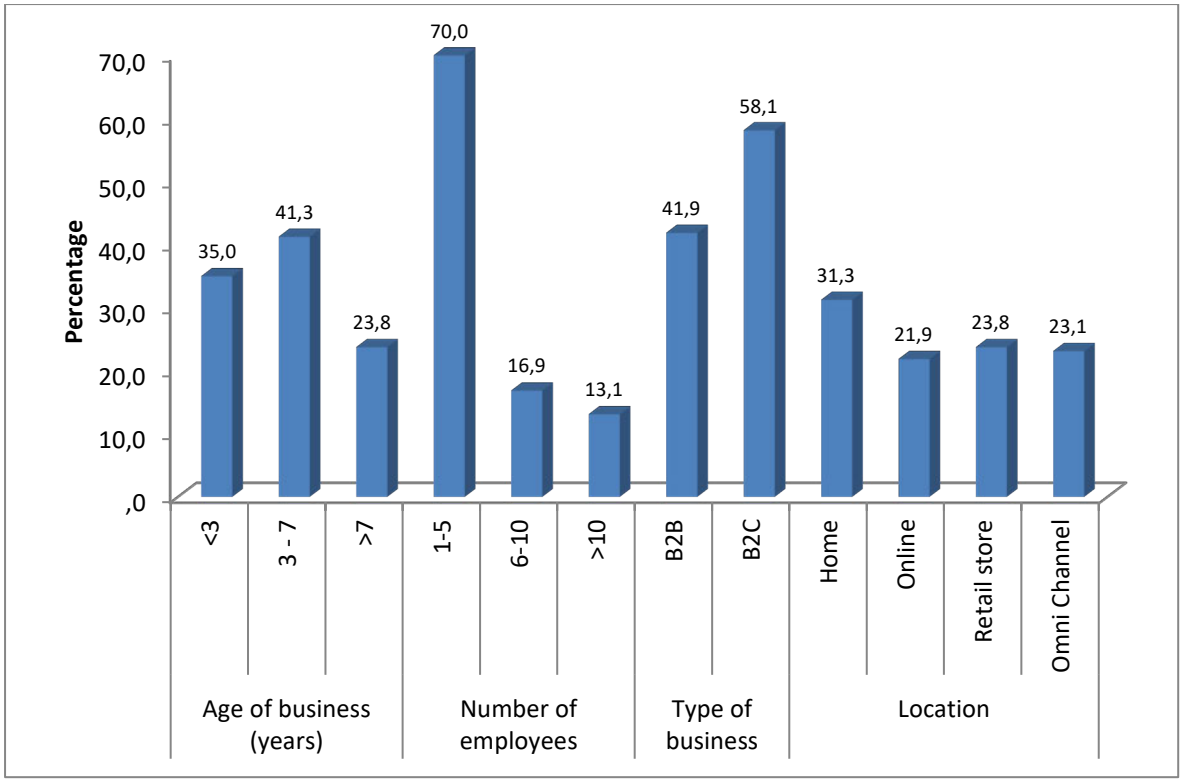


Figure 4: Sociographic profile

According to the results shown in Figure 4, 41.3% had their own business between 3-7 years, 35% for less than 3 years, and 23.8% for more than 7 years. The majority of the businesses in this sector are sole proprietors, with 70% of the participants have 1-5 employees. A further 16,9% have between 6 and 10 employees, while 13.1% have more than 10 employees. 58.1% of the participants operated as business-to-consumer type of businesses, and 41.9% operated as business-to-business type of businesses. The locations of the businesses in this sector vary. When considering the size and shape of these businesses the participants were provided with four options which were home, online, retail stores and omni-channel. Results indicated that 31.3% were located from home, 21.9% were solely online businesses, 23.8% had retail stores and 23.1% operated in an omni-channel format.

4.3 Measures for evaluation, adoption and usage

The dependent variables relating to adoption were represented by the three categories of evaluation, adoption and usage, with statements relating to these being presented in Section A of the questionnaire. Respondents were requested to rate their situation with regard to each of these categories via a number of statements which had been adapted from past literature. The answer to each statement was ranked on a 6 point Likert scale ranging from strongly disagree (1) through to strongly agree (6).

Analysis of the results initially began with frequencies and percentages for each item. These figures were used to calculate mean scores. After this, one sample t-testing was used to test whether a mean score was significantly different from a specific value. One sample t-testing was carried out to establish whether the average significant score differed from the central score of 3.5. Significant agreement indicated that the mean was >3.5, while significant disagreement was indicated by a mean that was <3.5. The one sample t-test is usually done when the population standard deviation is unknown or when the sample size is small, with this case being the latter. Once these figures were reported, further analysis ws carried out in order to obtain a single reliable composite measure for each dependent variable.

4.3.1 Evaluation

Table 6 summarises the results generated on the significance of evaluation.

Table 6: Significance of evaluation

No	Statements	Mean	Standard Deviation	p-value
A1.1	Our business is in the process of gathering information on BI with the possible intention of adopting it	4.01	1.367	<.001*
A1.2	Our business has conducted a trial run to evaluate a BIS.	2.78	1.512	<.001*
A1.3	Our business has investigated the benefits of using BI -	4.12	1.619	<.001*
A1.4	Our business has investigated the feasibility of using BI (e.g. having the resources such as skills and finances needed to adopt it)	4.21	1.583	<.001*
A1.5	Our business has investigated different kinds of systems that support BI.	3.31	1.634	.149

***indicates significance at the 95% level**

The results in Table 6 indicate that there is significant agreement that businesses are in the process of gathering information on BI with the possible intention of adopting and using it, that businesses have investigated the benefits of using BI and that they investigated the feasibility of using BI. In all of these cases p<.001.

However, the results also show that there is significant disagreement with the statement that companies have conducted a trial run to evaluate a BIS, p<.001.

There is neither significant agreement nor significant disagreement with the statement that businesses have investigated different types of systems that support BI (p = 0.149 >.001

Table 7: Frequencies of evaluation

No	Evaluation	Responses as Frequency (%)					
		Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
A1.1	Our business is in the process of gathering information on BI with the possible intention of adopting it	9 (5.6)	25 (15.6)	1 (0.6)	64 (15.0)	43 (26.9)	18 (11.3)
A1.2	Our business has conducted a trial run to evaluate a BIS.	17 (10.6)	84 (52.5)	26 (16.3)	1 (0.6)	14 (8.8)	18 (11.3)
A1.3	Our business has investigated the benefits of using BI -	17 (10.6)	17 (10.6)	18 (11.3)	15 (9.4)	64 (40.0)	29 (18.1)
A1.4	Our business has investigated the feasibility of using BI (e.g. having the resources such as skills and finances needed to adopt it)	17 (10.6)	17 (10.6)	9 (5.6)	14 (8.8)	79 (49.4)	24 (15.0)
A1.5	Our business has investigated different kinds of systems that support BI.	26 (16.3)	36 (22.5)	25 (15.6)	24 (15.0)	33 (20.6)	16 (10.0)

The results gathered in Table 7 indicate that from the respondents that were interviewed, 53.2% agreed that their businesses were in the process of gathering information on BI with the possible intention of adopting it, while 46,8% of the respondents disagreed with this statement. From the respondents that participated in this survey, 79.4 % disagreed with the statement that their businesses have conducted a trial run to evaluate a BI. These results also indicate that 67.5% agree with the

statement that their businesses have investigated the benefits of using BI, and 73% of the respondents agree that their businesses have investigated the feasibility of using BI. Only 45.6% of the respondents agree with the statement that their businesses have investigated different kinds of BIS, while 54.4% disagree with the same statement.

4.3.2 Adoption

Table 8 summarises the statistics that have been generated on adoption.

Table 8: Significance of adoption

No	Statements	Mean	Standard Deviation	p-value
A2.1	Our business has adopted customised elements of BI to support specific areas of need in the business.	3.42	1.662	.537
A2.2	Our business is uncertain about adopting a BIS.	2.49	1.360	<.001*
A2.3	Our business has decided that it is feasible to adopt BI.	4.01	1.334	<.001*
A2.4	Our business has decided that it is in their best interests to adopt BI.	4.66	1.082	<.001*
A2.5	Our business has decided that it is in their best interests to adopt BI and is currently preparing to use it	3.68	1.647	.184
A2.5	Our business is currently training our staff on the use of Business Intelligence.	2.53	1.453	<.001*

***indicates significance at the 95% level**

The one sample statistics on Table 8 indicate that there is significant disagreement that businesses are currently training their staff on the use of BI, and that businesses are uncertain about adopting BI (in both cases $p<.001$).

However, there is significant agreement that businesses have decided that it is in their best interests to adopt BI and that it is feasible for their businesses in this sector to adopt BI (in all cases $p<.001$).

There is neither significant agreement nor significant disagreement that businesses have adopted customised elements of BI to support specific areas of need in the business and that businesses have decided that it is in their best interests to adopt BI and are currently preparing to use it.

Table 9: Frequencies of adoption

	Adoption	Responses as Frequency (%)					
		Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
A2.1	Our business has adopted customised elements of BI to support specific areas of need in the business.	17 (10.6)	47 (29.4)	26 (16.3)	16 (10.0)	30 (18.8)	24 (15.0)
A2.2	Our business is uncertain about adopting a BIS.	35 (21.9)	71 (44.4)	20 (12.5)	17 (10.6)	9 (5.6)	8 (5.0)
A2.3	Our business has decided that it is feasible to adopt BI.	8 (5.0)	17 (10.6)	30 (18.8)	28 (17.5)	65 (40.6)	12 (7.5)
A2.4	Our business has decided that it is in their best interests to adopt BI.	0	0	40 (25)	10 (6.3)	75 (46.3)	35 (21.9)
A2.5	Our business has decided that it is in their best interests to adopt BI and is currently preparing to use it	9 (5.6)	54 (33.8)	9 (5.6)	21 (13.1)	42 (26.3)	25 (15.6)
A2.6	Our business is currently training our staff on the use of Business Intelligence.	33 (20.6)	84 (52.5)	6 (3.6)	1 (0.6)	34 (21.3)	2 (1.3)

The results in Table 9 indicate that 56.3% of the respondents disagree with the statement that their business has adopted customised elements of BI to support specific areas of need in the business. A total of 78.8% of the respondents disagree with the statement that their business is uncertain about adopting a BIS. Regarding the statement that businesses have decided that it is feasible to adopt BI, there was a total of 65.6% of respondents that agree 74.5% of the respondents agree that their business has decided that it is in their best interests to adopt BI. A total of 55.5% of the respondents agree that their business has decided that it is in their best interests to adopt BI and are currently preparing to use it. There is a total of 76.7% of respondents that disagree with the statement that their business is currently training the staff on the use of BI.

4.3.3 Usage

Table 10 summarises the significance derived from the one sample t-test conducted on usage.

Table 10: Significance of usage

No	Statements	Mean	Standard Deviation	p-value
A3.1	Our business has made the decision to adopt BI and is currently using it.	3.41	1.642	.471
A3.2	Our business has successfully implemented a BI.	2.58	1.049	<.001
A3.3	Our business uses BI to measure its business performance.	3.63	1.658	.318
A3.4	Our business uses BI to manage customer relationships.	3.74	1.630	.060
A3.5	Our business uses Business Intelligence to assist with financial reporting.	3.66	1.791	.253
A3.6	Our business uses BI to assist with inventory control.	3.55	1.765	.721

***indicates significance at the 95% level**

According to Table 10 there is significant disagreement with the statement that businesses have successfully implemented BI (A3.2, <.001).

However, the remainder of the statements exhibited neither significant agreement nor disagreement.

Table 11: Frequencies of usage

No	Statements	Responses as Frequency (%)					
		Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
3.1	Our business has made the decision to adopt BI and is currently using it.	14 (8.8	57 (35.6)	18 (11.3)	9 (5.6)	45 (28.1)	17 (10.6)
A3.2	Our business has successfully implemented a Business Intelligence.	8 (5.0)	100 (62.5)	15 (9.5)	27 (16.9)	9 (5.6)	1 (0.6)
A3.3	Our business uses Business Intelligence to measure its business performance.	0	65 (40.6)	27 (16.9)	7 (4.4)	24 (15.0)	37 (23.1)
A3.4	Our business uses Business Intelligence to manage customer relationships.	0	65 (40.6)	16 (10.0)	0	53 (33.1)	26 (16.3)
A3.5	Our business uses Business Intelligence to assist with financial reporting.	0	74 (46.3)	18 (11.3)	7 (4.4)	10 (6.3)	51 (31.9)
A3.6	Our business uses Business Intelligence to assist with inventory control.	0	83 (51.9)	9 (5.6)	7 (4.4)	19 (11.9)	42 (26.3)

The results presented in Table 11 indicate that 55.7% of the respondents disagree with the statement that their business has made the decision to adopt BI and is currently using it. There is a total of 77% of the respondents that disagree with the statements that their business has successfully implemented BI. In reference to the statement that businesses use BI to measure its business performance, 57.5% of the respondents disagree, and 42.5% agree with this statement. A total of 50.6% from the respondents disagree with the statement that their business uses BI to manage customer relationships, while 49.4% agree with this statement. 57.6% of the respondent disagree that their business uses BI to assist with financial reporting, while 42.4% agree with this statement. From the results in Table 11 it is evident that 57.5% of the respondents disagree with the statement that their business uses BI to assist with inventory control, while 42.5% of the respondents agree with this statement.

4.3.4 Exploratory factor analysis – dependent variables

In order to get single composite measures for both dependent variables, factor analysis with promax rotation was applied to determine groupings of the items under each construct. Composite measures were formed by calculating the average of the agreement scores across items included in the composite factor.

Items that did not load strongly enough or cross loaded were removed during the process. Cronbach's alpha was used to determine the reliability of the composite measure. The coefficient for Cronbach's alpha lies between 0 and 1, with any value that is below 0.6 considered to represent less than satisfactory internal consistency or hence reliability. Ideally, values that are above 0.7 can be stated to indicate that statements in a group are internally consistent with each other (Saunders, Lewis and Thornhill 2019).

The results for the three dependent constructs in this study (evaluation, adoption and usage) are summarised in Table 12.

Table 12: Summary of the exploratory factor analysis

Construct	KMO	Percentage variance extracted	Items retained	Cronbach's alpha
Evaluation	.823	74.15	1.1 – 1.5	.929
Adoption	.839	62.29	2.1; 2.3-2.6	.879
Usage	.787	72.83	3.1 – 3.6	.938

As can be seen in Table 12, all three composite measures are reliable (Cronbach's alpha >.7). In addition, a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was run to see how appropriate the factor analysis was. A KMO of >.7, indicates that the factor analysis was successful. During the process of factor analysis items that either cross load or do not load strongly enough are removed.

Table 13 details the items for the dependent variables that were retained once the factor analysis had taken place.

Table 13: Items retained post factor analysis for the dependent variables

Construct	Item	Statement
Evaluation	1.1	Our business is in the process of gathering information on BI with the possible intention of using it.
	1.2	Our business has conducted a trial run to evaluate a BIS.
	1.3	Our business has investigated the benefits of using BI – e.g. better analysis in decision making; increased organisational efficiency; improved business performance; and increased customer satisfaction.
	1.4	Our business has investigated the feasibility of using BI (e.g. having the resources such as skills and finances needed to adopt it).
	1.5	Our business has investigated different kinds of systems that support BI.
Adoption	2.1.	Our business has adopted customised elements of BI to support specific areas of need in the business.
	2.3.	Our business has decided that it is feasible to adopt BI.
	2.4.	Our business has decided that it is in their best interests to adopt BI.
	2.5.	Our business has made the decision to adopt BI and is currently preparing to use it.
	2.6.	Our business is currently training our staff on the use of Business Intelligence.
Usage	3.1.	Our business has made the decision to adopt BI and is currently using it.
	3.2.	Our business has successfully implemented a Business Intelligence.
	3.3.	Our business uses Business Intelligence to measure its business performance.
	3.4.	Our business uses Business Intelligence to manage customer relationships.
	3.5.	Our business uses Business Intelligence to assist with financial reporting.
	3.6.	Our business uses Business Intelligence to assist with inventory control.

4.3.5 Significance of responses for adoption stages

Respondents were asked to indicate which stage of BI adoption their business was currently at. The chi-square goodness-of fit-test was carried out to test whether any responses were selected more significantly than others with regards to the question, by comparing the observed frequencies in each category (cell) with the theoretical expected frequencies. The test aims to ascertain whether any of the categories for a specific question are 'chosen' more often or if they are 'equally chosen'. The 0.05 level of significance is used. This means that at most 5% of the time the null hypothesis of equal expected frequencies will be rejected when in fact it is true and should be accepted.

In response to the first question (A5), "At what stage of BI adoption is your company currently", it was found that all options were selected equally and therefore not

significant (p=0.81). Options on offer consisted of “not considering; currently evaluating, or having already adopted BI”.

However, responses to Question A5 which asked “If you are anticipating that your company will adopt BI in the future, how soon do you think it will happen?”, exhibited a different picture, with 33% of respondents indicating that they would probably adopt BI within 2 to 5 years and a further 23% within a year. The chi-square test confirmed that a significant number indicated that they plan to adopt BI within the next year or between 2 and 5 years, p<.001.

4.4 Measures for factors influencing adoption of BI

The independent variables relating to factors influencing the adoption of BI were represented by three categories, namely technical (perceived relative advantage and costs), organisational and environmental factors. Statements relating to these were presented in Section B of the questionnaire. Once more, respondents were requested to rate their situation with regard to each of these categories via a number of statements which had been adapted from past literature, according to a 6 point Likert scale.

One sample t-testing was used again to test whether a mean score was significantly different from a specific value. As before, it tested whether the average significant score differed from the central score of 3.5, with significant agreement indicating that the mean was >3.5, while significant disagreement was indicated by a mean that was <3.5.

4.4.1 Technological factors

Technological factors are represented by statements related to costs and perceived relative advantage. Table 14 Illustrates the results in response to statements related to these two factors.

The results on perceived relative advantage show that there is significant agreement that BI would allow micro-small apparel businesses to make correct decisions and take the right actions; that BI improves the quality of decisions and actions in a business;

BI enhances the effectiveness of decisions and actions in companies; and BI gives greater control over a business.

The results for costs shown in Table 14 indicate that there is significant agreement that micro-small apparel businesses would be able to make a plan financially to adopt BI (p .003< 0.005) and that adopting BI would be cost effective (p <.001).

There is neither significant agreement nor disagreement with the statement that the cost of BI software is unaffordable for businesses (p >.005).

Table 14: Significance of technological factors

IV	No	Statement	Mean	Standard Deviation	**P**-value
Perceived Relative Advantage	1.1.1	BI would allow our business to take correct decisions and the right actions.	5.16	0.669	<.001
	1.1.2	BI improves the quality of decisions and actions.	5.14	0.889	<.001
	1.1.3	BI enhances the effectiveness of decisions and actions in companies.	4.85	0.826	<.001
	1.1.4	BI gives greater control over a business.	4.88	0.807	<.001
Costs	1.2.1	The cost of BI software is unaffordable for our business.	3.71	1.389	.055
	1.2.2	Our business is able to make a plan financially to adopt Business Intelligence.	3.81	1.289	.003
	1.2.3	Adopting BI would be/is cost effective for our company (costs saved regarding time and effort would).	4.47	1.298	<.001

4.4.2 Organisational factors

Organisational factors are represented by management support, rational decision-making culture, organisational data environment, and organisational readiness. Table 15 summarises the significance that has been generated with respect to organisational factors.

Table 15: Significance on organisational factors

IV	No	Statements	Mean (SD)	Standard Deviation	p-value
Management Support	B2.1.1	Our management actively participates in establishing a vision and formulating strategies for utilising Business Intelligence.	4.04	1.555	<.001*
	B2.1.2	Our management communicates its support for the use of Business Intelligence.	4.01	1.467	<.001*
	B2.1.3	Our management is likely to take risks that involve the implementation of Business Intelligence.	4.66	1.057	<.001*
Rational Decision Making	B2.2.1	Our business encourages staff to make informed decisions.	5.02	1.079	<.001*
	B2.2.2	Our business encourages staff to look for data/information to inform their decision making.	4.65	1.260	<.001*
	B2.2.3	Our business encourages one to measure and evaluate evidence when making decisions.	4.93	0.959	<.001*
Organisational Data Management	B2.3.1	The data/information that is currently available in our company is of a high quality.	3.21	1.360	.007*
	B2.3.2	The data/ information that we currently use in our company is reliable.	2.96	1.189	<.001*
	B2.3.3	We have a clear understanding of the set of data/information necessary for the success and sustainability of our business.	3.81	1.425	.007*
Organisational Readiness	B2.4.1	Our business knows that BI can be beneficial to support operations.	4.14	1.319	<.001*
	B2.4.2	Our business has the necessary technical, managerial, and other skills to implement BI.	3.53	1.479	0.790
	B2.4.3	Our business values and norms would not prevent us from adopting BI in our operations.	4.57	0.936	<.001*

***indicates significance at the 95% level**

With regards to management support, respondents significantly agree with the statements that management actively participates in establishing a vision and formulating strategies for utilising BI; communicates its support for the use of BI; and that management is likely to take risks that involve implementation of BI ($p < .001$).

With regards to the rational decision-making culture the results suggest that the respondents significantly agree with the statements that businesses in the micro-small apparel sector encourage employees to measure and evaluate evidence when making decisions, and that employees are encouraged to look for data/information that will assist in decision making ($p < .001$).

Regarding organisational data environment, the results indicate that there is significant disagreement with the statement that data used by micro-small apparel businesses is reliable ($p < .001$).

There is neither significant agreement or disagreement with the statements that the data/information that is currently available in the businesses surveyed is of a high quality; and that businesses have a clear understanding of the set of data/information necessary for the success

Results for organisational readiness indicate that there is significant agreement that the business values and norms of micro-small apparel businesses would not prevent them from adopting BI in their operations and that businesses know that BI can be beneficial to support operations ($p < .001$).

There is neither significant agreement or disagreement that businesses have the necessary technical, managerial, and other skills to implement BI ($p > .005$).

4.4.3 Environmental factors

Table 16 summarises the statistics that have been generated on environmental factors such as business values, BI providers/vendors and government support.

Table 16: Significance of environmental factors

No	Statements	Mean (SD)	Standard Deviation	p-value
B3.1	Our business values and norms would not prevent us from adopting Business Intelligence in our operations.	2.39	1.249	<.001*
B3.2	Business Intelligence providers actively market Business Intelligence software by providing incentives for adoption.	2.90	1.245	<.001*
B3.3	Business Intelligence providers promote the use of Business Intelligence software by offering free training sessions.	3.11	1.259	<.001*
B.34	Government regulations support the adoption of Business Intelligence and all factors needed to be considered during the adoption process.	2.53	1.401	<.001*

***indicates significance at the 95% level**

Based on the results generated on external support as an environmental factor, the respondents significantly disagree on the statements that business values and norms would not prevent businesses from adopting BI; BI providers actively market BI software by providing incentives for adoption and promote the use of BI software by offering free training sessions, and that government regulations support the adoption of BI and all factors needed to be considered during the adoption process ($p < .001$).

4.4.4 Exploratory factor analysis – independent variables

In order to get single composite measures for the independent variables, factor analysis with promax rotation was applied to determine groupings of the items under each construct. Composite measures were formed by calculating the average of the agreement scores across items included in the composite factor.

As was done previously, items that did not load strongly enough or cross load were removed during the process. Cronbach's alpha was used to determine the reliability of the composite measure. Values that are lower than 0.6 are considered to be unsatisfactory, while ideal values are higher than 0.7.

The results for the three independent categories in this study which are technological, organisational and environmental are dealt with separately and are presented below.

4.4.4.1 Technological factors

Exploratory factor analysis with promax rotation was applied to the items under technological factors. Items that either cross loaded or did not load strongly onto any factor were dropped. Two factors were extracted which account for 78.49% of the variance in the data. Rotation converged in three iterations. The technological factors that were examined in Table 17 are perceived relative advantages and costs.

Table 17: Factor analysis for technological factors

Construct	KMO	Percentage variance	Items retained	Cronbach's alpha
Perceived relative advantage	.648	54.25	1.2 – 1.4	.877
Costs		24.24	2.2 & 2.3	.851
TOTAL variance extracted		**78.49**		

***Extraction method: alpha factoring**
***Rotation method: promax with Kaiser normalization. A. Rotation converged in six iterations**

Table 18 summarises the factor analysis for the two technological factors which are perceived relative advantage and costs. As can be seen, both composite measures are reliable (alpha >.7). In addition, a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was run to see how appropriate the factor analysis was. The KMO was >.6, which was adequate.

Table 18 outlines the factor loadings for the technological factors that were retained once the factor analysis had taken place. It can be observed that some statements were dropped due to not measuring what they were intended to.

Table 18: Factor loadings for technological factors

No	Statements	Factor	
		1	2
Perceived Relative Advantage	B1_1.4 Business Intelligence gives greater control over a business.	.965	
	B1 1.3 Business Intelligence enhances the effectiveness of decisions and actions in companies.	.778	
	B1_2.2 Business Intelligence improves the quality of decisions and actions.	.726	
Costs	B1 2.2. Our business is able to make a plan financially to adopt Business Intelligence.		.986
	B1_2.3. Adopting Business Intelligence would be/is cost effective for our company (costs saved regarding time and effort would).		.725

4.4.4.2 Organisational factors

Factor analysis was then conducted on the four organisational factors which are organisational readiness, rational decision-making culture, management support, and organisational data environment. Cronbach's alpha was run on the four constructs on

organisational factors. These composite measures were all found to be reliable (alpha >.7). In addition, a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was run to see how appropriate the factor analysis was. The KMO was >.6, which was adequate. During the process of factor analysis items that either cross loaded or did not load strongly enough were removed. The rotation converged in six iterations. Four factors were extracted which account for 85.78% of the variance in the data. The results are summarised in Table 19. Construct validity (convergent and discriminant validity) are also shown.

Table 19: Factor analysis for organisational factors

Construct	KMO	Percentage variance extracted	Items retained	Cronbach's alpha
Organisational readiness	.631	54.664	4.1 – 4.3	.880
Rational decision-making culture		12.235	2.1- 2.3	.878
Management support		9.764	1.1- 1.2	.952
Organisational data environment		7.121	3.1 – 3.2	.709
TOTAL variance extracted		**85.78**		

***Extraction method: alpha factoring.**
***Rotation method: promax with Kaiser normalisation. A. Rotation converged in six iterations.**

Table 20 outlines the factor loading for the organisational factors that were retained once the factor analysis had taken place, along with factor loadings.

Table 20: Factor loadings for organisational factors

Statements	Factor			
	1	2	3	4
B2_4.2 Our business has the necessary technical, managerial, and other skills to implement Business Intelligence software.	.994			
B2_4.1 Our business knows how information technology (IT) can be used to support operations.	.829			
B2_4.3 Our business values and norms would not prevent us from adopting Business Intelligence in our operations.	.764			
B2_2.2 Our business encourages staff to look for data/information to inform their decision making.		.967		
B2_2.1 Our business encourages staff to make informed decisions.		.862		
B2 2.3 Our business encourages one to measure and evaluate evidence when making decisions.		.672		
B2_1.2 Our management communicates its support for the use of Business Intelligence.			.966	
B2 1.1 Our management actively participates in establishing a vision and formulating strategies for utilising Business Intelligence.			.853	
B2_3.2 The data/ information that we currently use in our company is reliable.				.922
B2 3.1 The data/information that is currently available in our company is of a high quality.				.784

According to Table 20, all composite measures were found to be reliable (alpha >.7). Construct validity is evident showing that the scale measures what it is intended to measure in terms of convergent validity where there is a positive correlation with the measures for the construct, as well as discriminant validity indicating that the measurement clearly differs from measurements for other constructs.

4.4.4.3 Environmental factors

Factor analysis was applied but there are only four items which is actually too few items. Nevertheless, Cronbach's alpha was used to determine which items would result in a reliable composite measure. Two items under the heading of environmental factors were found to be reliable (alpha >.7).

Table 21 shows the factor analysis for the environmental factors to prove the reliable composite measure.

Table 21: Composite measure for environmental factors

Environmental factors	KMO	Percentage variance extracted	Items retained	Cronbach's alpha
External support	.500	80.124	1.2 – 1.3	.890

4.4.5 Existence of factors in the businesses

Prior to addressing the objectives, a final analysis was carried out to determine any significant agreement or disagreement as to the existence of the independent and dependent factors in the businesses. The results are presented in Table 22, indicating any significant agreement or disagreement as to the existence of the independent variables and dependent variables.

Table 22: Significance of independent variables and dependent variables

Variables	Statements	Significance	t	Mean	Std Dev	df	p
Independent	Perceived Relative Advantage	Agreement	24.450	4.9563	.75340	1.45625	p<.005
	Costs	Agreement	6.714	4.1406	1.20686	.64063	p<.005
	Organisational Readiness	Agreement	7.467	4.1708	1.13639	.67083	p<.005
	Rational Decision-making Environment	Agreement	17.438	4.8667	.99137	1.36667	p<.005
	Management Support	Agreement	4.524	4.0281	1.47649	.52813	p<.005
	Organisational Data Environment	Disagreement	-4.712	3.0813	1.12419	-.41875	p<.005
	Environmental Support	Disagreement	-5.256	3.0036	1.18824	-.49375	p<.005
Dependent	Evaluation	Agreement	1.715	3.6850	1.36452	.18500	.088
	Adoption	Agreement	1.673	3.6575	1.19103	.15750	.096
	Usage	Disagreement	-.647	3.4281	1.40450	-.07187	.518

According to Table 22, the first five constructs for the independent variables show significant agreement, which indicates that respondents agree that perceived relative advantage, costs, organisational readiness, rational decision making environment, and management support are influencing factors for the adoption of BI. However, the participants disagree that organisational data environment and environmental support are influencing factors for BI adoption.

None of the three dependent variables namely evaluation, adoption and usage are significant, indicating that there is no conclusive evidence that BI is being evaluated, adopted or used by respondents.

4.5 Regression analysis

In order to address the objectives, regression analysis was applied to test for the effect of the independent variables (technological, organisational and environmental factors) on the three dependent variables (evaluation, adoption and usage).

4.5.1 Adoption

Table 23 shows the results of the regression analysis for the dependent variable adoption to test the effect of the dependent variables.

Table 23: Regression analysis for adoption

CONSTRUCTS	R^2	F	df1; df2	p-value	B (regression coefficient)	t	p-value
T_Percieved Relative Advantage	.827	103.824	7; 152	<.001	.256	3.861	<.001
T_Cost					-.235	-4.047	<.001
O_Organisational Readiness					.787	15.489	<.001
O Rational Decision-making Culture					-.209	-3.303	.001
O_Management Support					.099	2.069	.040
O_Organisational Data Environment					.638	10.610	<.001
E_Environmental Support					-.247	-5.542	<.001

These seven independent variables/factors account for 82.7% of the variance of adoption (R2 = .827), F (7, 152) = 103.824, p<.001. The results indicate that the factors that significantly predict adoption are perceived relative advantage (β = .256, p<.001); organisational readiness (β = .787, p<.001); management support (β = .099, p =.040); and organisational data environment (β = .638, p<.001).

Factors that influence adoption negatively are cost (β -.235, p<.001); rational decision-making culture (β = -.209, p=.001); and external support (β = -.247, p<.001).

However, when looking at the constructs individually, for example the seven constructs used to measure adoption, individually they have different variances. Rational decision-making culture and management support are not significant for adoption (p = >.001), while cost is significant for adoption it was also found to have negative relationship (p = <.001). Therefore, even though respondents have agreed to be able to make financial plans to adopt BI. Cost still remains a constraints for them, as there isn't much funding available for such innovations particularly in micro-small businesses.

4.5.2 Valuation

Table 24 shows the results of the regression analysis for dependent variable evaluation to test the effect of the dependent variables.

Table 24: Regression analysis for evaluation

IV	R^2	F	df1; df2	p-value	B (regression coefficient)	t	p-value
T Percieved Relative Advantage	.811	120.497	7; 152	<.001	-.054	-.750	.455
T_Cost					-.047	-.758	.450
O Organisational Readiness					.417	7.625	<.001
O Rational Decision-making Culture					-.704	-10.322	<.001
O_Management Support					.448	8.664	<.001
O_Organisational Data Environment					.818	12.638	<.001
E_Environmental Support					-.030	-5.542	.538

Based on the results from the respondents, these seven independent variables/factors account for 81.1% of the variance of evaluation (R2 = .811), F (7, 152) = 103.824, p<.001. Organisational readiness (β = .417, p<.001); management support (β = .448,

p<.001); and organisational data environment (β = .818, p<.001) are all significant predictors of adoption. Factors that influence evaluation negatively are perceived relative advantage (β -.054, p= 0.455; cost (β -.2047, p= 0.450); rational decision-making culture (β = -.704, p<.001); and external support (β = -.030, p =.538).

However, when you look at the constructs individually, perceived relative advantage, cost and environmental support do not significantly impact the difference in variances (p = >.001). Rational decision-making culture has a significant variance to evaluation (p = <.001), even though the relationship is negative.

4.5.3 Usage

Table 25 shows the results if the regression analysis for dependent variable usage to test the effect of the dependent variables.

Table 25: Regression analysis for usage

IV	R^2	F	df1; df2	p-value	B (regression coefficient)	t	p-value
T Perceived Relative Advantage	.811	93.284	7; 152	<.001	-.187	-2.287	.024
T_Cost					-.027	.381	.704
O Organisational Readiness					.410	6.552	<.001
O Rational Decision-making Culture					-.613	-7.850	<.001
O_Management Support					.626	10.573	<.001
O_Organisational Data Environment					.620	8.370	<.001
E_Environmental Support					-.644	-11.752	<.001

The results indicate that these seven independent variables/factors account for 81.1% of the variance of usage (R2 = .811), F (7, 152) = 103.824, p<.001. Organisational readiness (β = .410, p<.001); management support (β = .626, p<.001); and organisational data environment (β = .620, p<.001) are all significant predictors of

adoption. Factors that influence adoption negatively are perceived relative advantage (β -.187, p= 0.024; cost (β -.027, p= 0.704); rational decision-making culture (β = -.613, p<.001); and external support (β = -.644, p<.001).

The overall p value shows significant variance as a result of the 7 factors. However, the first two factors, being perceived relative advantage and cost, do not seem to indicate a significant variance as individual constructs. Therefore, individually they do not significantly impact the difference in variation.

4.6 Conclusion

This chapter discussed the analysis of the results based on the data that was collected for this study. This was a quantitative study, which conducted various tests such as the one sample t-test, and the chi-square test. An exploratory factor analysis was conducted to test validity and regression analysis was conducted to address the objective of the study. The next chapter will discuss each objective based on the findings of the study.

CHAPTER 5:DISCUSSION OF RESULTS

5.1 Introduction

A breakdown of the findings from Chapter 4 is presented in this chapter. These results are reviewed in relation to those from earlier studies, which were described in Chapter 2. Thereafter, conclusions are drawn in light of the goals.

The significance of this study lies in the contribution it offers to the body of knowledge regarding the growth of SMMEs in the South African setting. It has been noted that there hasn't been much research done on BI adoption, especially for micro-small textile enterprises in South Africa.

5.2 Objectives

The main objective of this study was to understand the factors that influence the adoption of BI in micro-small apparel businesses in the greater eThekwini Region. In order to achieve this, the following sub-objectives were drawn from the primary objective.

5.2.1 Sub-Objective 1

To establish the factors that influence the evaluation of BI in micro-small apparel businesses.

5.2.1.1 Comparison of findings with past research: sub-objective 1

The literature review has established a number of findings from research conducted in other regions around the world. There is not much research conducted in the South African context of BI adoption, particularly for the micro-small apparel sector.

Previous studies have demonstrated that the integration of a technological innovation begins when the business evaluates the benefits of the technology. The evaluation stage focuses on the identification and prioritisation of the needs and problems the business is faced with. The activities involved in identifying a need and looking for answers are reflected in the evaluation stage (Damanpour and Schneider 2006). This entails learning about or becoming aware of innovation that already exists, developing

an initial opinion on it, and suggesting innovation for adoption (Hameed, Counsell, and Swift 2012; Patwardhan and Patwardhan 2012).

With regards to BI, evaluation would consider whether a BI tool could solve the problems the business is faced with. According to Puklavec Oliveira, and Popovič (2018) BI evaluation is the assessment of the potential benefits of BIS to improve a firm's execution in its business operations such as cost reduction and market development.

Jakliča, Grublješiča, and Popovič (2018) established that aligning BI to the changing needs and expectations of users and the way they like to work can be difficult. Therefore, it is important for businesses to evaluate their business processes and adopt a BI software that fits the needs of the business accordingly.

According to a study by Mittal et al. (2018), there is little motivation in the USA to adopt smart technologies like BI software. Eze et al. (2018) concur, noting that hesitation is present in the UK as well, primarily brought on by concern and uncertainty about adopting BI. This problem results from BI considerations that lack planning and evaluation (Reynolds, Fourie and Erasmus 2019).

Afolayan and de la Harpe (2019) established that SMMEs must first design and evaluate BI against their business strategy and processes in order to close the technological gap and remain competitive. However, their investigation did turn up several substantial challenges, such as the following:

- SMMEs frequently worry about their understanding of BI's dynamics and operational design, as well as the degree to which it applies to the business process.
- Due to their impressions of new technology developments and the significance of the risk that goes along with them, SMMEs have a cautious attitude toward BI.
- SMMEs lack a systematic process or approach for figuring out business requirements that would ensure their understanding of how the new technology might accomplish company objectives.

- SMMEs often end up failing to fully evaluate BI due to the overwhelming amount of information required when considering BI adoption. In particular when trying to match a system with business needs.

The current research made use of the results gathered from previous studies in order to prepare the questionnaire. Results gathered in the eThekwini region were quite similar to those conducted around the world, despite different socio-demographics. Of the respondents that were interviewed, 53% of the micro-small apparel businesses in the eThekwini region agreed that their businesses were in the process of gathering information on BI with the possible intention of adopting it. However, this study also found that a 79.4% of these businesses had not conducted a trial run to evaluate a BI (see Table 7). Despite that they were in the process of gathering information regarding BI.

This study also discovered that majority of the businesses in this sector have investigated the benefits of BI (67.5%) and 73% of the respondents have investigated the feasibility of using BI. However, not many businesses have investigated different kinds of BI to discover ones that are suitable for their business needs. A discussion of possible assumptions leading to these findings is discussed in the next section in relation to the determining factors of BI.

This study consisted of seven independent variables, namely:

- Perceived relative advantage
- Cost
- Organisational readiness
- Rational decision-making culture
- Management support
- Organisational data environment
- Environmental support

With regards to evaluation of BI in the micro-small apparel sector in eThekwini region, analysis revealed that from the seven independent variables; organisational readiness, management support and organisational data environment were all positive determinants of evaluation. This is expected, when an organisation has identified certain challenges and is ready for innovative developments, it will most likely evaluate

the systems available to solve the challenges at hand. Management support is important for evaluation as it encourages staff to adapt to new ways of working for increased business performance. Having a data-driven business culture is expected to be one of the major influencing factors for evaluation of BI.

Results indicated that factors that cause hindrance to evaluation were perceived relative advantage, rational decision-making culture and external support. These findings were in agreement with the challenges found in the literature regarding evaluation. Therefore one might conclude that micro-small apparel businesses take a conservative attitude towards BI because of their perceptions towards new technological advances and the weight of the risk that might be associated with them. This may be because owner/managers in the micro-small apparel sector do not have a formalised approach or process of identifying business needs that ensure their understanding of how new technology could meet business objectives, which results in the negative relationship of perceived relative advantage and rational decision-making culture with regards to the evaluation of BI. With regards to external support, a finding is that there is not any support from BI vendors and marketers with regards to the importance of BI for micro-small businesses. The results discussed in Chapter 4 indicated that the majority of the respondents disagreed with the statements that “Business Intelligence providers promote the use of Business Intelligence software by offering free training sessions”.

However, this study found that perceived relative advantage, cost and external support were not significant with regards to evaluation, implying that respondents probably did not understand the benefits, or have sufficient knowledge of BI prior to this study. This suggests that they were not aware of the advantages, costs or any external support with regards to BI. On the other hand, a rational decision-making culture was proven to be significant to evaluation, although it had a negative relationship. A suggestion would be that some SMMEs are still not yet able to justify the feasibility of evaluating BI. This supports findings by Afolayan and de la Harpe (2019) who stated that SMMEs do not have a formalised approach or process for identifying their business needs. As such, SMMEs are unable to see the benefits of evaluating BI.

5.2.1.2 Conclusion – sub-objective 1

The results from this study are in agreement with those studies conducted in other regions around the world. However, in the eThekwini region, the majority of participants indicated that they have not conducted a trial run to evaluate BI. An observation could be that this is caused by limited resources, as most of these businesses are sole proprietors with only 1-5 employees.

Therefore, conducting a trial run could be very time consuming for them. It is interesting to note that perceived relative advantage has no significant impact on evaluation as the majority of the respondents indicated that they have investigated the benefits and feasibility of BI. In addition, the results highlight a contradiction as SMMEs do not see the relative advantage of evaluating BI. This contradiction may be supported by a study conducted by Afolayan and de la Harpe (2019) which found that the lack of knowledge and understanding of BI limits the ability of SMMEs to evaluate BI to support the business. A possible reason for this is that owner/managers in the micro-small apparel sector do not have the time to learn or train one or two of their staff members on new technological systems, as they are working in a fast paced environment, where they are constantly pushing production and meeting customer demands.

5.2.2 Sub-objective 2

To establish the factors that influence the adoption of BI in micro-small apparel businesses.

5.2.2.1 Comparison of findings with past research: sub-objective 2

In terms of perceived relative advantage being identified as a positive influencing factor of adoption, Jaklica *et al.* (2018) supports this by stating that if an owner/manager's perceptions regarding the use of BI and its fit within the organisational work environment is positive, then one can reasonably assume that the owner/managers appreciation of the use of BI will be reinforced. Jaklica *et al.* (2018) also found that the greater the degree of organisational support, management incentives, visibility of BI and peer support, the more enhanced the positive perceptions towards BI adoption will be by employees in the organisation. The findings

from this study concurred with these findings, as perceived relative advantage was found to have a positive influence on adoption in the micro-small apparel.

Nguyen, Newby and Macaulay (2013) found that perceptions of risk and uncertainty can result in decreasing the technology adoption rate. The associated challenges comes in understanding the risks associated with technology, the numerous varieties of technology and solutions, along with the evolving nature of technology. In addition, Mittal *et al*. (2018) found that SMMEs take a conservative attitude on adoption because of their perception of the risks associated with the technology. The nature of uncertainty surrounding the return on investment (ROI) on the technology is a concern as they can understand the possibilities and associated risks involved.

It is interesting to note that perceived relative advantaged has a positive relationship with adoption even though it has a negative relationship with evaluation. The assumption for this would be due to the fact that prior to this study the majority of the respondents had little to no knowledge of BI. However, after the researcher had explained the concept of BI and elaborated further on the benefits of BI, they started gaining interest in the technology.

This study also established management support as being a positive influencing factor for the adoption of BI. Which is expected, because without management support, employees cannot adopt such initiative as they require immense planning and preparation for the adoption, which includes time allocated for training of staff. Previous studies established that the idea that management support is important to the successful adoption and application of innovations in SMMEs, as managers act as change operators during the adoption process (Ifinedo 2011). If management is not convinced of a BI, it is likely that the innovation will not be adopted. Chan and Chong (2013) emphasise that management support may be a key factor in all three stages of BI adoption with regard to the various adoption process stages. Hameed *et al.* (2012) concur that the top management's explicit and proactive support for the introduction and advancement of a technological innovation is regarded as the management support factor. Thus, the adoption of a BI is positively correlated with management

support. Since members of the senior management team frequently make decisions in SMMEs, the adoption of a BI should have their unwavering support.

Regarding organisational data environment being determined as a positive influence factor adoption of BI in this study, this concurs with Puklavec, Oliveria and Popovic 2014 who found that an information sharing culture (organisational data environment) is perceived as a dominant factor for adoption. Therefore organisations need to develop an organisational data environment that enables successful adoption. In addition, the authors found that organisational readiness was another important determining factor for adoption. This supports the findings on the micro-small apparel businesses from this study which also established that organisational readiness is a positive influencing factor for the adoption of BI.

Factors that influence adoption negatively are cost, relational decision making culture, and external support. However, when you look at the constructs individually, with regards to the seven constructs used to measure adoption, they have different variances. Rational decision-making culture and management support are not significant for adoption ($p > .001$).

Cost proves to have a significant variance with adoption, although it indicates a negative relationship. The assumption related to this finding would be that the adoption of BI or any other cloud based technology requires capital resources which the majority of businesses in micro-small apparel sector do not have. As much as the respondents indicated they could make financial plans to adopt BI, it could still be an obstacle for them, hence the negative relationship. The findings of this study also indicated that the respondents believed it would be cost effective for their businesses to adopt BI, which seems contradictory to the negative relationship. However, my understanding is that the respondent's perception of the relative advantage of BI is that it will save unnecessary costs for their businesses and assist with maximising profit.

In support of the cost findings from this study, previous researchers, concurred that the main inhibitors towards the adoption of BI systems were mostly cost related. This included the cost of the initial setup and support, as well as the cost and time required

for the required training of staff members to handle the system (Nguyen, Newby and Macaulay (2013); Mittal *et al.* (2018); Antoniadis Tsiakiris and Tsopology 2015)

Kulkarni, Robles-Flores and Popovič (2017) established that a rational decision-making culture shows the presence of an organisational respect for measuring, testing, and evaluating quantitative evidence in decision processes. Such a culture encourages the use of information and data to support work processes and perform analyses, also with progressed procedures.

From this study, there was also a large percentage of 78.8% of respondents that disagreed that they had any uncertainty with regards to the adopting BI. This study found that micro-small apparel businesses in the eThekwini region have decided that it is feasible to adopt BI and that it is in their best interest to adopt the technology. However, even though more than 50% of these businesses have stated that they are prepared to use BI, there is still a significant number of businesses that have not trained their staff to use BI (see Table 9).

In response to question (A4), “At what stage of BI adoption is your company currently”, it was found that all options were selected equally and therefore were not significant. However, responses to Question A5 which asked “If you are anticipating that your company will adopt BI in the future, how soon do you think it will happen?”, exhibited a different picture, with 33% of respondents indicating that they would probably adopt BI within 2 to 5 years and a further 23% within a year.

The results confirmed that a significant number of indicated that they plan to adopt BI within the next year or between 2 and 5 years. An assumption to these findings would be that when the necessary information is shared with the owner/managers about BI they are more likely to adopt the technology, although they would not necessarily seek out information. This could be related to the perceived costs inherent in the decision-making process.

5.2.2.2 Conclusion – sub-objective 2

The findings of this study with respect to this objective concur with the majority of the findings from previous research. Antoniadis Tsiakiris and Tsopology (2015) found that the main inhibitors towards the adoption of BI systems are cost related. This included the cost of initial setup and support, as well as the cost and time required for training the staff members to handle the system. An interesting finding was that although cost had a negative relationship to adoption in the results, most of the respondents still indicated that they were able to make financial plans to adopt BI and that BI could ultimately turn out to be cost effective for their businesses. However, despite these findings, funding still remains elusive for some businesses.

A number of studies agreed that when the owner/manager's perceptions about the use of BI and how it fits within the organisational work environment were positive, it was reasonable to believe that the owner/managers willingness to adopt BI would be reinforced (Jaklica, 2018; Pukavec *et al.* 2018; Mittal *et al*. 2018; and Antoniadis Tsiakiris and Tsopology (2015).

Furthermore, Jaklica *et al.* (2018) concurred that the greater the organisational support, management incentives, visibility of BI and peer support is, the more positive the perceptions towards the adoption of BI will be from employees in the organisation. These findings concur with those of this study which identified perceived relative advantage, organisational readiness, management support and organisational data environment as factors that generated a positive influence towards adoption.

5.2.3 Sub-objective 3

To establish the factors that influence the usage of BI in micro-small apparel businesses.

5.2.3.1 Comparison of findings with past research: sub-objective 3

Researchers established that access to a number of diverse data sets results in the availability of information that can support insight into business trends (Kiron and Shockley 2011) These findings suggest that the use of a BIS is critical for organisations. Mulani (2013) found that an information culture emphasises the

importance of making data an asset to the business, along with getting the right data at the right time and place, displayed in the right visual form and ensuring that decision makers gain access to intelligence, rather than just more information.

Findings from past research also revealed organisational culture and information culture as main determinants of BI usage/acceptance. An information culture includes information transparency, openness in reporting and presenting information on errors and failures. Furthermore, researchers established that developing a data driven approach as part of the organisational culture may positively influence BI usage (Grublješič, T. and Jaklič 2015; Mulani 2013). These findings are similar to the results of this study, which indicated that factors which are predictors of the usage of BI are organisational readiness, management support and organisational data environment. When the organisation is ready for a technological advancement and managers support the need for BI software to improve business operations, this will result in an organisational data environment (Kiron and Shockley 2011; Ali, Miah and Khan 2017; Mulani, 2013).

This study found that factors that influence the usage of BI negatively are perceived relative advantage, rational decision-making culture, and external support. The assumption to these findings concurs with those found by Skyrius *et al.* (2016) which indicated that in most SMMEs top management would initiate the usage of BI, without emphasising the value of BI to their staff, which hinders the process of BI implementation. Most SMMEs still use Microsoft Excel for data management which leads to inaccurate information. The reason for this is that systems that are based on incomplete, incorrect or doubtful data cannot be used for real management tasks which reduces trust from the users, therefore, the relative advantage cannot be clearly identified when SMMEs are still experiencing such problems with their existing reporting systems.

In addition, these findings could also suggest that the absence of a consistent, detailed and documented intelligence strategy causes a lot of uncertainty and misconceptions (Skyrius *et al.* 2016). Uncertainty and misconceptions cause a lack of direction, which could lead to a set of unrelated data that will not be of great benefit to the organisation.

There seems to be a relation between perceived relative advantage and a rational decision-making culture. Where there is a negative influence of perceived relative advantage, a rational decision-making culture also happens to have a negative influence.

This could suggest that the perceptions that an organisation has of BI will determine their decision on whether to implement BI or not. Another obstacle to the usage of BI is complexity. For instance, less complexity in a technology will lead to greater adoption benefits, proving that business managers and owners may be reluctant to use BI due to its high level of complexity. BI models are frequently very complex since they incorporate mathematical functions to forecast patterns in business performance and offer solutions for various problems the company can encounter. Boonsiritomachai, McGrath and Burgess (2016), established that the complexity of BI has a big impact on how widely it is used by SMMEs.

With regards to external support, this study found that the businesses in the eThekwini micro-small apparel sector state that BI providers in the region do not actively market BI software by providing incentives for adoption, neither do they promote the use of BI software by offering free training sessions. The respondents have also stated that government regulations do not support the adoption of BI and all the factors needed to be considered during the adoption process.

Findings from previous research indicate that the more external support received, the more SMMEs are persuaded to adopt BI. SMMEs have a limited number of internal IT specialists available to assist with implementation which is a major inhibitor of advanced BI adoption in SMMEs (Lee and Larsen 2009). The findings in this study also indicated that external support has a negative influence on all three dependent variables namely: evaluation, adoption and usage. In supportive of these findings, a study by Puklavec Oliveira, and Popovič (2018) also established that external support is non-significant to all three adoption stages. Lack of regulations leaves companies vulnerable to external fraud and cyberattacks, which can prevent the adoption of new technologies. Government support, which is defined as “help offered by the authority to foster the development of BI technologies in firms,” is another factor that is relevant

to this industry (Ifinedo 2011). If SMMEs have sufficient vendor or outside backing for innovation, they are also more willing to take a chance and try it. The highest predictors of BI adoption are vendor support and government assistance (Basole, Seuss and Rouse 2013).

5.2.3.2 Conclusion – sub-objective 3

The results on usage concur with past findings that a data-driven BI culture influences managerial decisions for data insights and analysis. It has been established that organisational culture and organisational data environments are the major influencing factors for BI usage. Organisational data environment includes information transparency, openness in reporting and the presenting of information on errors and failures. To this end, this study concurred with previous research which also found that developing a data driven approach as part of the organisational culture as well as management support positively influences BI usage (Grublješič and Jaklič, 2015; Puklavec, Oliveira, and Popovič 2018).

It is interesting to note that perceived relative advantage has a negative a relationship with usage and evaluation but has a positive influence with adoption. The assumption here would be the adoption process differs to usage as adoption is mainly influenced by the benefits of the innovation. However, when BI gets implemented. Factors such as ease of use could be challenging, other factors that could contribute to this negative relationship would be the excessive information that comes with implementing BI.

Previous research has emphasised the uncertainty and misconceptions related to the perceived relative advantages resulting in lack of direction, which could then the decision-making within the organisation.

5.3 Addressing the main objective

The main objective set out to establish the factors that influence the adoption of BI in micro-small apparel businesses in the eThekwini Region. The three sub-objectives were outlined / proposed in order to achieve this objective. Once all three sub-objectives were addressed conclusions were made to address in relation to the main objective.

This study has shown that organisational factors such as management support, organisational data environment and organisational readiness are significant predictors of BI adoption. This is to be expected, with previous literature concurring that organisational factors are paramount for BI adoption by SMMEs. Al Bar and Hoque (2015) add that for BI to be successfully implemented in an SMME, the support and commitment of owner/managers is critical for adoption. This support allows for the associated activities of software engineering to obtain physical resources, including the input of skilled labour and capital funds, resource allocation, or the minimisation of potential resistance caused by the adjustment to the internal structure of the business (Hung *et al.* 2016).

In addition, Brinkhues, Maçada and Casalinho (2014) stated that organisational capability does not only provide businesses with material and skills-based support for proper information management, but also allocates the required support for BI implementation in SMMEs. Therefore, BI implementation in SMMEs requires a link between organisational capability, information management capability, and BI implementation.

The results from this study highlighted that the factors that negatively influenced adoption were cost, rational decision-making culture and external support. This concurred with the findings from previous research. The main inhibitors of adopting BI systems were cost related. This includes the cost of initial setup and support, as well as the cost and time required for training the staff members to handle the system. Hameed *et al.* (2012) established that it is common for businesses to assess the costs in relation to the perceived relative advantage of BI before adopting it for their businesses. More than half of the participants from this study indicated that they are certain about adopting a BIS. Therefore, the businesses in this sector have decided that it is feasible to adopt BI, even though the majority of the businesses indicated that they were not training their staff on the use of BI (see Table 9). These results are in agreement with previous studies which established the cost related to the setup as well as the time required for training of staff members could be the main inhibiting factor for BI usage. Even after businesses have decided that it is feasible to adopt BI, they are still lacking resources with regards to the training of their staff members on

how to use the BI. According to Puklavec, Oliveira, and Popovic (2017), adoption and application of rational decision-making are unrelated to evaluation but have a strong and inverse relationship with it. However, research demonstrates that an organization-wide regard for measuring, testing, and assessing quantitative evidence in decision processes indicates the presence of a rational decision-making culture. According to Kulkarni, Robles-Flores, and Popovic (2017), such a culture promotes the use of information and data to support work processes, conduct analysis, and assess key performance indicators for corporate performance. It is interesting to note that within this study the stages of adoption indicate a variance in the significance of organisational decision making culture. This is in keeping with previous findings which suggest an absence of formalised decision making structures among SMMEs creating a void in the adoption phase.

With regards to external support, respondents indicated that BI providers in the region do not actively market BI software by providing incentives for adoption, neither do they promote the use of BI software by offering free training sessions. The respondents also stated that government regulations do not support the adoption of BI and all the factors needed to be considered during the adoption process.

Previous findings indicate that the more external support received, the more SMMEs are persuaded to adopt BI. SMMEs have a limited number of internal IT specialists available to assist with implementation; this need for specialists is additionally recognised as a major inhibitor of advanced BI adoption in SMMEs (Lee and Larsen 2009). External support does not only support the adoption of BI but also the implementation and use of BI. Puklavec, Oliveira, and Popovič (2018) found that within the environmental context, all three paths associated with external support are non-significant. The findings in this study also indicated that external support has a negative influence on all three dependent variables namely: evaluation, adoption and

5.4 Conclusion

This chapter introduced the main objective of the study, then went on to introduce the sub-objectives. After the objectives were introduced, there was a comparison of previous research with the current findings in relation to each of the sub-objectives. The chapter ended with a summary of all the findings to address the main objectives. The next chapter will outline the conclusion and make recommendations for future study.

CHAPTER 6:CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This study's main objective was to determine the factors that influence BI adoption in eThekwini's micro-small apparel businesses. There were three sub-objectives that made up this main objective. Establishing the factors that influence BI evaluation in the micro-small apparel businesses in the eThekwini Region was the first sub-objective. The second sub-objective, which involved establishing the factors that influence BI adoption for the micro-small apparel businesses in the eThekwini Region, was then pursued. In the eThekwini Region's micro-small apparel business sector, sub-objective 3 sought to establish variables that affect the use of BI.

This chapter begins by discussing the conclusions that were arrived at in Chapter 5. The implications of the research follow, with a discussion of the implications to the marketer, the government and academics. This is followed by a discussion of limitation limitations that could have had an effect on the results. Finally, recommendations for further research are presented.

6.2 Overall conclusions

The literature review from this study highlighted that SMMEs experience a lack of financial support which is required when conducting an evaluation of BI prior to the adoption and usage stage. The literature also highlighted that a lack of knowledge by SMMEs regarding BI and that cost factors come into play as perceived risks. The literature indicated that government and vendor support has been minimal. Most of the literature in this study highlighted factors regarding BI adoption in other industries within the SMMEs sector and mostly global cases were found. There was a paucity literature on BI adoption for the micro-small apparel sector, which was the motivation behind conducting this study.

The findings of this study concluded that organisational factors such as management support, organisational data environment, and organisational readiness, are significant predictors of BI adoption. This is expected, as literature proves that organisational impact is one of the most important determinants for BI adoption by

SMMEs. The results from this study also proved that the one of the main inhibitors of adopting BI was costs.

A major inhibiting factor for BI adoption found in this study was the lack of external support. The owner/managers in the eThekwini micro-small apparel sector who participated in this study stated that BI providers in the region do not actively market BI software by providing incentives for adoption, neither do they promote the use of BI software by offering free training sessions. The respondents also stated that government regulations do not support the adoption of BI and all the factors needed to be considered during the adoption process.

6.3 Research implications

This research has implications for the following parties:

6.3.1 Business intelligence vendors / software developers

This research will be useful for BI vendors and or software developers; if they market themselves better and show more support for micro-small businesses and offer training facilities, they could gain quite a big market share within the data management and analytics space. The findings of this study indicated that there is currently no support offered by BI vendors even though the micro-small apparel sector is a niche market that could maximise profits for these vendors.

Software developers could form partnerships with the businesses in this sector and offer customised BI software that caters to the specific needs of each business. The micro-small apparel sector is quite broad, there are plenty of opportunities for collaboration. With the digital transformation of retail and the 4^{th} industrial revolution upon us, it is imperative for businesses to invest in BI software.

Data analytics play a vital role in the success of a business – online shopping has become the new norm for many customers. Therefore, relying on walk-ins is no longer sustainable for businesses in the retail sector, particularly in the micro-small apparel sector. Over the last two years there has already been a lot of new businesses operating online. Hence, the need to adopt BI software in order to manage data and

create a competitive advantage by understanding customer needs and build rapport. However, micro-small businesses cannot achieve this without collaborative partnerships with software developers and BI vendors.

6.3.2 The government

This research could be useful to the government; the results of this study have indicated that there are not sufficient government incentives offered for such initiatives. While there are a number of government funding opportunities and business support mechanisms, the respondents indicated that government incentives do not support the adoption of BI and all the factors needed to be considered during the adoption process. Such factors include training courses and funding for such courses.

There are many governmental organisations that already assist micro-small businesses, such as SEDA, SEFA, eThekwini Business Support, the Durban Fashion Fair, and the DTI, just to name a few. If these organisations could develop training programmes that will educate businesses within this sector and SMMEs at large, this could contribute greatly to the objective of developing SMMEs to boost the South African economy. Such trainings could be adapted in all kinds of businesses within the SMME sector, not just those in the apparel industry.

The adoption and use of BI in the South African context could contribute greatly to the country's GDP and generally create growth opportunities for South African SMMEs in the global market. Government support for such an initiative would help decrease the high unemployment rate in South Africa as more jobs would be created around the country through these projects. South African SMMEs are perceived to contribute about 50% of the national gross domestic product while also providing employment opportunities to a conservatively estimated 60% of the national workforce (Taljaard and Van Der Walt 2018; Bruwer and Mason 2020). According to the NDP (2020), SMMEs have been identified as a key component to advancing inclusive growth and development in South Africa. The NDP highlights the importance of SMMEs for job creation, innovation and competitiveness, with the goal that 90% of new jobs being created by SMMEs in South Africa by 2030. SMMEs are of paramount importance to South Africa, especially from a socio-economic point of view (Manete 2018).

Therefore, the government has to focus more on investing on technological innovations for SMMEs in South Africa.

6.3.3 The academic field

This research has covered different aspects that add to the body of knowledge, the first aspect being BI adoption within the South African context for the micro-small apparel sector. The research also focuses on the factors that influence BI adoption by using the TOE framework focusing on the three stages of adoption, namely: evaluation, adoption and usage. This study focuses on the micro-small apparel businesses in the eThekwini region of KZN in South Africa. Therefore, this study presents a different perspective to the research that has been conducted elsewhere in South Africa or the rest of the world, thereby contributing to the field.

6.4 Limitations

A number of limitations were identified while conducting the empirical research and were found to apply to this study.

6.4.1 Lack of recent literature in the context of this particular study

The major limitation to the study was lack of literature of studies conducted in the exact same context. The majority of the research reviewed in this study has been conducted in other regions of around the globe, mostly in manufacturing SMMEs, and E-commerce SMMEs. There is not enough research in micro-small businesses, particularly those operating in the apparel retail sector. Other studies conducted in the South African context also focused on SMMEs in general, with no research having been conducted on BI adoption by micro-small businesses. This resulted in some of the sources used from similar studies dating from more than 5 years ago.

6.4.2 Interpretation of terms used in the questionnaire

The majority of the respondents did not know or understand what BI is, therefore the researcher had to first explain what BI is and how it relates to the context of their businesses. After experiencing this with a few respondents, the researcher included the definitions in the questionnaire. There also seemed to be a misinterpretation of a few other terms in the questionnaire, like feasibility, data management, and financial

reporting. Therefore, the researcher had to constantly explain these terms where applicable. Judging from the results of the study, it is possible that there could have been a lot of confusion within the respondents that impacted the findings.

6.4.3 Objectivity

The objectivity of participant's responses might be coloured by what was included or omitted in questions. The offering of explanations of terminology could have altered respondents' perceptions of BI.

6.4.4 The Covid-19 pandemic

The Covid-19 pandemic had a huge impact during the data collection stage; due the lockdown regulations it was difficult for the researcher to conduct the research in person by doing walk-ins to the various businesses. Therefore, the researcher had to send the questionnaires via different social media platforms, such as WhatsApp, Facebook Messenger and Instagram Messenger. This was extremely difficult as data expenses are a huge obstacle for the majority of people. The response rate was very slow, people would only respond after multiple messages and reminders to participate in the questionnaire. Some people did not even respond, which meant more businesses owner/managers had to be approached directly which was quite time consuming. After months of waiting, there was eventually enough responses to analyse the data.

However, the data was quite fragmented and therefore could not be used for the research. Fortunately, the regulations had been amended and things were back to normal for the researcher to conduct the questionnaire in person as initially intended. The results from this were then used for the study and analysed accordingly.

6.5 Recommendations for future research

This research study could be expanded by gathering information on other businesses within the micro-small business sector on a wider scale. This research was only conducted for micro-small apparel businesses in the eThekwini Region. The research should be broadened in order to gather information on BI adoption for micro-small businesses elsewhere in KZN or the whole South Africa. There are many other businesses that fall under the micro-small retail sector, such as spaza shops and informal traders. It would be interesting to see how BI adoption is perceived by owner/managers in these categories.

Considering the use of Yoco which is a BI tool, mostly used by small businesses, there is a potential for future research to investigate the benefits of such tools for financial reporting and data management. Such a study could also investigate whether BI tools such as Yoco contribute to profitability of businesses in this sector or not.

Another recommendation for future research from this project, would be a comparative analysis of BI adoption between online micro-small businesses and those with brick and mortar stores. An investigation to find out if there could be a difference in the perceived ease of use and acceptance of BI between these business operations would be highly recommended. It was hard to make this analysis for this particular study as it only focused on the factors of adoption and no comparative analysis was conducted between the different types of business operations.

Considering the similarity in the findings of empirical studies discussed in this paper, it would be interesting to find out if BI is actually necessary for SMMEs despite it's known benefits for large organisations. SMMEs seem to have evaluated and decided to adopt BI, however there are still quite a few SMMEs who have not successfully implemented BI. Therefore a study to investigate if SMMEs really need BI for the sustainability their businesses would be highly recommended. A recommended objective for this study would be to identify the success measures of SMMEs utilising BI in comparison to SMMEs who have not implemented BI.

6.6 Conclusion

This chapter has outlined the conclusions from this study, and describes the limitations of the study. A discussion of the research implications of the results for BI marketers, the government as well as academics follows. Finally, recommendations for future research have been presented.

This study reviewed literature on the adoption theories such as the diffusion of innovation theory as well as the TOE framework. The conceptual framework developed from this study was adapted from the TOE framework which was also used as the independent variables for the study. The dependent variables were drawn from the different stages of adoption. A quantitative cross-sectional methodology was carried out with the use of non-probability purposive sampling. This study found that none of the depend variables were found to be significant, therefore there is no conclusive evidence that BI is being evaluated, adopted or used by businesses in the micro-small apparel sector. However, significant predictors for all the dependent variables were found to be management support, data environment and organisational readiness.

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APPENDICES

Appendix A: Research questionnaire

Research Questionnaire

My name is Winiswa Mavutha, a Masters in Management Sciences (Retail) student at the Durban University of Technology. The research I wish to conduct for my Masters dissertation involves Factors that Influence the Adoption of BI for Micro-Small Apparel Businesses. The objective of the study is to understand the factors that influence the usage of Business Intelligence in micro-small apparel businesses.

Please fill out this short questionnaire to be part of this project. Your response will be kept confidential and the final report will not identify any respondent identification details. Below are some definitions to help you understand the concept behind this questionnaire better. Each of the other sections have definitions as well for better understanding of some terms.

Definitions:

Business Intelligence is defined as "the process of integration of data from disparate internal and external data sources, applying analysis tools and techniques to understand the information within the data, making decisions and taking decisions based on this gained insight" (Gangadharan and Swani, 2004:140). BI simply assists businesses with the analysis of information to make better decisions to improve business performance. BI plays a huge role in measuring the success of a business, it helps identify strengths, weaknesses, opportunities and threats of the business from all aspects. It can assist businesses with financial management, client relationship management, marketing and inventory control, there are various business aspects which BI can be made useful, no matter the size of the business.

Micro-small businesses are small entities, defined in terms of their size of investment. They are contributing significantly to output, employment etc, in the economy. They perform a critical role in the economy by providing employment to a large number of unskilled and semi-skilled people (Jose:2016). According to the National Small Business Act (1996) micro business should have less than 3 employees with a total annual turnover of less than R150 000and a total gross asset value of R100 000. Small businesses have less than 50 employees with a total annual turnover of less than R10 000 000 and a total gross asset value of R3 750 000. However, retail small businesses may have a total annual turnover of less than R15 000 000.

Apparel Businesses are the people or companies engaged in designing, making and selling their own fashionable apparel as own manufacturers, retailers or wholesalers.

SMMEs are Small Micro Medium Enterprises have been identified as a key component to advancing inclusive growth and development in South Africa. According to the National Development Plan (2020), government highlights the importance of these businesses for job creation, innovation and competitiveness, with the goal that 90 percent of new jobs will be created by SMMEs in South Africa by 2030.

BIOGRAPHICAL DATA

Please select the one response that best applies to you

1. How many years have you worked in the Retail Industry

<3 years	3 - <7 years	7-10 years	>10 years

2. How long have you had your business for?

<3 years	3 -7 years	>7 years

3. How many people are employed in your business (including yourself)?

1-5 people	6-10 people	>10 people

4. What is your highest level of education?

No formal education	Some schooling	Matric	Diploma/ Certificate	Undergrad degree	Postgrad degree

5. What sort of business do you run?

Business to Business	Business to Customer

6. Where is the Retail side of your business located?

Home	Online	Retail Store	Omni Channel

SECTION A:

Indicate your agreement with the following statements:

1. Evaluation: This stage focuses on the identification and prioritisation of the needs and problems the business is faced with.

	Strongly	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
1.1. Our business is in the process of gathering information on BI with the possible intention of using it						
1.2. Our business has conducted a trial run to evaluate a BIS.						
1.3 Our business has investigated the benefits of using BI - e.g. better analysis in decision making; increased organisational efficiency; improved business performance; and increased customer satisfaction.						
1.4 Our business has investigated the feasibility of using BI (e.g. having the resources such as skills and finances needed to adopt it)						
1.5 Our business has investigated different kinds of systems that support BI.						
1.6. Our business had no knowledge of BI prior to this questionnaire.						

2. Adoption: In this stage top managers expand perceptions of an innovation to decide whether it will support the development of organisational goals and objectives.

	Strongly Disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
2.1. Our business has adopted customised elements of BI to support specific areas of need in the business.						
2.2 Our business is uncertain about adopting a BIS.						
2.3 Our business has decided that it is feasible to adopt BI.						
2.4 Our business has decided that it is in their best interests to adopt BI.						
2.5 Our business has made the decision to adopt BI and is currently preparing to use it.						
2.6 Our business is currently training our staff on the use of Business Intelligence.						

3. Usage:

Is described as acceptance, adjustment for and usage of the innovation within the business.

	Strongly Disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
3.1 Our business has made the decision to adopt BI and is currently using it.						
3.2 Our business has successfully implemented a Business Intelligence.						
3.3 Our business uses Business Intelligence to measure its business performance.						
3.4 Our business uses Business Intelligence to manage customer relationships.						
3.5 Our business uses Business Intelligence to assist with financial reporting.						
3.6 Our business uses Business Intelligence to assist with inventory control.						

4 At what stage of BI adoption is your company currently at? (Select ONE option only)

Not considering	Currently evaluating (e.g. doing investigations or a pilot study)	Have evaluated but do not plan to adopt this technology	Have evaluated and plan to adopt the technology	Have already adopted the technology

5. If you are anticipating that your company will adopt BI in the future, how soon do you think it will happen? (Select ONE option only)

Not considering	In more than 5 years	Between 2 and 5 years	Between 1 and 2 years	Within the next year	We have already adopted BI

SECTION B – Factors that influence the evaluation and adoption of BI in micro-small apparel businesses

B1 Technological Factors: Please rate the degree to which you agree with the following statements

1. Perceived Relative Advantage: These innovation characteristics are significant to the perception of owner/managers to determine the capabilities of BI in supporting their main business operations.

	Strongly Disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly Agree
1.1 Business Intelligence would allow our business to take correct decisions and the right actions						
1.2 Business Intelligence improves the quality of decisions and actions						
1.3 Business Intelligence enhances the effectiveness of decisions and actions in companies						
1.4 Business Intelligence gives greater control over a business						

2. Costs

	Strongly Disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly Agree
2.1. The cost of Business Intelligence software is unaffordable for our business.						
2.2. Our business is able to make a plan financially to adopt Business Intelligence.						
2.3. Adopting Business Intelligence would be/is cost effective for our company (costs saved regarding time and effort would balance out the cost of the system)						

B2 Organisational Factors: Please rate the degree to which you agree with the following statements

1 Management Support: Is considered as top management's clear and dynamic support for the introduction and improvement of an IT innovation

	Strongly Disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly Agree
1.1 Our management actively participates in establishing a vision and formulating strategies for utilising Business Intelligence.						
1.2 Our management communicates its support for the use of Business Intelligence.						
1.3 Our management is likely to take risks that involve the implementation of Business Intelligence.						

2. Rational decision-making culture: Encourages the use of information and data to support work processes and perform analyses, also with progressed procedures.

	Strongly Disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly Agree
2.1 Our business encourages staff to make informed decisions.						
2.2 Our business encourages staff to look for data/information to inform their decision making.						
2.3 Our business encourages one to measure and evaluate evidence when making decisions.						

3. Organisational Data environment: When an organisation has access to information quality, availability, and loading information, related to the process of preparing input data for BIS.

	Strongly Disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly Agree	Not Applicable
3.1 The data/information that is currently available in our company is of a high quality.							
3.2 The data/ information that we currently use in our company is reliable.							
3.3 We have a clear understanding of the set of data/information necessary for the success and sustainability of our business.							

4 Organisational Readiness: The accessibility of the organizational resources required for innovation adoption.

	Strongly Disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly Agree	Not Applicable
4.1 Our business knows how information technology (IT) can be used to support operations.							
4.2 Our business has the necessary technical, managerial, and other skills to implement Business Intelligence software.							
4.3 Our business values and norms would not prevent us from adopting Business Intelligence in our operations.							

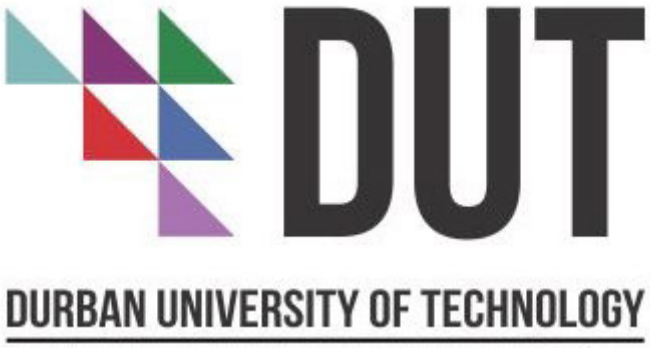
B3 Environmental Factors: Please rate the degree to which you agree with the following statements.

External Support: Refers to the status of support for implementing and using a technology-based solution.

	Strongly Disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly Agree
1.1 There are businesses in the community, which provide technical support for the effective use of Business Intelligence.						
1.2 Business Intelligence providers actively market Business Intelligence software by providing incentives for adoption.						
1.3 Business Intelligence providers promote the use of Business Intelligence software by offering free training sessions.						
1.4 Government regulations support the adoption of Business Intelligence and all factors needed to be considered during the adoption process.						

THANK YOU FOR YOUR TIME

Appendix B: Gatekeeper letter



19 May 2021

Request for Permission to Conduct Research

Dear Participant

My name is Winiswa Mavutha a Retail Management Masters student at the Durban University of Technology. The research I wish to conduct for my Masters dissertation involves The Adoption of Business Intelligence for micro-small apparel businesses in the eThekwini Region.

I am hereby seeking your consent to conduct research on your business regarding the adoption of Business Intelligence.

I have provided you with a copy of my proposal which includes copies of the data collection tools and consent and/ or assent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC).

If you require any further information, please do not hesitate to contact me on 0680509346 or email me on twinza58@gmail.com. Thank you for your time and consideration in this matter.

Yours sincerely,

Winiswa Mavutha
Durban University of Technology

Appendix C: Letter of information

LETTER OF INFORMATION

Title of the Research Study: Factors that Influence the Adoption of Business Intelligence for Micro-Small Apparel Businesses in the Great eThekwini Region.

Principal Investigator/s/researcher: Winiswa Mavutha

Co-Investigator/s/supervisor/s: Dr K Corbishley and Dr A Kamwendo

Brief Introduction and Purpose of the Study: The main objective of the study is to understand the factors that influence the adoption of BI in micro-small apparel businesses in the greater eThekwini Region.

Outline of the Procedures: A survey of questionnaires will be carried out in which the researcher will personally walk in to the selected micro-small apparel business owners in the great eThekwini Region. The selection of the visited business will be based on accessibility, safety and convenience. Data will be collected by means of structured questionnaires set in a Likert scale format. A pilot study will be used to evaluate potential questions for content and face validity after which any items that are seen to be unclear, unrepresentative or ambiguous will be removed if necessary. A questionnaire will be used to gather data from each of the selected micro-small apparel business owners in the great eThekwini Region.

Risks or Discomforts to the Participant: The research conducted will be nonintrusive and will not cause any harm to the research participants.

Benefits: No benefit will be provided to the participants as a reward for participating in the study.

Reason/s why the Participant May Be Withdrawn from the Study: Research participants will be allowed to withdraw from the research process at any stage during the research process. There will be no adverse consequences for the participant should they choose to withdraw.

Remuneration: No remuneration or financial benefit will be awarded to the research respondents for participating in the study.

Costs of the Study: The participant will not be expected to cover any costs towards the study.

Confidentiality:

Data will be collected under strict conditions of anonymity. The respondents' identities will be kept confidential and the material will be obtained, stored and ultimately disposed of in a manner that will ensure confidentiality of the participants. Questionnaires will be stored in a safe storage for five years and thereafter be shredded/Electronic records will be kept for five years and thereafter be deleted.

Research-related Injury: N/A

Persons to Contact in the Event of Any Problems or Queries:

(Supervisor and details) Please contact the researcher (tel no.), my supervisor (tel no.) or the Institutional Research Ethics administrator on 031 373 2900. Complaints can be reported to the DVC: TIP, Prof F. Otieno on 031 373 2382 or dvctip@dut.ac.za.

General:

Potential participants must be assured that participation is voluntary and the approximate number of participants to be included should be disclosed. A copy of the information letter should be issued to participants. The information letter and consent form must be translated and provided in the primary spoken language of the research population e.g. isiZulu.

Appendix D: Letter of consent

LETTER OF CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Winiswa Mavutha, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: 2,
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Zonke Mazibuko 26 June 2021

Full Name of Participant **Date** **Signature/RightThumbprint**

I, **Winiswa Mavutha** herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Winiswa Mavutha 26 June 2021

Full Name of Researcher **Date** **Signature**

Please note the following:

Research details must be provided in a clear, simple and culturally appropriate manner and prospective participants should be helped to arrive at an informed decision by use of appropriate language (grade 10 level - use Flesch Reading Ease Scores on Microsoft Word), selecting of a non-threatening environment for interaction and the availability of peer counseling (Department of Health, 2004)

If the potential participant is unable to read/illiterate, then a right thumb print is required and an impartial witness, who is literate and knows the participant e.g. parent, sibling, friend, pastor, etc. should verify in writing, duly signed that informed verbal consent was obtained (Department of Health, 2004).

If anyone makes a mistake completing this document e.g. wrong date or spelling mistake a new document has to be completed. The incomplete original document has to be kept in the participant file and not thrown away and copies thereof must be issued to the participant.

References:

Department of Health: 2004. *Ethics in Health Research: Principles, Structures and Processes* http://www.doh.gov.za/docs/factsheets/guidelines/ethnics/

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Appendix E: DUT ethical clearance

MANAGEMENT SCIENCES: FACULTY RESEARCH ETHICS COMMITTEE (FREC)

27 November 2019

Student Name: **Ms W Mavutha**
Student No: 21310515

Dear Ms W Mavutha

MASTER OF MANAGEMENT SCIENCES: RETAIL

TITLE: The Adoption of Business Intelligence for the Micro-Small Apparel Sector in the Great eThekwini Region.

Please be advised that the FREC Committee has reviewed your proposal and the following decision was made: **Approved – Ethics Level 2**

Date of FRC Approval: 27 November 2019

Approval has been granted for a period of two years from the above FRC date, after which you are required to apply for safety monitoring and annual recertification. Please use the form located at the Faculty. This form must be submitted to the FREC at least 3 months before the ethics approval for the study expires.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the FREC according to the FREC SOP's.
Please note that ANY amendments in the approved proposal require the approval of the FREC as outlined in the FREC SOP's.

Yours sincerely

Prof JP Govender
Chairperson: Faculty Research Ethics Committee

Appendix F: Editing Certificate

DR RICHARD STEELE
BA HDE MTech(Hom)
HOMEOPATH
Registration No. A07309 HM
Practice No. 0807524
Freelance academic editor
Associate member: Professional Editors' Guild, South Africa

154 Magenta Place
Morgan Bay
5292
Eastern Cape

082-928-6208
rsteele@vodamail.co.za

EDITING CERTIFICATE

Re: **Winiswa Mavutha**
Durban University of Technology master's dissertation: **ADOPTION OF BUSINESS INTELLIGENCE BY MICRO-SMALL APPAREL BUSINESSES IN THE ETHEKWINI REGION**

I confirm that I have edited this dissertation and the references for clarity and language. I returned the document to the author with track changes so correct implementation of the changes and clarifications requested in the text and references is the responsibility of the author. I am a freelance editor specialising in proofreading and editing academic documents. My original tertiary degree which I obtained at the University of Cape Town was a B.A. with English as a major and I went on to complete an H.D.E. (P.G.) Sec. with English as my teaching subject. I was a part-time lecturer in the Department of Homoeopathy at the Durban University of Technology for 13 years and supervised many master's degree dissertations during that period.

Dr Richard Steele
20 October 2022
per email

Appendix G: Turnitin Report

Final Dissertation WM KC

by Winiswa Mavutha

Submission date: 27-Oct-2022 03:33PM (UTC+0200)
Submission ID: 1936681120
File name: d_Dissertation_2510022_Winiswa_Mavutha_KC_Pre_Turnitin_copy.docx (655.57K)
Word count: 33115
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nal Dissertation WM KC

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