The Influence of Business Intelligence on the Operational Capabilities of Organisations in South Africa

by

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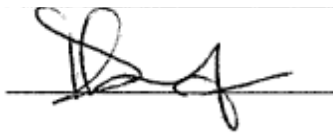Principal Supervisor: Prof Justine Olawande Daramola

Cape Town Campus

Date Submitted: 8 November 2022

Dedication

I, Dignity Paradza, declare that the contents of this thesis represent my own unaided work and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

8 November 2022

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Abstract

The extent of the success of Business Intelligence (BI) is still unclear as there have been variations in outcomes achieved from BI implementation on business capabilities. It remains a gamble to either employ or to continue employing BI in organisational systems as there is no guarantee whether business process performance will be achieved and eventually business value. BI demands large investments to be effective, and with such investments, the benefits are expected, either as operational efficiency or return on investment (increased organisational profitability). The lack of in-depth literature on BI influence on organisational capability inhibits process performance as practitioners who wish to benefit from BI remain mystified about how business value can be achieved. Further, this lack of understanding can lead organisations to fail to achieve growth, or worse, the decline in the business.

The adopted research philosophy for the study is Interpretivism it seeks to establish an understanding of the nuances that enable the realisation of Business Value (BV) from adopting BI. The ontological stance employed for this research is subjectivism which subscribes to the notion that reality is based on social actors' interaction with the environment around them, which therefore affirms the stance of subjectivity. The epistemological spectrum of the research was established as interpretivist, where perceived reality, the social actors mentioned in the ontology interpret or generate understanding (or knowledge) based on their perception of reality resulting in multiple facets of truth.

An inductive approach was employed since the emphasis was on creating a theory that best explains how BI generates BV. A holistic multiple case study was adopted because gaining a detailed insight into how BI influences capabilities to achieve business value requires a holistic analysis of the organisations under study. The unit of analysis was BI infused operations where the extent of the respective capabilities and the overall contribution to BV was assessed, while the unit of observation entailed the IT personnel from various levels of the organisation, specifically representatives from operational, tactical and strategic management. Non-random and convenient sampling were adopted for this research because of the scarcity of organisations currently adopting BI willing to be part of this study for various reasons. Snowballing and referrals were the main strategies for identifying potential respondents for the research. Data collection was executed by utilising in-depth interviews and focus groups suited to the nature and
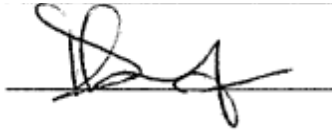
philosophy of the research using Zoom. Due to the nature of the data to be collected, Atlas ti was used for analysis with the use of thematic analysis.

The findings revealed the reliance on BI human resource capital, management and infrastructure to achieve BV. Furthermore, expanding BI teams, the need for adequate investment, development and application of advanced analytics and management support were highlighted as integral for realising BV. Moreover, BI Human Resource capital, BI infrastructure and BI management were all identified, in varying degrees, as critical to firm performance. This was through consistent sensing of BI benchmarks and tools against industry and internal standards, seize and transform organisational operations depending the anomalies identified so that organisations can curb or capital on the anomaly.

The thesis provides various contributions. From a theoretical contribution perspective, the thesis presents empirical evidence of the BI factors that influence the realisation of BV in the context of South African organisations. It also offers a methodological implication that includes an adopted conceptual framework based on a combination of three (3) theories: RBV, DC, and TOE as a lens for the study, which offers a new perspective relative to what has been done previously on the topic of understanding the relationship between BV adoption and its operational capabilities. The practical contribution stems from the impact the study and its findings can have on BI adoption and implementation in SA organisations.

Declaration

I, the undersigned, hereby declare that this thesis is my work, that all sources used and quoted have been cited and acknowledged using complete references and that this thesis was not previously submitted to any other university or university of technology for degree purposes.

8 November 2022

Signed   **Date**

Acknowledgements

I thank:

Publications from the thesis

Published papers

- Business Intelligence and Business Value in Organisations: A Systematic Literature Review - Paradza, D.; Daramola, O. Business Intelligence and Business Value in Organisations: A Systematic Literature Review. *Sustainability* **2021**, *13*, 11382. https://doi.org/10.3390/su132011382

- The influence of Business Intelligence Capabilities on Firm Performance: The Cases from South Africa, International Journal of Business intelligence (Under Review)

Paper in Preparation

- The role of Dynamic Capabilities in attaining Business Value through the application of Business Intelligence

Glossary

BA	Business Analytics
BDA	Big Data Analytics
BI	Business Intelligence
BV	Business Value
DC	Dynamic Capability
ERP	Enterprise Resource Planning
OC	Ordinary Capability
OI	Open Innovation
PPE	Personal Protective Equipment
RBV	Resource-Based View
ROA	Respondent Organisation A
ROB	Respondent Organisation B
ROC	Respondent Organisation C
ROI	Return On Investment
SKU	Stock Keeping Units
SST	Sensing Seize Transform
TOE	Technology, Organisation & Environment
VRIN	Value Rare Inimitable Non- substitutable

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Chapter 1: Introduction and Background

1.1.   Motivation for the study

Business Intelligence (BI) is a term used to describe the process of transforming raw data into information employed in organisational and, or institutional decision-making processes through the spread of knowledge across the entire organisation (Bordeleau et al., 2020; Torres et al., 2018). However, over the years, the term has evolved, with BI seemingly embodying once independent concepts similar or related to BI, such as Business Analytics (BA), Big Data Analytics (BDA) and Data Analytics which are now interchangeably adopted to represent BI within various scopes (Arias-Pérez et al., 2021; Bordeleau et al., 2020; Kim et al., 2021; Maté et al., 2017; Nam et al., 2019; Paradza & Daramola, 2021).

BI has enabled organisations to remain competitive, maintain, and improve their respective market shares by creating process efficiency, and, subsequently, business value (Gu et al., 2021; Trieu, 2017). The prospect of improved future profitability has also propelled the concept onto the centre stage, with private market research projecting a higher Return on Investment (ROI). According to market research agencies such as the International Data Corporation, BI was expected to generate an ROI of 277%, 139% and 55% in production, fiscal management, and investment in CRM, respectively (Arias-Pérez et al., 2021; Davenport & Harris, 2007; S. Wang et al., 2019).

According to Columbus (2014), 89% of businesses feared closure if they did not adopt BI. Contemporary literature continues with projections that identify BI as one of the top three investment priorities of most businesses to achieve revenue and customer increments of around 15% to 23% within the early adoption phases, respectively, and a subsequent boom to 45% and 41% respectively during the maturity stages (Arias-Pérez et al., 2021). The projections suggest BI's potential and impact and justify the subsequent investment injection by organisations.

However, the value gained from BI remains an area of controversy in the literature (Gu et al., 2021; Puklavec et al., 2018; Trieu, 2017). These controversies are fuelled by the lack of understanding of the intricacies influencing value in BI-related operations (Arias-Pérez et al., 2021). The lack of detail in the literature on the nuances that generate value through the adoption of BI presents a gap in the literature which this thesis aims to fill (Akter & Wamba, 2016; Aljumah et al., 2021; Aydiner et al., 2019; Gu et al., 2021; Torres et al.,

2018). Furthermore, there are varying interpretations of efforts attributed to establishing value generation through the application of BI, which has resulted in fluctuating outcomes based on the varying theories adopted (Paradza & Daramola, 2021; Trieu, 2017).

1.2. Background

There have been attempts in the literature to mitigate the issues of establishing means of attaining business value, resulting in the division of opinions. Some papers aimed to establish BI value through the analysis of return on BI investment (Delen and Demirkan, 2013; Owusu, 2017; Krishnamoorthi and Mathew, 2018a; Dong and Yang, 2020), while others used various KPIs such as customer intelligence generation (i.e. , improved products offering; improved customer service delivery, personalised product recommendation, customer service improvements) (Dong & Yang, 2020; Elia et al., 2020; Gnizy, 2019; Yadegaridehkordi et al., 2020) and customer management and satisfaction (Arias-Pérez et al., 2021; Maroufkhani et al., 2019; Mikalef et al., 2019; Raguseo & Vitari, 2018; Wamba et al., 2017) process improvement and improved competitive advantage and market share dominance (Elbashir, Collier and Davern, 2008; Popovič, Turk and Jaklič, 2010; Maté, Trujillo and Mylopoulos, 2017; Dubey et al., 2020; Elia et al., 2020), to mention a few. The above are the most mentioned forms of BV most organisations are currently employing, which explains how BV realisation has been complicated and often difficult to comprehend.

Capabilities are defined as a "firm's capacity to deploy resources, usually in a combination, using organisational processes, to affect the desired end" (Ambrosini et al., 2009, p. 35). In the definition, an important term to note is resources which enable the execution of tasks and with a combination of other resources resulting in business capabilities. Further, since the analysis was conducted on business entities, the Technology, Organisation and Environment (TOE) framework was adopted to help better conceptualise the facets of value creation which have been applied in other related research that incorporated the use and application of the various resources and capabilities (Tornatzky & Fleischer, 1990). As a result, the use of resources in the realisation of value inspired the use of different resource-based theories used as a lens for some studies. The commonly used theories include the Resource-Based View (RBV) theory and Dynamic Capability (DC) theory, which was later decomposed by Teece, Pisano and Shuen (1997) into Sensing Seizing and Transforming (SST), amongst others. In essence, Sensing, Seizing and Transform (SST) conceptualisation subscribes to

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identifying organisational opportunities and threats (sensing) through analytics, applying affirmative action on the identified opportunities and threats (seizing); and changing or 'transforming' business operations to capitalise on opportunities. Business capabilities are decomposed into key business organisational processes where the influence of BI on operational efficiency and effectiveness is examined to determine BV (Torres, Sidorova and Jones, 2018).

The RBV was developed to establish business process performance (and eventually BV). RBV theory involves the identification of critical resources in an organisation, either tangible or intangible, that must either be heterogeneous or immobile or possess attributes that are Valuable, Rare, Imitable and Organised (VRIO). Most of the published papers on BV literature are based on this theory. However, it has its weakness which inherently leads to the rise of SST through dynamic capabilities. The use of both RBV, DC- SST and TOE has yet to be attempted, and this research seeks to cover this gap and provide an empirical study indicating the methodological process of merging the two and the extent of the effectiveness of using all three theories. Using all three theories, RBV, TOE and DC, as lenses, the other theories' weaknesses can be mitigated, thus improving the quality of the outcome and the perspective of the findings (Krishnamoorthi & Mathew, 2018b). Utilising resources within different organisational processes is instrumental to establishing value generated through BI, hence the employment of resource-centric theories (Krishnamoorthi & Mathew, 2018a; Torres et al., 2018). Some resources employed and scrutinised include BI resources, which enable BI capabilities, resulting in the shift in perspective of BI-related capabilities. This is affirmed by Torres et al. (2018: 823), who point out that "The notion of BI as an operational capability implies the use of BI technological resources, the interaction between IT, human actors and organisational processes, and usefulness of the BI output. Therefore, considering BI as an operational capability, rather than simply a technical asset, is a promising step towards clarifying the relationship between BI and Business Value."

Theories have been identified to help clarify and provide a lens to establishing the relationship between BI and business value, which has propelled several journals to centre their respective research on theories (Akter & Wamba, 2016; Ashrafi et al., 2019; Torres et al., 2018). The commonly used theories include Resource-Based View (RBV), Dynamic Capability theory- Sense Seize Transform; Technology, Organisation and Environment (TOE), IS Success and Information Process theory, to mention a few.

According to Torres et al. (2018), the RBV and the Dynamic Capability theories are more suited to investigating the facets of business value generation through BI than IS Success and Information Processing theory because the latter pair focuses on decision-making outcomes rather than the strategic business value gained through BI. Due to this reason, RBV and Dynamic Capability theories are used within this study as their nature matches the focus of this research, which is to unveil the nuances of BV. Furthermore, TOE is adopted as well as it encompasses the major variables new technology (BI) interact with when adopted in an organisation, and through this relationship, the influence of BI on operational capabilities can be truly understood (Oliveira and Martins, 2011).

From an African perspective, BI has been equally influential within operational applications and has been investigated particularly to generate BV in contemporary literature. An investigation into value creation amongst three banks from Ghana, Nigeria and South Africa indicated that TOE variables facilitated the value creation process in Ghana and Nigeria but not in South Africa. The author, however, acknowledges the impact BI has on organisational performance (Yonney, 2022). Another study by Yonney (2022), which investigated the South African bank performances through the application of the TOE theory, established that infrastructure investment, bank size and availability of skilled BI personnel are imperative to BV realisation and also the importance of the application of the TOE theory in establishing BV.

Lautenbach, Johnston and Adeniran-Ogundipe (2017), who investigated factors necessary to achieve business value in South Africa, also identified the instrumental nature of top management support and data quality as instrumental to BI use and value creation. Further, a study by Calitz, Bosire and Cullen (2018) reaffirms the imperativeness of a supportive management structure. South Africa as a case study where BI application is still in its infancy due to the lack of a supportive management structure in previous years. However, this is steadily changing as most businesses now apply BI to all corners of the organisation to maximise operational profitability (Lautenbach, Johnston and Adeniran-Ogundipe, 2017). This study's uniqueness is centred on the relationship between BI adoption and the operational capabilities of organisations and how it affects BV.

1.3.   Relationship of key concepts

Fig 1.1 illustrates the connections between BI, Dynamic, and Operational Capabilities.
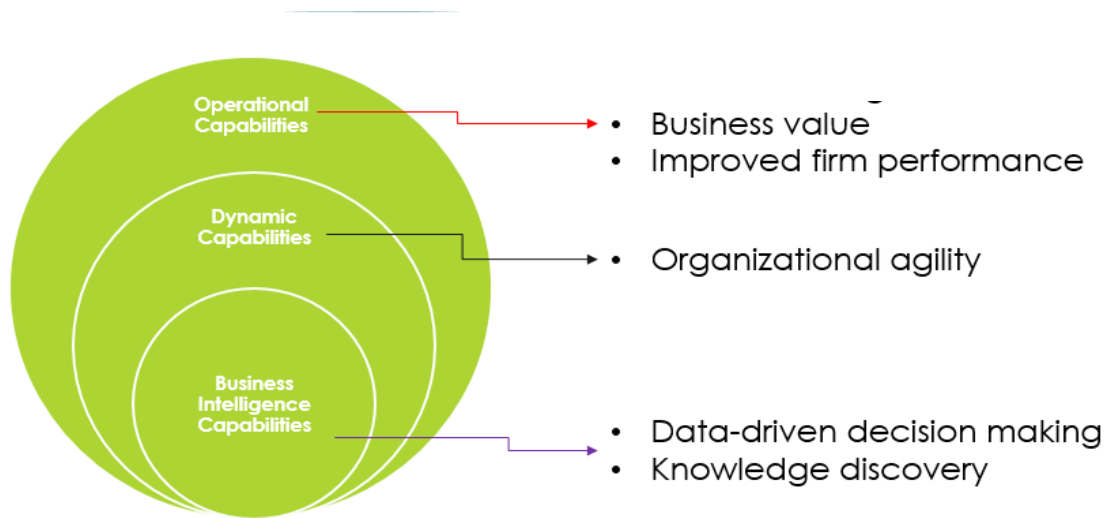
Fig 1.1. Relationship of key concepts (Source: Researcher)

Fig 1.1 illustrates the relationship between BI Capabilities, Dynamic Capabilities (DC) and Operational Capabilities, also referred to Ordinary Capabilities (OC), and the subsequent contribution to the organisation. BI Capabilities enable an organisation to generate new information about the internal and external environment of the business, which aids in the decision-making process (Lateef & Keikhosrokiani, 2022a; Mikalef et al., 2020; Yonney, 2022a). Dynamic capability aids in sensing opportunities and threats for the business, seizing on the opportunity and threats by identifying and deploying the relevant resources and strategies to capitalise on opportunities and counter-threats (Mikalef et al., 2020; Teece, 2014; Torres et al., 2018). The organisation then transforms or reengineers its operational capabilities based on the decisions made to achieve business throughput, business value and ultimately improved firm performance (Akter & Wamba, 2016; Teece, 2014, 2018).

BI Capability has influenced operational capabilities (OP) of organisations where through the application of BI Capability, organisations can affirm the organisational strategy effectiveness. BI Capability can also be considered information process capability that feeds information into the decision-making process by executives, thereby mitigating any possible threats and efficiently capitalise on opportunities. A by-product of dynamic capability is sensing, seizing, and transforming operational capability to achieve

operational agility adequate for the company to profit. As a result, the organisation can respond to BI dictated anomalies which, therefore, triggers operations to evolve to align with the organisational needs. A practical example is where BI Capabilities combined with business operations of the business generate insights that would have been difficult or even impossible to harvest were identified, which, therefore, aid in administering operational teams to react accordingly. Any displacement from the expected benchmarks is subject to reflagged, which is the first step of DC, sensing. The auctioning by operational teams embodies the seizing phase, an audit of available resources is conducted to establish the most efficient and effective means to attaining the desired outcome, reaching the final phase of transforming (Paradza & Daramola, 2021; Shenzhen & Jifan, 2018; Torres et al., 2018).

1.4. Research Problem

BI technology can improve businesses' operational capabilities (Arias-Pérez et al., 2021; Popovič et al., 2014; Puklavec et al., 2018; Razaghi & Shokouhyar, 2021). However, the extent of the success of BI is still unclear as there have been variations in outcomes achieved from BI implementation on business capabilities (Ashrafi et al., 2019; Côrte-Real et al., 2017; Shamim, Zeng, Khan, & Zia, 2020; Shamim, Zeng, Khan, Zia, et al., 2020; Trieu, 2017). It remains a gamble to either employ or to continue to employ BI in organisational systems as there is no guarantee whether business process performance and, eventually, business value will be achieved (Akter and Wamba, 2016; Torres, Sidorova and Jones, 2018; Aydiner et al., 2019). BI demands large investments to be effective, and with such investments, the benefits are expected, either as operational efficiency or return on investment (increased organisational profitability) (Aydiner et al., 2019; Puklavec et al., 2018; Shamim, Zeng, Khan, Zia, et al., 2020). This poses a great challenge and threat to organisations that have financially committed to BI, as billions of dollars of technological investment are possibly wasted (Gartner 2014).

The lack of in-depth literature on BI's influence on operational capability inhibits process performance as practitioners who wish to benefit from BI remain mystified about how business value can be achieved. Further, this lack of understanding can lead organisations to fail to achieve growth, or worse, the decline in the business (Kiron & Shockley, 2011; Phan & Vogel, 2010).

1.5. Research Aim and Objectives

1.5.1. Aim

This study aims to understand the influence of BI on the operational capabilities of organisations in South Africa as it relates to firm performance and business value realisation.

1.5.2. Objectives

1. To identify the BI capabilities integral for business value realisation in South African organisations.

2. To establish how BI capabilities affect firm performance in South African organisations.

3. To determine the influence of BI capabilities on the dynamic capabilities of South African organisations regarding business value realisation.

1.6. Research Questions

The study seeks to answer the main research questions:

What influence does BI have on the operational capabilities of organisations in South Africa?

1.6.1. Sub Questions

The sub-research questions to be investigated are the following:

1. What BI capabilities are integral to business value realisation in South African

organisations?

2. How do BI capabilities affect firm performance in South African organisations?

3. How do BI capabilities affect the dynamic capabilities of SA organisations regarding

business value realisation?

1.7. Significance of the study

In an era where information is key for the sustainability of any organisation, it is imperative to understand how value is harvested from BI capabilities. As indicated in this research, companies worldwide have made massive investments in BI adoption with the hope of a return on investment in operational efficiency and, subsequently, profitability growth (Aljumah et al., 2021). By establishing how businesses can generate BV through the adoption of BI, further innovation and development of the concept can occur, and further capitalisation can be instilled. Since, at the moment, it remains uncertain as to how value is generated, it is difficult to innovatively develop BI within an organisation, especially in a manner that can ensure consistent BV growth.

This study can also allow for more innovative means of applying theories and generating extensive insight into Business Value realisation through BI or various other phenomena since, to the best of the researcher's knowledge, the use of multiple theories has yet to be done. Furthermore, from an academic standpoint, this research seeks to cover the gap in the literature to unify RBV, SST (Dynamic Capabilities) and TOE. To the best of the researcher's knowledge, few South Africa-based studies have called for the application of all theories.

Also, this study answered the call for future research on the application of SST. According to Torres et al. (2018), there is a need for further research on the application of SST, especially with empirical research.

1.8. Delineation of the Study

This study focuses on organisations that have successfully implemented BI systems within their operations. Large organisations that meet the prerequisite of possessing a workforce and substantial income per annum were selected for this study. Further, the study aimed at organisations that operated in the telecommunications, fast moving consumer goods and banking. Such organisations were targeted mainly because they possess the necessary resources to fully adopt BI and position themselves to maximise BV output (Llave et al., 2018). More on the selection criteria is discussed further in the study.

1.9 Thesis Structure

This study is structured into 8 chapters. The first chapter introduces the topic and provides a background to the area of interest: understanding facets leading to BV realisation. Further in this chapter, the problem, research objectives, and research questions are stated. The significance of the study is also explored to indicate the necessity of the study, and the delineation of the study is specified to designate the parameters around the selection of the cases employed in this study.

The second chapter dissects BI as a concept, revealing the operations of BI and its relationship to various resources and capabilities. The chapter also explains process performance and its various forms and explores previous research focused on BI value generation. Further, related work is explored, thereby reinforcing the necessity of this study as it affirms the research questions mentioned as areas requiring further investigation.

Chapter three explains the theories adopted for this study and the justification for the application of the theories to this study. Chapter four dives into the methodology employed, encompassing the research philosophy, research approach, methodological choice, research strategy, data collection and data analysis. Chapter five discusses the case studies selected for this research and justifies why the cases were selected. The findings are presented in chapter 6 on a case-by-case basis before being presented as a cross-analysis in chapter seven, where the selected theories are applied to generate an understanding of the nuances that influence BV realisation from BI. Chapter eight concludes the study by answering the research questions indicated in the first chapter and presenting the study's recommendations.

1.10. Chapter Summary

The objective of this research was to provide better insight into the production and realisation of business value by examining operational capabilities within selected South African organisations. Since BI is a massive investment to organisations, a consistent and subsequent favourable result is expected, yet the methodology leading to BV is unclear.

Based on the problem statement, this chapter also covered the necessary research objectives and questions which can lead to the realisation of the stated goal.

Chapter 2: Literature Review

This chapter presents key concepts and information around BI and operational capability such as operational capability, infrastructure capability, human resource capability, administrative capability, business value, forms of business value, business intelligence application and value in South Africa. It also presents a review of previous efforts on BI, BV and operational capability and a gap analysis of the literature.

2.1. Overview of Business Intelligence

According to Popovič, Turk and Jaklič, (2010), the definition of Business Intelligence (BI) has been poorly explained. He further illustrates this point by referring to Arnott et al. (2005, p. 71), who state that "Business Intelligence is a poorly defined term, and its industry origin means that different software vendors and consulting organisations have defined it to suit their product; some even use 'BI' for the entire range of decision support approaches". To indicate this inconsistency, they pinpointed five definitions from various authors who expressed their views on BI. However, they all have a specific opinion on the application of processed information available to the business, which it can use to better its operations. In essence, (BI) is a result of the evolution of Big Data (BD), where large volumes, variety and velocity of data are synthesised into information organisations base their operational strategies on. The intent and hope are to maintain or expand market share and profitability through operations success. Quintessentially, the premise of BI is to quickly provide detailed and reliable analytics to top management so that they can ascertain better decisions in varying complex situations (Davenport & Harris, 2007).

It is important to note that BI is one of many terms used to describe the process of applying analytics to identify new patterns within the operational rhythm of an organization to maximize potential profitability, with a portion of the literature using different terms depending on perspective and angle. In some papers, BI is classified as Big Data (BD) (Côrte-Real et al., 2017; Miah et al., 2017), Business Analytics (BA) (Krishnamoorthi & Mathew, 2018a; Seddon et al., 2017) and Big Data Analytics (BDA) (Maroufkhani et al., 2019; Sun et al., 2018) which has been occasionally interchanged in literature (Paradza & Daramola, 2021). The emergence of BI can be further tracked back in history to the 1990s when the most focus was on Enterprises Resource Planning (ERPs) systems that aimed to control business operations (Williams & Williams, 2007). At that time, most businesses interested in this early concept were 'transaction incentive businesses' such as marketing agencies, telecommunication, retailing and financial services, whose aim

was to better understand their clientele through the analysis of sales history to ensure improved profitability and revenue (Williams & Williams, 2007).

This later evolved in the late 1990s when most organisations were adopting IT within their operations to ensure 'front office' efficiencies (such as sales and marketing campaign management) by aiming to improve customer service delivery and ensure strategic, operational management (Williams & Williams, 2007). Additionally, most of the challenges faced by data warehouses were resolved, at this point, paving the way for advanced optimisation of the IT tool. This optimisation allowed for more tailor-made information extraction and analysis, resulting in more detailed and insightful information necessary for sustained growth and profitability (Williams & Williams, 2007).

According to Devernport and Harris (2007), BI is anchored on six elements that allow the capitalisation of BI, and they include the following:

i.   Data management – involves sourcing accurate and relevant data and reading it for further analysis.

ii. Transformation tools and processing - revolves around the cleansing of the extracted data and the popularisation of relevant databases with the processed data.

iii. Storage - represents where the databases are kept and organised, which can normally entertain larger data volumes.

iv. Application and software tools used for analysis – This is needed to possess the necessary applications and software capable of further investigating large data quantities.

v.   Presentation - involves presenting information from analysed data in an easy-to-comprehend manner.

vi. Operational processes - investigate the administrative perspective of the data, which involves validating the information, error management, data protection and archiving.

These BI processes infuse the business in four (4) distinct organisational dimensions, including knowledge management by the organisation; the purpose the BI is intended for; the BI infrastructure; and processes designed to evaluate the effective implementation of BI (Olszak & Ziemba, 2003).

Operationally, BI has been integrated to assess the firm's performance in real-time which enables agile transitions of operations, resulting in a higher chance of capitalising on the insights. The BI system generates trends and preferences in the market ensuring that the products developed are in line with the demand in the market. Further, BI improves the chances of product success in the market as the design and price structure preferred by the target market would have been considered therefore, providing a product the customer would positively react to and at a pricing grade deemed reasonable by the target market. As a result, BI would have influenced the operational capability, and dynamism of the organisation's operations reaffirming the imperativeness of better understanding the application and value of BI (Arias-Pérez et al., 2021).

2.2. Relationship between Organisational Capability and Dynamic Capabilities

Organisational capabilities are referred to as a "firm's capacity to deploy resources, usually in combination, use organisational processes to effect the desired end" (Ambrosini et al., 2009, p. 35). Teece, Pisano and Shuen, (1997) explain capabilities as the strategic management process of integrating, repurposing, and adopting micro and macro resources to adjust to the changing environment. The definition establishes the influence of resources in enabling an organisation's operations and attaining the desired outcome.

Organisational capabilities come in two forms, as explained in Section 2.1 of this thesis, ordinary capabilities, also known as operational capabilities, and dynamic capabilities. Operational capabilities include activities and resources that enable an organisation to function daily, while dynamic capability is tasked to monitor and manage the external shift in the business environment and facilitate adequate change to capitalise or counter where necessary and possible (Mikalef et al., 2019; C. M. Olszak, 2014; Torres et al., 2018). Organisational capability cannot be bought but formed, and depending on the resources available to an organisation will determine the type and level of influence of the capability the organisation possesses and the value generated (Mikalef *et al.*, 2019).

Dynamic capability, as mentioned, involves different capabilities depending on the organisation and the resources available to sense, seize and transform these resources into a competitive advantage. There are variations of capabilities recognised to achieve BV, but according to Torres et al., 2018; Wamba et al. (2017), value realisation is analysed through the examination of Infrastructure capability (value capability), Human

Resource Capability (competitive capability) and Management Capability which will be discussed in-depth in the section below.

2.2.1. Infrastructure Capability

IT infrastructure is a set of mutually accessible resources available across an organisation that facilitate communication and coordination to enable the present and future application of modern technology (Chen & Siau, 2012). IT infrastructure can include platform technology such as "hardware and operating systems, network and communication technology and data and key software technology" (Ashrafi & Zare Ravasan, 2018, p. 972).

In the context of BI, BI infrastructure includes data quality, system, storage, also famously known as data warehouses, management and analysis. Infrastructure capability is instrumental in collecting and analysing data to produce information that management applies within decision-making processes to formulate new strategies. The more sophisticated the BI infrastructure is, the more likely an organisation can produce useful information. Through the computation capability associated with sophisticated infrastructure, organisations can process larger volumes, variety and velocity of data, therefore, discovering patterns and relationships previously unknown (Torres et al., 2018).

Furthermore, data quality is especially important within the infrastructure as it directly correlates to insight accuracy, which governs the effectiveness of BI applications (Božič & Dimovski, 2019; Côrte-Real et al., 2019; Shanks & Sharma, 2011; Torres et al., 2018). Data quality is closely associated with quality systems since systems incorporate data storage and management. Quality systems play a pivotal role in BI success as they facilitate the dispensation and processing of data as well as ensure that the organisational data systems have a considerable degree of flexibility to identify potential opportunities and threats (Ashrafi & Zare Ravasan, 2018; Torres et al., 2018; Chen & Siau, 2012).

2.2.2. Human Resources Capability

Human Resource Capability consists of the human capital with expert data management or processing skills crucial to attain the relevant intelligence (Maroufkhani et al., 2019). The solicitation of accurate data deciphered from expert personnel leads to more efficient sensing of possible threats and opportunities. According to Clavier et al. (2014), knowledge attainment, management and application are equally decisive to effective BI

application and consequently attain BV. Human resource capability remains one of the very important capabilities for BV realisation. However, most organisations struggle to fulfil this function of the BI requirement as BI skilled experts are in short supply within the labour market, therefore, compromising the optimisation of BI operations (Lamba & Dubey, 2015; Maroufkhani et al., 2019; Popovič et al., 2019). This has propelled current literature to focus more on HR analytics and social sciences research associated with personnel roles in BI as it remains an area of curiosity and drawback from maximum BI adoption and value relation (Paradza and Daramola, 2021).

2.2.3. Management Capability

BI management capability is mostly associated with conversion processes within an organisation and the adoption of innovative technology and systems, as well as the degree of commitment to the various innovative technologies (El-haddadeh et al., 2020). BI management scope can include formulating BI strategy, identifying and selecting appropriate organisational structures for executive BI strategies, selecting the correct BI project, and effectively managing BI projects (Trieu, 2017). Management capability plays a critical role in the realisation of value as they impose and enforce the use of BI within organisational processes and ensure the readiness of the organisation or institution for effective BI application (El-haddadeh et al., 2020). BI management capability is also responsible for retaining, recruiting and developing personnel within the BI systems. Additionally, management fosters a culture that leans on the essence of BI adoption, increasing the likelihood of technology acceptance within the organisation (Torres et al., 2018).

2.3. Relationship between Business Intelligence and Operational Capability

BI operational capability impacts the BV outcome, and the degree of BV realised through the indirect influence of dynamic capability on operational capability. This influence reinforces business processes to achieve success, eventually leading to BV (Côrte-Real et al., 2017). This is affirmed by Mikalef et al. (2020), who point out that BI operational capabilities (BI Capabilities) should be accessible to all facets of the organisation to achieve reasonable BV.

Organisational capability's function is to aid the organisation in identifying and capitalising on opportunities and threats by applying dynamic capabilities. This is a progressive approach to earlier conceptualisations, as initial studies pointed to a strong correlation

between dynamic capability and value realisation. However, this has evolved to note the impact and influence of operational capabilities in achieving value (Torres et al., 2018). A business reinforces its structures, processes and roles through these processes and allows a liberal flow of data to individuals or collectives that most require them while firmly constituting data privacy, protection and ethics (Mikalef et al., 2020).

It is imperative to note that the competitive advantage attained from the operational capability, influenced by dynamic capabilities, is temporary and should be consistently revisited, especially in hyper-dynamic environments. The ever-changing nature of such markets forces most organisations to consistently apply dynamic capabilities on operational capabilities to maintain the achieved level of competitive advantage (Torres et al., 2018). In essence, the dynamic resources that enable an organisation to be operational agile aids in the realisation of process performance. In an event where anomalies are identified in the trends, operational managers can react quickly to the change, where be capitalising on an opportunity or mitigating a potential threat before excess damage takes place to the performance of the organisation.

2.4. Process Performance

Processes are multidimensional and require constant holistic management to ensure constant improvement and process success. The process management process includes process identification, analysis, redesign, implementation and monitoring. To manage processes, the processes need to be constantly measured as opposed to organisational units, as processes include a holistic perspective of the capability and return of the process (Aydiner et al., 2019; Suša Vugec et al., 2020).

Since processes need to be constantly measured using standard KPIs, BI simplifies these processes by constantly providing data on the processes' performance, eventually leading to the evaluation of process success. This has resulted in the emergence of 'business-oriented analytics', a term used to describe the influence of BI on processes that can lead to new information being developed (Suša Vugec et al., 2020). Processes are mostly measured using reliable, flexible and responsive, either financial or non-financial matrixes, which should be aligned with organisational objectives that determine firm performance (Aydiner et al., 2019).

2.5. Business Intelligence and Business Value

The relationship between BI and BV has been well documented in the literature, with BI influence facilitating sustained growth and competitive advantage (Suša Vugec et al., 2020; Aydiner, Tatoglu, Bayraktar, & Zaim, 2019; Aydiner, Tatoglu, Bayraktar, Zaim, et al., 2019; Elbashir et al., 2008). For organisations to attain value, a prerequisite of assets and organisational capability is imperative to forge the means to realising firm performance and BV. More so, the more assets and capabilities an organisation commands determines the level of impact BV achieved attainable. The more assets and operational capabilities an organisation have at its disposal, the more likely it is for the organisation to attain BV (Ylijoki & Porras, 2019).

Based on a premise by Soh and Markus (1995), Ylijoki and Porras (2019) state that firm investment in BI assets is mandatory if BV is to be achieved. According to Soh and Marcus, great expenditure devoted to improvement of the BI infrastructure will result in the realisation of unique resource and capabilities, which therefore results in the realisation of BV. Also, Ylijoki and Porras (2019) explain that IT expenditure represents an economic sacrifice to secure required IT infrastructure and assets; however, the BI value creation process is subject to external influences (Ylijoki & Porras, 2019).

Despite the various schools of thought on resource importance to value realisation such as Ambrosini et al. (2009), Chae et al. (2014), and Mishra et al. (2017) to mention a few, it is universally agreed that BI resources should be evenly spread across an entire organisation and apply equal emphasis on less technical aspects of the BI systems. Furthermore, focus on BI resource dispensation occasionally takes precedence. However, more efforts should be equivalently applied to better understand the evolution of the BI system from experimentation to rationalisation. Additionally, very little is known about the motivators of BI to achieve BV, as prominence has previously been placed on the technical aspects of BI and adoption processes (Mikalef et al., 2020).

2.5.1. Different forms of Business Value

The business value generated from BI has been conceptualised in different forms depending on organisational capabilities and objectives, which determine the appropriate KPIs for the organisation and industry (Aydiner, Tatoglu, Bayraktar, Zaim, et al., 2019).

The most recognised form of BV is Return on Investment (ROI) due to the organisational evaluation of IT systems' influence. The level of profitability achieved after the full

adoption of BI systems indicates the value generated from the implemented systems. This can also include cost reduction through the BI systems use achieved, which subsequently allows the realisation of more profits (Elia et al., 2020).

Cost reduction can also be associated with process efficiency, among the most mentioned forms of BV. The more efficient an operational process is, the fewer resources it demands, which indicates the value generated from adopting BI. Process efficiency has been recognised as an effective means of evaluating BI systems. However, it has to eventually link with other KPIs such as cost reduction or profitability (Dubey et al., 2020; Elbashir et al., 2008; Elia et al., 2020).

Yogev, Even and Fink (2012) categorise Business Value into two spectrums which include strategic business value and operational business value, where the former represents value generation that benefits the strategic stance of a business, such as competitive advantage through the identification of opportunities and threats, and successful research and development projects. The latter explains the improvement of internal processes, which ultimately increases firm performance through cost-saving and time.

Customer satisfaction is also among the most mentioned forms of BV in literature, indicating the importance and value of satisfying customers. The improvement in service delivery is among the reasons most organisations employ BI within their operations, which explains why some organisations evaluate their BI systems on the matrix of customer satisfaction (Dong & Yang, 2020; Vallurupalli & Bose, 2018).

Table 1 illustrates the various forms of business value mentioned in the literature.

Table 2.1: Forms of Business Value

Literature Reference	Business Value Form
Elbashir, Collier and Davern (2008); Owusu (2017); Puklavec, Oliveira and Popovič (2018); Gnizy (2019); Dong and Yang, (2020); Dubey et al. (2020); Elia et al. (2020)	Customer Intelligence benefits

Elbashir, Collier and Davern (2008); Owusu (2017); Dubey et al. (2020); Elia et al. (2020)	Costing Benefits
Dong and Yang (2020); Elia et al. (2020)	Investment Return
Elia et al. (2020)	Improved environmental analysis, Prediction trends, Better customer management
Popovič et al. (2018)	Improved transparency
Seddon et al. (2017); Popovič et al. (2018)	Improved competitive advantage
Gnizy (2019)	Improved entrepreneurial insights, Improved learning capability
Seddon et al. (2017)	Process execution improvement
(Owusu, (2017)	Improved risk management, Efficient recording, Improved decision-making process, IT saving; Improved competitive advantage
Chalutz Ben-Gal, (2019); Côrte-Real et al. (2019); Shamim, Zeng, Khan and Zia (2020); Kim et al. (2021)	Improved HR recruiting

Source: Researcher

2.6. Business Intelligence Application in South Africa

As with other parts of the world, BI has been instrumental in contemporary operations within African businesses, enabling cutting-edge insights that repeal competition and sustain a sizeable market share (Lautenbach et al., 2017b). Atsu, Ahlijah Yonney (2022); Atsu Ahlijah Yonney (2022) discuss the impact of BI on African banks, specifically banks in Ghana, Nigeria and South Africa, where it was uncovered that through the application of TOE theory, BI requires infrastructure investment, skilled personnel and data quality to attain BV.

However, despite the hype, most of the previous studies on BI in South African organisations have focussed on the effective adoption of BI while little is published on BV

or firm performance achieved from BI, indicating a notion that BI is still in its infancy (Calitz, Bosire & Cullen, 2018). Most organisations and institutions still strive to understand the best BI adoption practices and factors influencing a successful BI implementation. This is eloquently explained by Lautenbach et al. (2017), who suggest that organisations should ensure that data-driven BI infrastructure is available to support BI production and use. The authors further point out that top management and competitors' influence are paramount for BI adoption and acceptance within South African organisations.

The main drawback of efforts to adopt BI in Africa and South Africa (to be exact) is the lack of necessary frameworks that simplify the adoption of BI, especially considering end-users' reluctance to use BI within South African firms (Adeyelure et al., 2018). According to Calitz, Bosire and Cullen (2018), management support, BI report availability and clear reporting guidelines are essential to BI acceptance in organisations. Additionally, behavioural habits and perceived benefits of adopting BI also increase BI acceptance (Kgasago & Jokonya, 2018).

Since there is limited literature on BV in South Africa, to gain a perspective of BV realisation in a case similar to South Africa, (Owusu, 2017) sheds some light on Ghana as a case study. The study was conducted with the adoption of a Balanced Score Card as a theoretical lens. He explained that for BI systems to achieve a recognisable degree of success, knowledge management is critical, especially learning and knowledge growth, internal operational processes, and customer performance.

Synthesising this discussion, it is apparent that BV literature associated with Africa is limited and more so for South Africa. The attributes of this study will provide a unique perspective on BV realisation in Africa and, more so, in South Africa, which could inspire a change in focus from BI adoption to BI adoption and value creation.

Table 2.2 provides an overview of journal articles published on BI application in Africa which helps to provides a clearer stance on research areas covered under BI adoption in Africa, thereby reaffirming the necessity of this study.

Table 2.2. Application of Business Intelligence in Africa

Paper	Main Theme	Theories Adopted	Methodology	Key Findings	Critic/ Comment comparing to current study
Calitz et al. (2018)	BI adoption in higher education institutions sustainability of reporting framework in South Africa.	No theories provided but mentions reporting frameworks	Quantitative study with the use of questionnaires.	Paper unveiled that management support and structure reporting practises are detrimental to strategic business planning Further the study showed that BI application of BI in the higher education institutions is still in its infancy	The study explains BI application in higher education institution however, the study fails to show how the institutions gain value and theories applicable to realise value.
Yonney (2022a)	Study investigates the adoption of BI and firm performance realised in the banking sector in South Africa	Technology Organisation Environment (TOE)	Quantitative	Study exposed that bank software, employee cost and size has a positive effect on the profitability and shareholder value.	The study does not cover other critical components to realising BV as well as only using one theory underpin the realisation of value which can overlook other critical components if other theories such RBV and DC is applied.
Adeyelure et al. (2018)	Paper proposes a framework that can aid Small Middle Enterprises (SME) access BI and capitalise on opportunities associated with the technology in Africa.	No theories provided	Quantitative with closed-ended questionnaire	The study revealed that determinants necessary for SME to capitalise on BI analytics.	The study did not use any theories that can provide different lens to unveil critical aspects to SMEs capitalising on BV through BI.

Lautenbach et al. (2017a)	Study aims to identify factors necessary to realise BV.	Technology Organisation Environment (TOE)	Quantitative	The findings showed that data related infrastructure capabilities, top management support and external market influence positively related to realising BV.	The study only utilised one theory which have a drawback on not fully conceptualising all factors necessary to realise BV.
Kgasago & Jokonya (2018)	Paper investigates factors instrumental in user acceptance of BI in the South African energy sector	No theories provided	Quantitative using closed ended questionnaires	The study uncovered habit and affect has a positive relationship to user acceptance as well as the social actors.	Like other on this list, the paper did not use theories to uncover user acceptance. Further, the paper does not speak to realisation of value, rather BI acceptance.

Source: Researcher

2.7. Related Work

Several papers have been published around BI and value realisation. Aljumah, Nuseir and Alam (2021) aimed to establish the impact of BI on organisational performance by mediating the role of BI and organisational capabilities through quantitative means. The study established the influence and importance of management support and systems quality as crucial to achieving value and the dynamism of capabilities to neutralise threats and capitalise on opportunities. The study adopted a dynamic capability approach for the lens due to the focus on organisational capability. The paper calls for future studies focusing on BI capabilities as mediators to BV realisation while applying BI as ambidexterity.

Arias-Pérez, Coronado-Medina and Perdomo-Charry (2021) also contributed notably to BV realisation through BI adoption, where the study investigated the effect of BI capabilities on Open Innovation (OI) such as customer involvement and firm performance by employing structural equation modelling on data collection from 112 organisations. The findings revealed some degree of influence of BI capabilities on a financial firm's performance, despite a much lower impact between OI and non-financial performances. The paper also affirms the importance of the notoriety of BI capabilities as integral parts of BV realisation. Similar to Aljumah et al. (2021), the paper calls for future research to investigate the mediating role of BI on OI and firm performance.

Razaghi and Shokouhyar (2021) conducted a similar study rooted in supply chain management where they aim to establish the level of impact of BI-propelled operations and capabilities on global sourcing that can eventually lead to firm performance. Adopting a quantitative approach, the study revealed that BI capabilities positively impact global sourcing and firm performance directly. The paper's shortfalls include the lack of analysis of BI on BI dimensions such as human resources, infrastructure flexibility and management influence. The authors point out that understanding the mediating role of BI on global sourcing and firm performance is in line with the recommendation of Aljumah et al. (2021) and Arias-Pérez et al. (2021).

Paradza and Daramola (2021) published a systematic review that aimed to fulfil four main objectives, which included ascertaining the theories that have been adopted within BI and BV literature, factors that lead to the achievement of BV, hindrances to BV realisation, and the various forms of BV that have been mentioned in the literature. The paper

revealed that RBV, DC and TOE were predominantly adopted by researchers that have studied the relationship between BI and BV. Furthermore, the authors identified human resource capital, data quality, BI alignment with organisational goals, BI infrastructure, top management support, and data culture as crucial to achieving BV. Hindrances to BV success realisation were also identified and discussed in-depth. The paper called out the need for new means of investigating BV realisation from BI by adopting different theories as a lens or as a combination of theories to generate new information and perspectives. Additionally, the paper requested literature that focuses on critical factors necessary to achieve BV and studies that affirm or dispel the highlighted forms of BV.

Sardi et al. (2020) also present a literature-based study on BI and firm performance measurement to establish trends and future research areas. Despite the notable increase in BI firm performance papers, there is still a lack of literature investigating how BI can influence performance measurement, principally within the business and accounting spectrums.

Côrte-Real, Ruivo and Oliveira (2020) investigated the impact of BI and Internet of Things (IoT) tools on aiding organisations to achieve unique competitive advantage. The study aims to aid insight into business operations, resulting in firm performance. IoT is defined as "all types of objects that have sensing, networking, and processing capabilities to communicate with other devices and services providing value-added services (pp: 3). The paper adopted a Knowledge-Based View and Dynamic Capability theory as a lens to uncover the significance of data quality in achieving value through BI and IoT adoption.

Côrte-Real et al. (2019) reported on prerequisites to BV realisation. In the paper, the authors employed a mixed-method approach where the Delphi method was adopted to rank the factors in their order of significance. The authors found that 62% of the value generated was explainable due to BI use.

The study by Krishnamoorthi and Mathew (2018) establishes the importance of how BI systems are set up to achieve and not necessarily how much investment an organisation can inject to achieve BV. Emphasis is placed on the organisational capability to guide organisations to BV by examining case studies. The three main concepts mentioned include organisational assets, business capabilities and firm performance, where they establish the relationship between the three and their influence on achievement. The results revealed that BI analytical technology is imperative to achieve BV, as they

appeared in all three case studies. Other factors indicated as instrumental include analytical capability, which includes the personnel who work with or produce the information. The authors also explained the forms of BV recognised within their model, including benefits of BI, like process efficiency and financial KPIs, such as ROI.

2.8. Gap Analysis

After synthesising available literature on BI and BV, some research gaps were identified. The varying perspectives can be oriented on the nature of the research conducted, methodology, theories applied and variation in the conceptualisation of BV.

2.8.1. Literature calls for understanding BI's role in influencing BV

Recent related studies on BI on BV have focused on understanding BI from a mediating role to track its influence on different facets of operations to ascertain the genesis and trajectory of BV that can be sustainably harnessed. Multiple variations and investigations involving different variables within different spectrums have been investigated to better understand BI realisation (Arias-Pérez et al., 2021; Krishnamoorthi & Mathew, 2018; Razaghi & Shokouhyar, 2021). Despite authors answering this call, there is still a need for more literature on BI's intermediating role in influencing BV, especially within other disciplines such as business, management and accounting (Sardi et al., 2020).

The paper positions BI in a mediating role in attaining BV, where emphasis can be placed on the data analysis and operational capabilities. Through a process-based analysis, organisational resources, operational capabilities, and dynamic capabilities mark the genesis of BV (Torres et al., 2018).

This study answers this call as it also positions BI in a mediating role where analysis and focus are placed on operational capabilities propelled or supported by BI to establish BV creation. Through the examination of organisational resources, operational capabilities and dynamic capabilities, value-added process stages can be identified to mark the origin of value creation using process-based analysis (Torres et al., 2018)

2.8.2. Need for the combination of the theoretical lens

The papers reviewed in Table 2.3 share the commonality of being underpinned by different theories in varying degrees. However, most used only one theory to interpret the meaning from the respective studies. The main drawback of such an approach is that it limits the extent and reach of the study as data is viewed from a one-dimensional

perspective, resulting in a missed opportunity for information acquisition, especially in qualitative studies (Collins & Stockton, 2018).

Since BI studies have called for understanding the facets that mobilise value creation, comprehension needs to be achieved. This requires an in-depth investigation of the area of interest. This occasionally requires adopting a qualitative approach that tends to work with limited data sets, which is where theories play a pivotal role in aiding data limited to concern generalisation (Collins & Stockton, 2018). Therefore, using more theories would significantly enlarge the spectrum of analysis and generate more insightful information about the area of study (Paradza & Daramola, 2021).

This research also answers this call as it employs three theories to establish the facets of generating value: RBV, DC and TOE. They all play a pivotal role in achieving the set objectives identified in Chapter 1 and are discussed and justified in-depth for this study in Chapter 3.

2.8.3. Need for qualitative research in BV studies

Most research investigating BI and BV's mediating roles or with another third variable has been quantitative. This suits the notion of establishing relationships between variables. However, for comprehension to be attained, qualitative research methods are best suited to achieve the set goals as they allow multiple facets of truth and entertainment accounts from various sources who may perceive the area of interest differently, consequently providing a wider spectrum of information (Saunders et al., 2019). This research also satisfies the need for more qualitative research in BV literature.

2.8.4. Confirmation of various forms of BV

As indicated in the *Introduction,* organisations have different conceptualisations of BV, depending on various factors, such as the organisational goals, structure, and internal KPIs adopted (Torres et al., 2018). Paradza and Daramola (2018) provide an extensive analysis of the KPIs recognised in BI literature; however, they called for empirical confirmation of these forms of BI so that a better understanding of BV can be achieved as practitioners and academics alike would be able to recognise BV within their operational bases better. This current study aims to establish this call out and affirms the form of BV employed in BI-infused organisations in South Africa.

2.8.5. Empirical factors that influence BV realisation

Through the analysis of various operations and operational capabilities, it is important to pinpoint the crucial elements that generate BV and catalogue them so that further theories can be deduced, and investigations can further the research around BV. This was also a call from (Sardi et al., 2020; Paradza and Daramola, 2021; Razaghi and Shokouhyar, 2021), who all pointed out the need for identifying factors that directly lead to BV realisation.

This is especially important for the development and improvement of BI systems in various sectors and countries around the world where BI is still in its infancy. Practitioners can benefit from this as published literature a better understanding of value generation can be realised through practical system improvements.

2.8.6. BV Literature in Africa

Further compounding the above gaps, BI value creation literature in a developing country like South Africa is in short supply, which could explain the stunted BI maturity within the country (Calitz, Bosire and Cullen, 2018). Extending the available BV literature in developing countries can propel more organisations to achieve BI maturity, harness the full benefits of BI systems, and achieve an ROI from BI investments. It provides great insight if more information about BV realisation is attained in Africa, which then can allow cross-examination of the BV realisation process across the world, resulting in the emergence of new information and theories.

Table 2.3 below depicts a literature analysis of related work, crystallising the research gap this research occupies.

Table 2.3: Summary of Related Work

Paper	Main Theme	Theories Adopted	Region	Methodology	Key Findings	Critic/ Comment comparing to current study
Aljumah et al. (2021)	Establish the impact of BI on organisational performance	Dynamic Capability Theory	United Arab Emirates - Asia	Quantitative research with the use of survey questionnaires	Determinants such as systems and data quality and management support are instrumental to realising BV from BI.	The study uses only one theory to establish BV realisation, which can result in the paper achieving a one-dimensional perspective. Additionally, the paper calls for the examination of the mediating role of BI capability on OI and firm performance.
Arias- Perez et al. (2021)	BI mediation in the relationship between Open Innovation (OI) and firm performance.	Knowledge-Based View	Columbia - South America	Structural equation modelling	BI has a partial mediating effect on OI and firm performance.	As with Aljumah et al. (2021), the study risks lacking depth in perspective and information due to one theory adoption. Also, the paper calls for further examination of the mediating role (nuances of achieving BV) of BI and OI and firm performance.
Razaghi & Shokouhyar (2021)	Explore global source benefits associated with BI capabilities, eventually leading to firm	Conceptual attitude model	Iran – Asia	Quantitative research	The study uncovered the role of BI and management capability in realising firm performance.	The study primarily focused on the supply chain industry, which may not apply to other sectors. As with the other related papers, Razaghi & Shokouhyar (2021) also employed one

						theory that can also limit the view of the situation and the related epistemology attained.
	performance in the supply chain sector.					The study also calls the exploration of BI capabilities elements (BI infrastructure, Personnel and Management) on global sourcing and firm performance.
Paradza & Daramola (2021)	Reviewed papers to establish the most commonly adopted and mentioned theories, key attributes to BV, factors that hinder BV realisation and the various forms of BV.		South Africa-Africa	Systematic Literature Review	RBV, DC and TOE are commonly used in BV literature. BI infrastructure, skilled personnel, data quality and top management (among others) are key to BV realisation; skilled personnel, and data quality (among others) are the main drawback in achieving BV; ROI, process performance, customer service insights, and	The paper calls for an exploration of the application of more theories or a combination of theories to provide a multilateral view of BV realisation and the empirical investigation into key factors to BV realisation and confirmation of mentioned forms of BV.

					management are the mainly mentioned forms of BV.	
Sardi et al. (2020)	Reviewed papers that covered BI and firm performance measurements		Italy- Europe	Systematic Literature Review	Paper uncovered an increment in BV literature; highlight a shortage of BV literature in the business, management and accounting sectors	The paper solicits more literature encompassing the distinctions leading to BV realisation.
Côrte-Real et al.(2020)	Based on establishing the impact of BI and Internet of Lot (IoT) capabilities on process success which consequently leads to BV.	Knowledge-Based View, Dynamic Capability	Portugal - Europe	Survey	Data quality is instrumental in unlocking value from BI and IoT.	The methodological approach employed is different to this study, where surveys were employed. This current study adopted a qualitative approach through in-depth interviews and focus groups to allow the pursuit of in-depth understanding to attain meaning.
(Côrte-Real et al., 2020)	The paper investigated the antecedence of BV in organisations.		Portugal - Europe	Exploratory: Delphi method	The study identifies three forms of sustained, real and potential and affirms the BI as a	The paper pleads for collaboration on the findings through empirical means.

					prerequisite to sustained BV.	
Krishnamoorthi and Mathew (2018)	The study investigates "elements of analytical technology assets and business analytics capability and to understand mechanisms for business value creation…" (pp:643)	RBV	India - Asia	Multi-case study analysis	The paper excavated the influence of BI on firm performance through the analysis of "operational and organisational performance measures" (pp: 643).	The paper provided a strong platform to conduct research such as this; however, the paper requires empirical affirmation.

Source: Researcher

2.9. Chapter Summary

The chapter covered essential components of this study, such as BI, operational capability, dynamic capabilities, relationships between BI and capabilities, as well as Firm performance and BV. The chapter also extensively covered the research gap in BV literature, affirming the necessity of conducting this research and establishing the promise of new insight around the area of interest. The following chapter discusses the theoretical framework adopted for this study.

Chapter 3: Underpinning Theories

This chapter examines the theories that underpin this study. The significance of a theory is best summarised by the quote below:

Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge within the limits of critical bounding assumptions. The theoretical framework is the structure that can hold or support a theory of a research study. The theoretical framework introduces and describes the theory that explains why the research problem under study exists" (Swanson & Chermack, 2013, p. 1).

In effect, a theoretical framework facilitates the study by dissecting the area of interest into a form that was unnoticed or fully understood. The theories mould the research investigation by employing structure and consistency throughout the study.

To recap, the objective of this study is to understand the influence of BI on the operational capabilities of organisations in South Africa. Based on the aforementioned objective, the theories outlined below were selected to provide a lens to aid the achievement of the objective. The section below identifies the theories selected and the justification for their selection.

3.1. Theory Adoption and Justification

As indicated in the first chapter, the theories selected as lenses include RBV, DC- SST, and TOE. These all play a vital role in better understanding the nuances of BV. The section below depicts the chosen theory and reasoning to justify their selection for this study and related studies where they have been applied. This will also provide an understanding of what the theories represent and how they were used in the past.

3.1.1. Resource-Based View Theory (RBV)

The RBV is a minimalistic approach to better describe how an organisation works through resources invested to achieve a set goal. The epistemological context of the theory is anchored on the notion that firm performance differs due to resources available to a particular organisation (Barney, 1991). The theory also establishes differences in resources, namely static and dynamic resources (assets). The former can be described as limited ordinary resources an organisation employs to achieve operational success and include human, financial and physical assets (S. Wang et al., 2019). The latter stems

from organisational capabilities such as organisational learning (responsible for identifying and learning within the micro and macro business environments), which benefits the organisation through opportunity identification (J. Barney, 1991; Lockett et al., 2009; Teece et al., 1997).

Barney (1991) points out that the RBV has four characteristics known as the VRIN, which can be decomposed into i) Value- represents whether the resource in question is valuable to the organisation, and aids in improving organisational positions and eliminating possible threats; ii) Rare- explains the scarcity of the resource within the organisation's macro-environment iii) Inimitable- concentrates on the uniqueness of the resource and iv) Non-substitutable- replacements of the resource, especially with competitors, should be scarce. Additionally, VRIN was designed to allow teaching on resource identification and deployment to ensure value (Barney and Mackey, 2016). Peteraf and Barney (2003) state that the influence of resources on the organisation may differ depending on the nature of the resource, and as such, the impact of the resources differs depending on the resources and the purpose. In the field of Information Systems, RBV is the most adopted theory when establishing the BV mainly because it exhibits how IT resources generate strategic value for organisations (Ji-fan Ren et al., 2017; S. Wang et al., 2019). However, RBV has some demerits, such as the inability to comprehensively explain how organisations attain a competitive advantage which then introduces the Dynamic Capability theory (Mikalef *et al.*, 2017).

There has been some dissonance in the classification of resources on whether the value of resources and capabilities should be considered in the VROI framework. However, most authors have reinforced the importance of value in VROI, where in some instances, it was considered first before rarity and imitability (Barney & Mackey, 2016). Nevertheless, most authors concur on the function of RBV to indicate organisational "disadvantages, competitive parity, temporary competitive advantage and sustained competitive advantage" (Barney & Mackey 2016: 371).

The earliest traces of RBV can be found in the 1930s when economists such as Chamberlin (1933) influenced a paradigm shift from economic structures that yielded a decent return on investment to a firm resource-centric approach. Resource-centric approach propelled the examination of firms' capabilities, particularly how they improved organisational offerings, resulting in substantial profitability through identifying key

organisational capabilities, including technical know-how, reputation, brand awareness, teamwork, patents, and trademarks.

Fig 3.1 illustrates how VRIO uncovers competitive advantage.
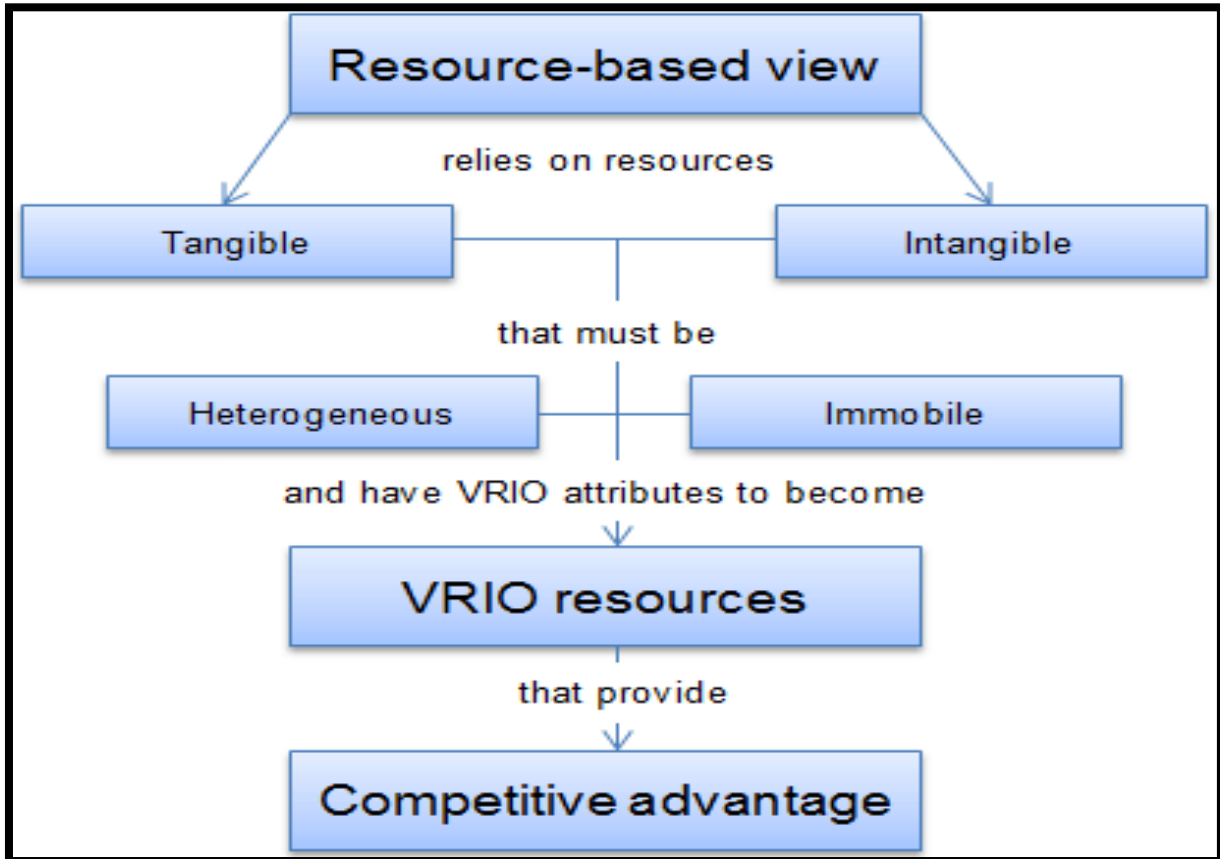
Fig 3.1: VRIO and stages of competitive advantage (theintactone, 2022)

According to Goggin (2021), each stage of the VRIO is a step closer to prolonged competitive advantage. The authors explain like an onion, with every layer achieved, an organisation can foster a long-term competitive advantage as long the four elements are constantly present.

The earliest recognisable forms of RBV can be cited from Edith Penrose on the theory of firms' growth (Penrose, 1959). She states: "A firm is more than an administrative unit; it is also a collection of productive resources, the disposal of which between different users and overtime is determined by administrative decision. When we regard the function of the private business firm from this point of view, the firm's size is the best gauged by some measure of the productive resources it employs" (Penrose, 1959, p. 24).

The highlighted quote displayed two main principles of RBV: the role of managers in developing and deploying resources (Barney, 1994) and the relationship between the firm and the resources available (Chatterjee & Wernerfelt, 1991; Robins & Wiersema, 1995). Penrose (1959) also offers some remarkable insight into RBV where she differentiates resources from services. She argues that resources are not to be confused with services as depending on the function of the resource at a given time will result in a specific service attained while the same resource in a different circumstance will produce an alternate service, different to the former. This drives home one of the main contemporary characteristics of RBV, namely, the uniqueness of resources in organisations and how they provide different competitive advantages and, ultimately, value. This is one reason why the theory was considered for this study. She adds that internal resource alignment and configuration facilitate and can also restrain an organisation's potential and capabilities if not properly employed. External elements such as technology demand and growing demand are also critical to the effective deployment of RBV (Fahy & Smithee, 1999).

RBV has attracted considerable criticism, including RBV's neglect to assess the capability potential of resources as they are deemed as 'just' resources, which fails to identify the nuances of how the resources develop into capabilities. Further, RBV neglects that different resource combinations can conjure similar or exact results that deviate from the essence of competitive advantage (Stinchcombe, 2000).

Having extensively discussed RBV, the theory was selected as it aims to establish competitive advantage and the value of the resources selected for a specific project, both instrumental in this study. Also, other theories can compensate for some of the drawbacks indicated, including the DC, which views resources as capable instruments and also indicated through scrutiny of the nuances that contribute to a capability and subsequently competitive advantage and value.

3.2. Dynamic Capability Theory

As explained in the previous section, dynamic capability theory is a byproduct of the RBV theory, with its characteristics firmly engrained in RBV theory (Teece et al., 1997; Mikalef *et al.*, 2017). According to Teece et al. (1997: 516), DC "is the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments". The ethos of the DC theory is centred on the firm's ability to identify and

manage change, whether externally or internally and consequently foster new competitive advantages for the business through management reaction to coordinate resources and capabilities (Teece et al., 1997).

As a strategic management theory, DC emphasises operational capabilities and dynamic capabilities an organisation has at its disposal. Operational capabilities involve resources that generate an intended outcome with in-built characteristics gained from learning, involving a collaboration of resources. Operationally, capability functions are not limited to (only or mostly) current product offerings alone but also include new product development processes. Ordinary capabilities allow an organisation to achieve a standard outcome and, to a degree, advanced capabilities in performance. Ordinary capabilities can include 1) skilled personnel (in some settings, contractors are included as well), 2) infrastructure, 3) processes, and 4) and administrative coordination. Ordinary capabilities are evaluated through KPIs such as productivity and hours worked, which can be benchmarked on a micro and macro level. However, ordinary capabilities that enable an organisation to be highly competitive are no guarantee for strategic competitiveness as, with time, the 'strong capabilities' may result in dragging organisational performance (Teece, 2016).

On the other hand, DC involves the evolution of ordinary capabilities to advanced operational activities, which involve the formation or coordination to capitalise on the dynamic external environment. DC is focused on ensuring that the organisation reacts decisively and effectively at specific times. This requires a precision assessment of the business environment, especially technological development, managerial astuteness, and employment of dynamic-minded culture. Engrained DCs enable an organisation to profitably reform, discover, and reconfigure resources, assets, and ordinary capabilities to exploit the business environment through innovation and change (market disruption). The external environment assessment possesses opportunities and threats that the organisation should be ready to capitalise on or nullify and subsequently avoid organisational inflexibility. DC can be disintegrated into three clusters which are (Teece, 2016:211):

- The identification, development and co-development and assessment of technological opportunities concerning customer needs (sensing)

- The mobilisation of resources to address needs and opportunities and to capture value from doing so (seizing)

- Continued renewal (transforming).

The process of sensing, seizing, and transforming must be homogeneously applied to the entire organisation to enjoy the full potential of DC. This is most effective with less complex and shallow hierarchies that allow the transmission of knowledge and communication throughout the entire organisation (Teece, 2016).

DC has been discussed to encompass nuances that can embody the essence of its practices, resulting in developing a firm's resources and capabilities. They include organisational learning, the organisational process of exploitation and exploration, the role of dynamic capability with the organisational setup and the organisational capability to absorb new information and react to change (Nielsen, 2006).
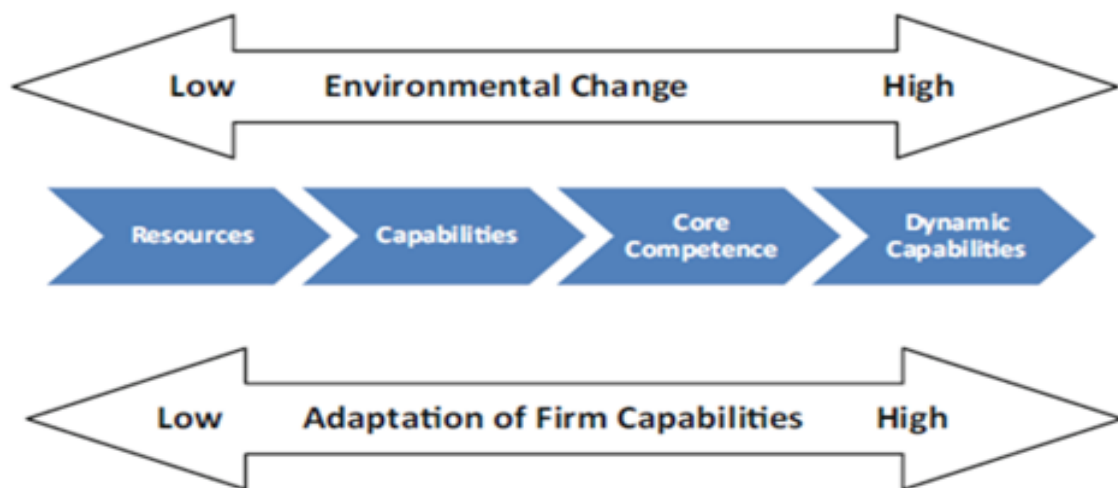
Fig 3.2: Dynamic Capability development (Source: https://ebrary.net/12057/management/conceptual_framework_dynamic_capabilities_media_firms)

Fig 3.2 displays the DC development from resource form to dynamic capability. Low environmental change and adaptation of firm capabilities tend to require the use of resources, and every increment of either will subsequently require an evolution of resources into capabilities. A collection of resources creates organisational capabilities where environmental change and adaptation of firm capabilities also steadily rise as the organisation would be able to adapt to change in the business environment and forge

organisational capabilities due to the agility of the resources. The identified capabilities are assessed to establish key capabilities and represent critical components the business has in its arsenal. The organisation's ability to quickly reconstitute the core capability with bridge dynamism, therefore, improves the general competitive advantage of the organisation (Božič & Dimovski, 2019; Mikalef et al., 2020; Teece, 2016, 2018; van de Wetering et al., 2019).

3.2.1. Sensing, Seizing and Transforming (SST) Model

The SST is a further decomposition of the RBV from Teele's DC, where the role of DC is specified into three pillars: Sense, Seize and Transform. As explained in the previous section, DC is a strategic management tool tasked with monitoring the internal and external changes in the business environment and facilitating change by deploying the necessary capabilities to achieve the desired conclusion. This process can be encapsulated into SST where 'sense' signifies the identification of possible opportunity or threat and, from an IS perspective, requires large volumes of information to ascertain a definitive factor of interest for the organisation.

According to Teece et al.'s (1997) DC framework, 'seize' refers to the collaboration and elucidation of information to enable effective decision-making to influence the dispensing of necessary resources to enact the decided strategy. 'Transform' entails the creation, reformation, or reconfiguration of ordinary capabilities to endorse the decision of the strategy selected by strategic management (Teece et al., 1997; Torres et al., 2018). DC as a theory has become very instrumental in BV studies as it has been consistently applied to establish the aspects that facilitate value creation. The success of DC has allowed for a further conceptualisation of the theory, resulting in the emergence of SST, structured on a step-by-step process involved in DC (Teece et al., 1997).

As a complement to the RBV, the DC plays a crucial role in compensating for the shortfalls of RBV. The shortfall is the stagnated assumption that resources and capabilities never change but remain in the same state perceived at the time. With the aid of SST, the DC will explore how organisations adjust to change and capitalise on any pending opportunities or neutralise threats. Furthermore, DC is among the most used theories to establish how BV is achieved from BI, underscoring the necessity to include the theory in this study.

3.3. Technology, Organisation and Environment Framework (TOE)

This is a framework designed by Tornatzky and Fleischer (1990) to establish the effectiveness of adopted technology (new and existing technology) within organisational factors (encompassing organisational size, scope, and managerial structure) as well as environmental factors (industry size, competitors, regulatory environment (Lautenbach et al., 2017). Due to its adaptability in IS literature, the TOE framework has been greatly applied in multi-disciplinary literature, where the focus was on technology adoption in organisations (Lautenbach, Johnston, and Adeniran-Ogundipe, 2017; Verma and Bhattacharyya, 2017; Paradza and Daramola, 2021). The TOE framework has been widely used to evaluate technology adoption in firms (Wang, Wang, and Yang, 2010; Ramdani, Chevers, and Williams, 2013; Wang et al., 2016).

3.3.1. Technological context

Technology context involves existing technology suitable for an organisation and new technology a business can employ within the frames of the firm (Wang et al., 2016). Despite the technological context involving new and existing technology a firm can employ, it also includes other important characteristics, including relative advantage, compatibility, complexity, trialability and observability. Relative advantage is where the technological innovation employed provides more benefits to a firm than current technology, influencing technological adoption. Relative benefits can include improving business growth, performance success increment, and reducing operating and administrative costs, which all play a vital role in influencing technological adoption (Wang et al., 2013). These characteristics are similar to the 'forms of BV' discussed in the previous chapter, reaffirming this framework's necessity as a theoretical reference in the study.

Wang et al. (2013) explain compatibility as the alignment between technology and the ethos of an organisation, such as business values, the firm's history and perceived relationship to the adopter's needs which can influence the operational processes within a firm, possibly fuel resistance in users. Complexity is the level of perceived difficulty associated with adopting and using technology which can heavily influence the continuity of use of new technology within an organisation. Trialability involves processes focused on the periodical experimentation of technology, allowing an organisation to assess whether a technology can be relevant to their organisation and operating environment. Observability includes presenting results to stakeholders (Wang et al., 2013). All these

factors are instrumental in considering technology in businesses hence the necessity to apply these standards to BI value assessments.

3.3.2. Organisational Context

Organisational context includes operations centred on the organisation itself, particularly its stature and relationships with functional departments relating to sharing information, leadership and control strategies, internal and external networking connections, and organisational readiness (Angeles, 2013). Additionally, the influence of top management is crucial as it determines the level of commitment to various ICT projects an organisation has at a point in time, resulting in the identification and dispensation of organisational resources. By posing a clear objective of the firm's strategies, values and comprehension of the mediating role of technology, management can ensure the attainment of their respective BI goals.

Cross-functional teams play a special role in formulating an innovative vision and constantly conveying a unilateral message of technological and innovative necessity within an organisation (Angeles, 2013). Furthermore, an organisation adopting new technology should possess the experience to adopt ICT technology as a prerequisite. Ramdani et al. (2013) highlighted that firm and determined organisations might be swayed from adoption if they lack the knowledge and experience of adopting new technology. The authors also add that an organisation's size is instrumental in adopting new technology, as larger-sized organisations determine the resources available to partake in such a project, process the necessity for new technology, and have the skill and experience to adopt and implement new technologies. ; Larger firms are more likely to survive the financial burden of failed technology adoption.

3.3.3. Environmental Context

Environmental context surrounds the competitive pressures of being a non-adopter and the subsequent risk posed by mediocre performances and loss of market share. Other environmental factors can be compartmentalised under innovation diffusion, information needs perspective, and critical mass and information intensity (Wang et al., 2016). Essentially, the environmental context encompasses the macro environment of the business and the posturing influences and stakeholders such as competitors (as mentioned earlier), customers, suppliers, government and community, to mention a few. Angeles (2013) affirms this point and adds that the mentioned stakeholders strongly

influence an organisation's adoption decision-making and can easily disrupt the adoption process in various ways. For instance, a government can deploy legislation that can restrict or constitute a technology to become expensive or unreachable to attain (Angeles, 2013). The environmental context also includes market scope, as a certain market would require an organisation to navigate through complex legal and cultural issues which facilitate technology adoption. Additionally, external ICT support heavily influences ICT adoption and success as the availability of implementation and user support is critical, cementing the influence of third-party support in ICT sectors (Ramdani et al., 2013).

Since this study was centred on organisations, the TOE theory will establish and assess the interaction of BI with the different business environmental sectors, which will provide a profound enlightenment on the area of interest. As with the other theories listed above, TOE has been consistently applied in previous studies as a crucial element in understanding the BV generation phenomenon. Additionally, despite TOE being limited by individual assessment bias, since information is from the host organisation's perspective (Li, 2020), the TOE framework will also benefit from the collaboration with other theories which possess facets that can eliminate bias through validation.

Table 3.1 below discusses theories employed in BV studies over the years, which better justifies the application of the selected theories in this study in conjunction with the research question to be answered. Further, studies that applied these theories are outlined to provide some reference for applying the theories selected for this study, thereby justifying the use of the respective theories.

Table 3.1: Theoretical Framework adoption reasoning

Theory	Research Objectives (RO) Targeted	Key Theory Constructs	Similar Application In Journals
Resource-Based View (RBV)	RO1	Competitive Advantage, Value, Resources	Işik, Jones and Sidorova (2013); Ji-fan Ren et al. (2017); Fosso Wamba, Akter and de Bourmont (2019); Mishra et al. (2019); Wang et al. (2019)
Dynamic Capability theory (DC)	RO1. RO3	Operational Capability, dynamic capability,	Shanks and Bekmamedova, (2013); Gupta and George (2016); Božič and

		resources, competitive advantage	Dimovski (2019); Wang, Zhang and Zhang, (2020)
Technology-Organisation-Environment (TOE)	RO2 & RO3	Adoption	Lautenbach, Johnston and Adeniran-Ogundipe (20170; Verma and Bhattacharyya (2017); Ain et al. (2019); Yadegaridehkordi et al. (2020)
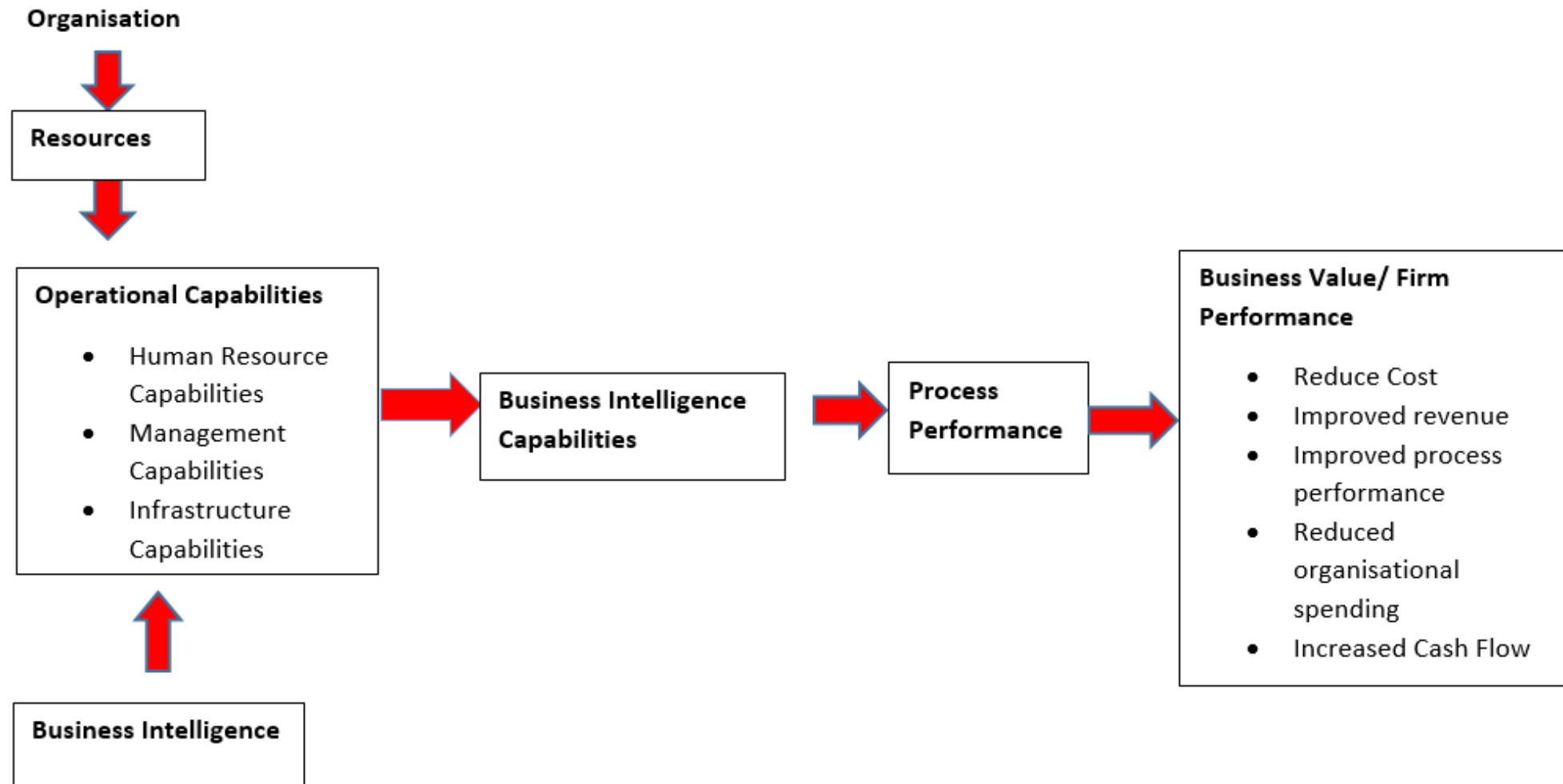
Fig 3.3. Conceptual Framework of the study (Source: Researcher)

The conceptual framework in Fig 3.3 illustrates the key concepts for generating BV by adopting BI, starting from the organisation. This encompasses the resources the organisation possesses, not to mention the organisational capabilities of the organisation. Additionally, the overview shows the operational capability and how they are influenced by technology which in this case is BI. The operational capabilities infused with BI form BI capabilities which, through the application DC allow constant monitoring of change and later adoption of the change resulting in operational reengineering, depending on need (aspects indicated through the internal and external analysis of the environment and business). Based on the insight generated, firm performance should subsequently result in BV.

The conceptual framework was applied to this research to help provide varying perspectives of the data and provide a trajectory to how BI aids in realising BV from a literature perspective. It also presented relationships between variables and how they interact to create new components, such as the infusion of BI and operational capabilities. This is critical to the realisation of BV as those components enable the effective application of BI to generate the much-anticipated BV (van de Wetering et al., 2019).

3.4. Chapter Summary

This chapter identified the theories selected, provided justification for the selection and discussed the nature of the theories as presented in previous studies. The chapter also provided a conceptual framework of the key concepts associated with this study and how they interact with each other to realise BV.

Chapter 4: Methodology

This chapter discusses the methodology adopted to achieve the aim of this study, which is to understand the influence of BI on the operational capabilities of organisations in South Africa. The structure of this chapter is based on the research onion by Saunders et al. (2019) to provide a coherent presentation of the methodological processes adopted.

As such, the chapter is segmented into 1) Research philosophy, 2) Research Approach, 3) Methodological Choice, 4) Strategies, 5) Time Zones and 6) Technique and procedures.

4.1. Research Philosophy

Philosophy plays a crucial role in academia in various ways. However, the benefits of philosophy are constantly questioned and can be testified by the questions possessed by Hughes (1990), where he argues, "…what is it about the philosophy that gives it this seemingly vital role in human intellectual affairs? Is this a contingent fact of our intellectual history or is there some distinctive about the philosophy that gives it an authoritative place?".

The significance of philosophy in research is encapsulated by the statement above. Frank (2013) attempted to answer the question by explaining that the effect of a simple philosophical question can generate confusion and misapprehension in our minds, therefore, showing the impact philosophy has on understanding a phenomenon that inspires critical reasoning to be applied. The author continues to explain that understanding one's personal belief contributes to a better research study and allows for better comprehension of philosophical issues, given that most people do not apply such reasoning daily. This is especially so regarding the interrelatedness of ontology, epistemology and methodology investigations. This research employed an interpretivist philosophy, usually affiliated with qualitative research, where the researcher subjectively draws meaning from the area under investigation (Saunders et al., 2019). Simply, interpretivist philosophy is the notion that humans create reality and meaning from it, and due to the interactional complexity, the means of understanding them should be different to that of physical material.

Furthermore, the interpretivist philosophy aligns with this research as it involves the study of humans and their interaction with the world around them. For instance, this research examined the application and value creation of BI within operations, which involved

understanding the role of BI capabilities within the various systems, resulting in the realisation of BI yield (Saunders et al., 2019). This, as a result, indicates the dependability of the research on social actors to provide meaning (by explaining BI-infused systems and establishing nuances that influence BV creation).

4.1.1. Ontological Stance

The ontological stance of this research is subjectivism, explained by Saunders et al. (2019), who state that it "incorporates assumptions of the arts and humanities, asserting that is the social reality made from the perceptions and consequent actions of social actors (people)" (pp: 137). Subjectivism entails the influence of social actors on each other and the world around them to deduce understanding based on one's personal experience and comprehension of reality.

Subjectivism was the appropriate ontology for this study because understanding the nuances that generate BV from BI required a flexible understanding from various angles of investigation. According to Saunders et al. (2019), subjectivism requires constant revision of the phenomenon since accounts are generated from various actors. Subjectivism was most appropriate to achieve understanding and the subjective nature of analysing procedures, one of the processes used to understand BV realisation better.

4.1.2. Epistemology of the study

Subsequently, the epistemological posture of the study involved an interpretivist epistemology which can be explained by differentiating between human and physical influence on the world under study, where the former can influence the environment under investigation. At the same time, the latter has minimal influence on the world around it (Saunders et al., 2019). Furthermore, the governing belief of interpretivist epistemology is that there is no universal framework that can be applied in all scenarios. As such, it is important to conduct understanding on a scenario-based basis where social actors at a given time, space, and situation can understand a situation differently from another time and space (Saunders et al., 2019).

An interpretivist epistemology was selected for the study as it aligns with subjective ontology. Furthermore, since the study aimed at extracting understanding, the source of information was from social actors, compounding the necessity of applying an interpretivist epistemology in this study to understand what was going to be achieved by

acquiring different accounts from different actors at different times so that rich information could be obtained.

4.2. Research Approach

Inductive reasoning is when information is gathered to generate a theory about an area of interest. It is commonly applied to qualitative research, where subjective reasoning is required to generate a possible truth about the area of interest (Saunders et al., 2019). This is in line with the subjectivist ontological nature of this study which dictates that the aim is to understand how organisations generate BV through the influence of BI on operational capabilities. By applying inductive reasoning, which allows the researcher to deeply understand the topic of BI and the operational capabilities of organisations, a theory can be generated to explain how BV is attained.

4.3. Methodological choice

This study is qualitative since the aim is to understand the phenomenon that does not need to rely on quantitative information to comprehend, rather accepting multiple facets of subjective truth. Qualitative research observes participants and their interaction with each other to understand an area of interest (Saunders et al., 2019)

Additionally, the nature of qualitative research detects the excavation of meaning from participants and understanding of the relationships between them (Saunders et al., 2019). More specifically, the study adopted a multi-method qualitative study as the research employed two methods of collecting data: in-depth interviews and focus groups.

4.4. Research Strategy

The research strategy adopted for this research was a case study, and the definition of a case study, according to Yin (2018, p. 270), is divided into two crucial parts; where he describes it as "an empirical method that:

- Investigates a contemporary phenomenon (the "case") in depth and within its real-world context, especially when

- The boundaries between phenomenon and context may not be clearly evident."

The two-part definition can be explained by indicating how case studies allow the examination of a phenomenon within its setting which is to various degrees not the case in other types of research. This enables a researcher to harvest rich and in-depth information about a 'case' since the phenomenon would be observed in its environment

and context. Furthermore, relating to the second part of the definition, it is difficult to differentiate the case and the context within a real-life scenario, which requires other methodological influence (Yin, 2018).

This reason specifically shows why the case study strategy was adopted as it allowed for an assessment of a case within its environment and, importantly, allows for the excavation of rich and in-depth information about how BV is realised from BI adoption in South African companies. Various case studies can be adopted. However, for this thesis, a multiple case study was employed. A multiple case study involves the same occurrence occurring but in different places (Yin, 2018), which was the case for this thesis, where each of the three cases involved was examined to determine BV value through the analysis of the organisational BI operational capabilities. This allowed each organisation to become a 'case'.

4.4.1. Types of Case studies

Two types of case studies are commonly used in academic research, namely single and multiple case study, which are further decomposed into other variations within their selected prefix (Yin, 2018). Fig 4.1 illustrates the types of case studies occasionally adopted in academic studies.
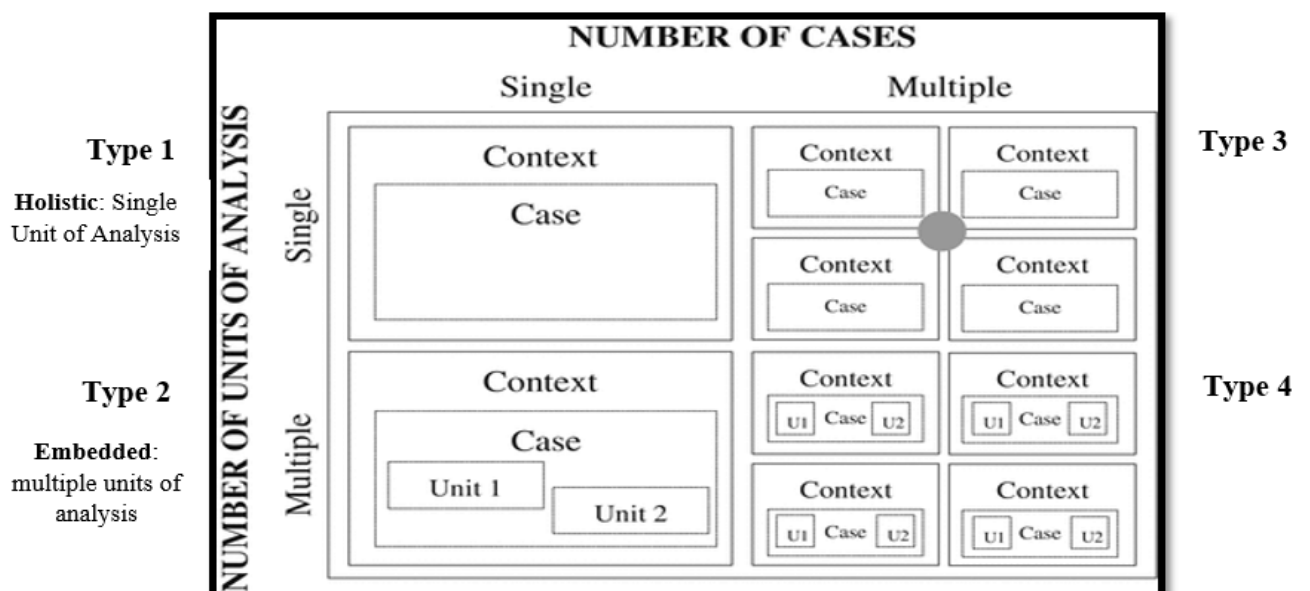
Fig 4.1: Types of Case Studies (Source: Yin. 2018)

4.4.1.1. Single Case Studies (Type 1 and 2)

According to Yin (2018), there are five variations of single case studies. They include critical, unusual, common, revelatory, or longitudinal. Single case (Type 1) study normally represents a single experiment setting, meaning that the reasons used to justify a single experiment can be extrapolated to justify a single case study. Additionally, theory or theories adopted should heavily influence the single case study to select as they form the platform for selecting the 5 forms of single case studies.

In a critical case scenario, the case study assists in confirming or denying the theory's validity by analysing the propositions set for or by the theory. This confirms the case as critical, as it becomes the pinnacle of the research investigation to shape the future research trajectory. An extreme case involves a rare or unusual instance or occurrence that necessitates documentation due to the rarity of the situation. An example would include an investigation into rare disorders or injuries in clinical psychology where a once-off instance dictates the need to understand a medical phenomenon better. Contrarily, in common case scenarios, investigations are centred on the common, everyday occurrence that requires investigation. For instance, a case of students at a university. A revelatory case occurs when previously the researcher could gain access to a specific group of people for various reasons. A longitudinal case is where an inquiry is conducted at various points in a case to establish growth or any other form of change that would have taken place in-between the identified timeframe (Yin, 2018).

In certain instances, a single case can have multiple units of analysis; for instance, a case can be a project, and within this project, a researcher can choose to investigate other collaborating sub-projects that contribute to the main project, thereby making the case single embedded (Type2). It is imperative to note that sub-units should constitute part of the main case study. Single-embedded cases provide a sense of focus and direction in research in which a single case study may lose trajectory. However, single-embedded cases can also focus on subunits resulting in the neglect of the other subunits within the case (Yin, 2018).

4.4.1.2. Multiple Case Studies (Steps 3 and 4)

Multiple case studies have surged over the last few years, and they represent situations in research with more than one case to illustrate or investigate to gain understanding (Yin, 2018). An example of a multiple case study can include examining teaching practices

between two small schools. An important attribute that makes multiple case studies indispensable is the ability to validate findings through cross-case analysis making the research outcome compelling compared to single case studies. Inversely, multiple case studies also have drawbacks in the form of resources required to execute such a magnitude of research. Due to the multiple cases, more time and human resources will be required to excavate the meanings required by the objectives, resulting in costly research (Yin, 2018).Gustafsson (2017) adds to the benefits of multiple case studies by explaining that the data from multiple cases allows the researcher to compare, leading to the verification of information. Moreover, this leads to stronger theoretical propositions and affirmed research questions.

Due to the benefits discussed above, multiple case studies were selected to affirm the findings depicted in this study. Since qualitative research struggles to establish validity and reliability, and according to Golafshani (2003), the two are interlinked as establishing one will result in the affirmation of the other, which, through multiple case studies, all can be achieved through this strategy.

4.5. Data Collection

Data for this study was collected using two qualitative techniques, namely, in-depth online interviews via Zoom and focus groups. They both possess unique capabilities that allowed the study to attain rich and in-depth information about the area of interest (i.e. understanding how BV is generated from assessing the influence of BI operational capabilities). The data collection process used key informants who are personnel familiar or regularly involved with the area of interest within a given organisation (case) and occasionally within the middle to top management of an organisation (Torres et al., 2018). The data was collected from May 2021 to September 2022. Scheduling delays affected the latency of the process.

4.5.1. Zoom Meetings adoption in Data collection tools

Due to the COVID-19 pandemic, face-to-face data collection tools had to be reoriented to accommodate the Personal Protective Equipment (PPE) standards set by the government and the various organisations participating. As such, innovative means needed to be adopted to align with the government mandate and that of participating organisations, bringing the Zoom meeting came into play. To avoid contact with participants, the Zoom app was used to communicate between the researcher and

respondents. Through this, the researcher maintained a healthy social distance and effectively conducted in-depth interviews and focus groups.

4.5.2. In-depth interviews

Interviews are intentional conversations between an interviewer and interviewee on a subject of mutual interest. The interviewer asks clear and precise questions about the area of interest, and the interviewee attempts to answer the question as honestly and transparently as possible. Commencing an interview with a good rapport creates a strong platform for an insightful interview, as the interviewee would feel much less anxious or intimidated. Careful listening allows the interviewer to analyse the interviewee's rhetoric, identify points of interest, and affirm meaning (Saunders et al., 2019).

This research adopted an in-depth interview technique, also called unstructured interviews, where the nature of the interview is informal and unplanned. Using unstructured questions, the possibility of attaining rich and in-depth data increases as the interview is guided by instinct over certain key areas of interest using follow-up questions. The unique feature of in-depth interviews is the notion of following a liberal structure in asking questions compared to using guided and prompted questions which forces a change in the data trajectory (Saunders et al., 2019).

Given that the research aimed to understand the distinctions of value creation better, in-depth interviews allowed respondents to freely explain their thoughts without restriction, thereby enriching the quality of data. Due to the liberal nature of the discussions, this approach encouraged respondents to fully explain their meanings, which helped demystify complicated questions and concepts.

4.5.3. Focus Groups

Focus groups are more of a group form of in-depth interviews where instead of conversing with an individual, a group of related people, either through duties, approach or influence on the areas of interest, are interviewed and are allowed to bounce ideas off each other and facilitated by a moderator (interviewer) to ensure the conversation maintains direction and clarity. As a result, focus groups tend to generate insightful data as respondents are reminded and encouraged about areas of the phenomenon they might have omitted in a different scenario, such as an interview (Roller & Lavrakas, 2015; Saunders et al., 2019).

Because of these capabilities, the focus group data collection approach was adopted for this study and for the respondents' convenience. It was challenging for the researcher to

schedule three separate meetings, and the various participating companies' 'key informants' were short for a time, as preparations for the festive seasons were underway and forced the adoption of focus groups. Using focus groups, the interviewing process was simultaneously conducted, saved from the respondents' perspectives, and, as explained in the previous paragraph, allowed for much more detailed data.

This method was applied to Company B as it allowed a flexible interviewing schedule for the participants and inspired open and in-depth discussion about BV from BI. The focus group comprised all five participants from the case, including the Head of BI, the operational manager and team member, and BI analysts.

4.5.4. Pilot Study

Pilot studies were conducted to ensure that the in-depth interviews and focus group data were relevant and to an appropriate standard that safeguarded the attainment of set objectives. Before administering the in-depth interviews and focus groups to the main case studies selected, pretesting was conducted on an incomplete respondent set. Where, for instance, all three functional-level key informants were unavailable for questioning, the case was used to assess the quality of the questioning, which improved the overall data quality during the actual data collection. Feedback from the pilot studies indicated any anomalies and weaknesses in the in-depth interview questions (Abousheishaa et al., 2022).

4.6. Unit of Analysis and Observation

The unit of analysis of the study was organisations that employ BI within their operations from all levels. All facets of production are supposed to be influenced or guided by BI analytics. Furthermore, the organisation needed to employ at least 500 employees and generate an annual turnover of at least R51 million. These benchmarks were imperative because data size and quality capabilities rest mostly with larger organisations, as smaller institutions might lack the resources to sufficiently support such initiatives (Llave, 2018).

The unit of observation included users of BI analytics, from strategic practitioners to operatives, so that the extent of the BI influence can be realised from a comprehensive approach. The social actors included BI analysts, engineers, operational managers, functional managers, and regional or national managers. These highlighted participants play a crucial role within their organisations in applying BI within the spectrum of their duties and responsibilities and are more familiar since they frequently use the tool.

Obtaining data from the outlined participants ensured that the data collected was relevant, accurate, and detailed so that better understanding could be achieved.

4.7. Sampling

The study adopted a non-probability sampling approach in which the chance of selection is unknown and difficult to apply to cases where statistical confirmation is required (Saunders, Lewis and Thornhill, 2019; (Wolf et al., 2016). Within the spectrum of non-probabilistic sampling, convenience and snowballing sampling were adopted. Convenience sampling is where no particular sequence is applied to select a sample, but the availability of appropriate samples determines the selection. Snowballing encompasses identifying a primary sample and then using the primary sample to identify the next sample that meets similar parameters as the first. This process repeats itself until referrals track back to the initial sample (Saunders et al., 2019; Wolf *et al.*, 2016).

These sampling techniques were instrumental in obtaining the respondents of this study. The inability of limited organisations to qualify against the set benchmarks and the difficulty of accessing the key informants resulted in the selection of the candidates who qualified to participate in this research. This study benefited from identifying willing participants that met the criteria mentioned above (convenient sampling) while using these willing participants helped to identify or recommend other possible participants who were keen on participating (snowballing).

4.8. Ethical Considerations

All participants of this study were informed of their rights before participation, and the following areas were explained:

- Participants had the right not to answer questions they felt uncomfortable answering.
- The respondents were free to decline further participation in the study at any point of their choosing.
- The respondents were also informed not to participate or answer questions that could harm them professionally or otherwise or impose on their privacy.
- The set objectives of the study were to be maintained; no new objectives were to be employed at any point during or after participation.
- Participants had the right to leave at any point during the interview or focus group.

- Holding to the right to ask questions helped them better understand the purpose of the study or the objective of the questions asked.

- Information collected was kept in an encrypted and undisclosed database to which only the researcher and supervisor had access.

- Furthermore, the anonymity of all participants was upheld, and code names were designated in place of actual names (Saunders et al., 2019).

- Respondents were allowed to ask the question and gain clarity on any they felt was not clear, as well as discuss the impact of participating in the study

Respondents were allowed to ask questions, gain clarity on anything they felt was unclear, and discuss the impact of participating in the research.

4.9. Validity and Reliability of the study

Reliability can be explained as consistent outcomes over time about a phenomenon under investigation by adopting similar methodological processes (Golafshani, 2003). In principle, reliability explores the ability of the outlined research process to generate the same or similar outcomes. Validity is described as a means to determine the level of the truthfulness of the results of a study through, in some instances, asking varying questions to re-establish similar results (Golafshani, 2003; Kirk & Miller, 1986).

Reliability and validity can be difficult to establish in qualitative research because of the generally liberal nature of qualitative research. Therefore, (Golafshani, 2003) points out that any qualitative research establishing reliability or validity is of no importance; however, more suiting words such as dependability and trustworthiness can replace the reliability and validity of a study. Furthermore, as important as validity is to quantitative research, it is equally important in qualitative research, but it is not easy to prove. With this said, Creswell and Miller (2010) suggest that validity should be established by the researcher's ethos, which subsequently requires the researcher to continuously consider the level of validity while designing a research methodology.

This study was conducted with the highest quality and ethics. Every detail described and explained in this study is accurate and of the highest degree of honesty and transparency.

4.10. Data Analysis

Qualitative data analysis embodies examining qualitative data (data that cannot be quantified) to derive meaning (Thorne, 2000). The meaning of the qualitative data for this

particular study was harvested using thematic analysis, which, according to Saunders et al. (2019:651), is a flexible means of analysing qualitative data through a coordinated and accessible approach to data analysis. Thematic analysis is useful in either case where the data is to be analysed in large quantities and otherwise. It helps generate rich information and insight. Braun and Clarke (2006) recognised a six-step process of how to use thematic analysis, and the steps encompass 1) Comprehension of large qualitative data; 2) An amalgamation of related themes from different transcripts into one; 3) The processing of data to identify key patterns for further examination 4) Produce a thematic description of these data sets; 5) Develop and test explanations and theories based on apparent thematic patterns or relationships; and 6) Draw and verify conclusions (Saunders et al., 2019).

Thematic analysis is flexible enough to accommodate any research paradigm, including induction, deduction or abduction (Saunders et al., 2019). The Atlas ti software tool was adopted to assist with the execution of the thematic analysis, and it helped by efficiently organising and creating patterns and themes of the data (ATLAS.ti, 2022).

4.10.1. Data Analysis stage 1

The first data analysis stage was mainly to allow the researcher to familiarise himself with the data set, as Braun and Clarke (2006) indicated.

4.10.2. Data Analysis stage 2

The data set was first transcribed from voice and video (since the data collection was conducted via Zoom Meetings) to text before incorporating the data into Atlas ti. The computer software then formulated relevant themes from the data sets, which helped the researcher understand the information presented. Further, after the Atlas ti had generated themes, the next step was for the researcher to develop themes that were omitted by the computer software which were significant enough to be included in the theming process. The significance of the theme depended on the role of the data to the BI influence on BV context or, in certain instances, was often mentioned by respondents. The themes were applied using a deductive reasoning perspective where specific themes were preselected for the data analysis based on the primary theories adopted for this research (Saunders, Lewis and Thornhill, 2019). The predefined themes were conjured from literature mentions and the conceptual framework presented in Fig 3.3.

4.11. Chapter Summary

This chapter covered the methodological process adopted to acquire the data. It covered the research philosophy, approach, methodological choice, research strategy, data collection, unit of analysis and observation, sampling, informed consent and confidentiality, and data analysis.

Chapter 5: Description of Selected Cases

This chapter discusses the cases selected for the study so that a clear depiction of the investigated cases can be gained. The chapter describes the cases (organisations) selected for this study, company ethos, structure, workforce capacity and the justification for selecting the cases.

5.1. Descriptions of the Cases

The names of organisations participating in this study will be reserved per the agreement of conduct with the participating institutions. This, therefore, means that the actual names of the organisation shall not be disclosed in the documents or other material linked to this study. The participating organisations were given code names, namely, Company A, Company B and Company C.

The description of the companies is presented below for a crystallised understanding of the cases.

5.1.1. Company A

Company A possesses a significant investment in technology across its functional levels and locations across the world. For the sake of this thesis, the technology discussed in this chapter will be centralised on BI adoption and use. The organisation uses BI in its daily operation influencing operational execution through support from the state-of-the-art infrastructure. The state-of-the-art technology is focused on providing easy-to-use technology which can help to improve service delivery and impose efficient operations. The technology is also directed to ensure higher security features for organisations and their clients throughout the various offering ranges. Equal emphasis is also placed on operators of this technology, where the company broadens skill sets and reinforces ethos related to innovative thinking and capability. The company specialises in both radical and complementary development of technology. Furthermore, as a well-established corporation, Company A is a leader in technological development, which therefore deems the organisation to be classified as a 'technology pusher.'

Company A is a multi-national corporation with branches across Africa. Offering telecommunication solutions in various sectors, Company A offers high-quality products and services in its market, branching from telecommunication devices to service delivery, enabling the devices' functionality. The company employs over 6000 people worldwide and possesses an asset holding of more than R50 billion and total equity of over R100

billion. Furthermore, the company achieves an average annual revenue of over R70 million in South Africa. As a multi-national, Company A has locations around Africa. However, the main headquarters are based in South Africa, where most strategy formulation, business vision, and direction are formulated and coordinated.

The telecommunications industry in South Africa was audited to be worth around R148.8 billion in 2016, and since then, it has grown larger with a value increment of 1% annually. Mobile data services experienced 25% growth per year, thus exhibiting significant growth. The industry was experiencing a shift from fixed to mobile data line connectivity, with 77% of the revenue in 2018 being accredited to mobile services *(The Telecommunications Industry and Retail of Devices in South Africa: South Africa, 2021)*. The industry is highly competitive and dynamic, reinforcing BI and BI infrastructure adoption and development. However, the product offerings tend to be similar to most telecommunication companies offering voice and mobile data as well as device sales, satellite offerings and infrastructure setups (The Telecommunications Industry and Retail of Devices in South Africa (South Africa, 2021).

5.1.2. Company B

Company B is a leader in innovation within its industry, spearheading progressive techniques such as mobile payments and branching out from customary retail trading to online product offerings. Through the advancement of this technology, the company has managed to save costs and improve customer service delivery, resulting in increased turnover. The company also has technology-based offerings such as money transfers worldwide, and a well-established customer loyalty programme. The organisation has adopted BI within its operations in the different divisions dedicated to various objectives of the business offerings. As such, BI is adopted at all levels of the organisation, which affirms the necessity of including the organisation in the study.

Company B is amongst the leading retailers in South Africa, with a workforce of over 50000 people and an average annual turnover of R70 million. The company commands an annual growth of over 3%, which is substantial given the industry's complexity and competitive nature. As with Company A, Company B is also influential beyond the borders of South Africa, with operations across the continent. The company offers various retail commodities, further broadening the organisational influence and revenue-generating capability, including products such as groceries, liquor and money transfer facilities.

Likewise, regarding structure, the main operating base is South Africa, with subsidiaries directed from within. The company maintains a healthy, sustainable operation by focusing on recycling material used for packing, which helps reduce costs and aid the environment to remain viable for human habitation.

The retail industry in South Africa is highly competitive though monopolised between five key players who constitute around 60% of the market share. However, despite commanding a much smaller market share, smaller retailers play a pivotal role in the market's progression. The South African retail industry can be classified within two stratospheres, namely, formal and informal sectors. The formal retail business is characterised by the operating structure where all functions and operations are legally grounded (within the South African context) and registered with the South African Revenue Services (SARS). In contrast, informal business structures sometimes operate outside the legal structures endorsed by the government. 70% of the industry comprises formal retail businesses, while only 30% constitute informal ones. The formal sector includes a business model encompassing franchising, public and private companies, and corporate and independent ones with a larger share of the total participants (Masojada & Hameli, 2018). Due to the COVID-19 pandemic, the industry realised a 66% growth in 2020 in online sales (Daniel, 2021).

5.1.3. Company C

Company C is focused on a digital-centric philosophy where technology guides reason and ambition. All operations are orchestrated and grounded on information attained through various technologies, which then directs to where the organisation should improve. This digital philosophy also influences the type of personnel the organisation seeks and the conceptualisation of the other resources required to achieve the set goals. This is achieved through a diligent analysis of the organisation's competencies and otherwise incompetence which then drives the movement to acquire resources and capabilities that satisfy the outlined need. Further, the company seeks to establish a self-dependent ecosystem bound by the advancement in technology and utilisation of resources to set new trends that will aid in the realisation of set objectives.

Company C boasts a workforce of more than 45000 employees in more than 18 countries across Africa and Europe. Its development was a by-product of over decades of persistent establishment on the JSE, where the organisation has succeeded. In South Africa,

Company C represents one of the founding banking institutions that focuses its strategic purpose on developing the African continent through sustainable infrastructure, educational development, and environmentally friendly operations.

Company C has established a three-segment system to sustain its operations which involve consumer and high-net clients, business and commercial clients and corporate and investment banking. These target segments represent a diversified portfolio that ensures that the company footprints are recognisable in all necessary facets of society. This, along with the application of various technologies, allows for the customisation of products that appeal to the specific customer segment, resulting in customer loyalty and repeat business. This is evident when reviewing the customer asset capability of the bank, which has the company identified as the largest asset lender in South Africa.

The South African Reserve Bank (RBSA) governs the banking sector and protects the local currency by controlling inflation and stabilising the demand and supply of the local currency in the market. Despite the RBSA being an independent entity separate from the government, it works closely with the Treasury to establish legislation and influence the country's macroeconomic policies (US Library of Congress, 2022).

In the 1950s, the South African banking sector was multi-dimensional, where most banking activities such as house lending, personal loans and credit card facilities were commissioned to commercial banks. After the era, the private banking sector boomed, and discount houses, merchant banks and general banks emerged to contest the mentioned facilities. As a result, this created a race to control this market by restructuring commercial banks to accommodate medium-term lending. The commercial banks' movement escalated into further diversifying their product offering, and insurance policies became the new status quo (US Library of Congress, 2022).

The banking sector is predominantly controlled by the 'Big Five' banking institutions, namely ABSA, FNB (formerly known as Barclays Bank), Capitec, Nedbank and Standard Bank. However, in the 1980s, different institutions controlled significant parts of the market, such as Volskas and Trust Bank (US Library of Congress, 2022).

5.2. Justification of the cases

The selected cases (Company A, Company B and Company C) all possess a workforce of at least 500 employees, all with significantly more employees and attaining a turnover of at least R51 million. They are also listed on the Johannesburg Stock Exchange,

reaffirming their status as 'large' organisations. Additionally, all three companies possess the infrastructure and resources to effectively employ BI and attain BV from the system operation employed.

As explained in the previous chapter, the three organisations were selected because of convenience, referral (snowballing), and BI-capable infrastructure. The organisations have engrained BI operations to improve operations and achieve firm performance to various degrees.

5.3. Chapter Summary

This chapter describes the cases selected for investigation and the justification for selecting the cases for this research.

Chapter 6: Data Analysis and Findings

The purpose of this chapter is to present the data analysis and findings from the data collection process. The findings are based on case studies discussed in the previous chapter, which both possess a substantial equity capability and have functional BI capability infused with the operational functions. The data collected represent the thoughts and opinions of the informants on their respective organisations' adoption and value creation of BI through the examination of BI-embedded operations.

The chapter is structured on three cases that provide a detailed presentation of the findings from each. The sequence of information is based on the format of questions used during the data collection process. Furthermore, before the briefing on the data collected, a section of the chapter will explain the fieldwork and justify the selection of the key informants.

6.1. Field Work

Due to the COVID-19 pandemic, the course of this study was forced to diverge since Personal Protective Equipment (PPE) standards mandated by the South African Government had to be implemented in all facets of society. Furthermore, in fear of the spread of the pandemic and mitigating the constant rise of COVID-19 infections, the researcher opted to conduct the data collection process through Zoom Meetings. Zoom Meeting is a video conference application that allows real-time video communication between two or more parties (Zoom, 2021). Using this app, the researcher ensured the PPE-mandated protocols were upheld, and the participating organisations were also protected from possible external infection, which could heavily affect the organisation's operations. The data was collected from June 2021 to August 2022. The delay was due to scheduling issues since the organisations (A and B) were preparing for festive trading. Further, there were issues in securing willing participants for the research as the researcher decided to increase the number of cases to fully conceptualise value creation, which was the case with Company C.

6.2. Key Informants

Each of the three cases provided key informants who are characterised by the following attributes:

- BI Team leaders or coordinators

- Involved in operational execution.

- They were well-informed about the company's operations and ethos, which helped link BI to the rest of the organisation.

- Possessed an in-depth understanding of the organisation's BI dynamics and value creation processes.

Table 6.1 shows the case demographics of the cases selected to illustrate the persona of the entities better.

Table 6.1. Case Demographics

	Case A	Case B	Case C
Company profile	More than 7000 employees and an annual turnover of over R90 billion	More than 50000 employees and an annual turnover of over R90 billion	Over 45000 employees and an annual turnover of over R51 billion
Public Listing	Publicly listed on the JSE	Publicly listed on the JSE	Publicly listed on the JSE
Sector	Telecommunication	Fast Moving Consumer Goods- Retail	Banking Sector
Unit of analysis	organisational processes (entity being studied)	organisational processes (entity being studied)	organisational processes (entity being studied)
Unit of observation	the IT personnel from different levels (inclusive of Top, medium and lower levels) of the target organisation	the IT personnel from different levels (inclusive of Top, medium and lower levels) of the target organisation	the IT personnel from different levels (inclusive of Top, medium and lower levels) of the target organisation
Number of participants	5	6	6

Table 6.2 depicts the position/ role of individual participants in this study within their organisation with a perspective on their sustainability and understanding of the subject matter, which is the attainment of BV from BI.

Table 6.2: Case study participant occupational distribution

Occupations	Company A		Company B		Company C	
	Level in the organisation	Number of participants	Level in the organisation	Number of participants	Level in the organisation	Number of participants
Head of Business Intelligence	Top Management	1	Top Management	1	Top Management	1
Data Analysts	Strategic and Operational	2	Strategic and Operational	3	Strategic and Operational	2
Operational Managers	Strategic and Operational	2	Strategic and Operational	2	Strategic and Operational	3

The respondents that participated in this research were assigned code names to maintain their anonymity. The code names include the abbreviation of the organisation they represented with the order in which the information was added to the study. For instance, a respondent from Company A, first mentioned in this study, is named R (Respondent) OA (Company A) and 1 (first respondent), making it ROA1. In instances where the respondents are from Company B, the coding is changed to accommodate the respondent's representation. The same applies to Company C, where the same coding was applied to reference the respondents answering the questions. This involved naming the respondents as 'R', then the organisation, OC (Company C), and the respondent's number as the last element of the code name.

6.3. Description of Findings

6.3.1. Predefined Themes

The predefined themes were selected based on the essence of the three theories adopted for this research: RBV, DC and TOE. The predefined themes embody the aspects of the three theories, which aimed to provide direction on identifying and understanding the nuances that help in the realisation of BV.

6.3.1.1. Predefined Themes associated with RBV for Company A

i. BI Significance to Operations

BI was identified as critical to how Company A operates, where all operations are centralised on the BI insights, propelling the organisation's strategies and objectives. All the respondents reinforce this from Company A, which shares the opinion of ROA1:

> *Business Intelligence (BI) is critical to the business because it helps us understand and monitor critical aspects of our business activity to put in corrective actions where required.*

BI is an instrumental element in the realisation of BV, through constant process success attained from understanding and monitoring the key business operations as well as applying corrective action in timely manner provide means possible to generate BV and competitive advantage. BI as a resource is instrumental to how Company A operates, and this is further affirmed by ROA2 when he states:

> *Most of the operations depend on the use of BI, but predominantly it will be in the area of product sales, customer behaviour patterns and operational efficiency in serving or supporting the sale of products and services.*

ROA1 pinpoints the BI-based activities that are critical to the operations of Organisation A, and they include

> *Performance Trending against baselines, benchmarking, or forecasting identifies the need for some form of action to be taken.*

These areas further reinforce the significance of BI to Company A and how BI was embedded in the operations of the organisation in varying systems. Performance trending against baseline enables the organisation to access its efforts to attain the desired objectives and to benchmark. Forecasting aids in predetermining future activities, helps the organisation prepare and fully capitalise on opportunities and ensures that the organisation has adequate resources to combat threats.

ii. Business Intelligence as a scarce resource

As much as BI is valuable to Company A, it is rare as most businesses in South Africa are still in the process of effectively implementing BI in their operations or have already

done so despite the general infancy of the application. Interestingly, BI is propelled into adoption by fear of competition, as Company A indicated that one of the reasons BI was adopted into operations was due to competitive pressure and the need to broaden operations. ROA5, like ROA2, explains,

> *The trading environment is callous, whereas a business needs to understand the market or industry we operate in. BI helps us understand the trends and patterns of key measures that determine how successful we perform in the market relative to our competitors. This we measure against industry trends to get a view of how we are doing as a business*

ROA1's statement shows that competitive analysis is anchored on BI that other organisations also used against Company A. This analysis helps organisations to assess their presence within the market and foster innovative and creative means to stay abreast of and exceed the competition.

iii. Difficulty in replicating

Despite BI's prominence within the SA market, the application of BI can be unique to an organisation. According to Barney (1991), imperfectly imitable includes a resource that other organisations can easily adopt. This is the case with Company A, where BI is infused in all stages of Organisation A's tailor-made operations. Even after considering the uniqueness of Company A's operations, there should be some similarities, especially with competing organisations, to generate similar operations, which, when applied to customised BI applications, can result in the duplication of the BI system. This is echoed by ROA2 and ROA3 that:

> We also develop applications for the network team to evaluate the performance and utilisation of our base stations. We also have comprehensive details applications to profile the customer base to support the segment, CVM and product teams' understanding of the customer base performance.

iv. Availability of substitutes to replace the current system

Non-substitutability is encompassed by the ability to replace the resource (BI) with a non-rare resource. BI has been integrated into the operations of Company A with no apparent replacement as of the moment of compilation. However, it is important to note that BI can

be improved through developing new technology or evolving its existing technology. Company A is focused on the continuous improvement of BI through regular investment in BI technology. This is affirmed by four of the respondents, ROA1, ROA2, ROAS3 and ROA4 who all share the perspective of ROA3 thus:

> *We ensure that when we invest in developing new applications, we are clear on the business value that can be generated from the solution and that demand for all solutions is from business.*

BI investment is a constantly reoccurring activity within Company A, and measures of achieving value are predetermined before investment, ensuring that investment value is the primary aggregator. ROA2 also concur with the BI investment focus that

> *The BI world is evolving with new concepts, tools, dimensions, etc. An organisation like ours must keep updating and utilise these new items to release the benefits of their investment in BI to support the overall business.*

As indicated by ROA2, the BI complexity and application level after such investment and development is unlikely to be easily replaced by non-rare resources, which sustains BI as a non-substitutable resource.

Table 6.3. Illustrates the themes from Company A that are aligned with an RBV perspective.

Table 6.3 Summary of predefined themes related to RBV for Company A

Theme	Presence	Theme Count
Business Intelligence significance to operations	✓	5
Business Intelligence as a scarce resource	✓	2
Difficulty to replicate	✓	2
Availability of substitutes to replace the current system	X	4

6.3.1.2 Predefined themes associated with DCT for Company A

i. BI as a change indicator

BI is considered an important tool that Case A heavily depends on to execute and monitor critical aspects of daily operations. It is also known to assist the organisation in identifying areas needing corrective action and ensuring that operations are successful. To illustrate the density of dependability of Company A on BI, ROA1 pointed out:

> *Company A tracks many indicators on a daily basis. We predict over 80 revenue and KPIs on a daily grain using machine learning in order to manage the business more effectively. We have over 50 qlik Sense (reporting tool) applications for the business units to manage performance at a granular channel, price plan, device type, regional level*

BI was identified as essential to Company A's everyday operation and has been credited to "run the organisation" by one of the interviewees. BI has also helped Company A to refocus its efforts and spend more time developing more comprehensive insight than traditionally spending much time producing reports. For instance, before BI, reporting teams spent much time compiling 'fundamental reports' whereas, with the adoption of BI, the reporting teams can invest more time tackling more complex analyses that can provide unique insight and ensure the business retains its competitive capability. However, there have been concerns about the adequacy of resources currently invested in BI, as further elaborated by ROA1, who explains:

> *…very effective business unit but could be better resourced to meet demand more timeously.*

ROA1 also highlights that in pursuit of maintaining a competitive nature, Company A also closely monitors competition with BI tools:

> *BI helps us understand the trends and patterns of key measures that determine how successful we perform in the market relative to our competitors. This we measure against industry trends to get a view of how we are doing as a business*

Contrary to analysing and monitoring external threats, Company A monitors internal change by monitoring daily revenue, usage of network components and operational

effectiveness rates. These KPIs are pivotal for ensuring that pricing meets customer expectations and comparing various performances against set baselines and forecasts.

The origins of BI within the organisation were primarily instigated by pressure from the competition. To remain at the pinnacle of the telecommunication industry, Company A adopted BI. BI has helped the organisation fend off competition by applying BI in customer persona development, enabling them to personalise offerings to their target markets. Furthermore, personas also allowed the organisation to offer varying periodical offerings that entice customer excitement and appeal. The organisation's effectiveness to outwit competition is cleverly monitored daily to a myopic extent, enabling gradual changes in customer offerings and resulting in consistency of performance. Additionally, Company A can identify where the organisation is losing out to the competition through this process.

As an instrumental component across the entire organisation that guarantees the optimum functionality of the organisation, BI is said to be mainly influential in improving operational efficiency. This is mostly true for customer behaviour patterns emphasising customer service delivery and customer satisfaction, and sales product (finance), where consistent monitoring is applied by comparing budgets and forecasts. The organisation also develops BI-based applications that help better monitor specific KPIs for specific departments and evaluate operational performance and utilisation of deployed resources.

BI adoption was propelled by the need to improve sales and monitor the progression of sales figures where the tool was first applied. The application later spread to customer satisfaction, procurement, and stock levels. Since the organisation's operations are interlinked to a degree, this enabled and facilitated the adoption in other functional departments as explained by ROA2:

> *All of the functional activities have so many overlaps. For example, sales depend on stock levels, and stock levels depend on the procurement lead times which support any marketing or Sales campaign*

To get the organisation to adopt and accept BI, the organisation applied a proof of concept demonstration where practitioners were exposed to the new system through training. Furthermore, the organisation spread extensive communication, explaining the functionality of the new tool and, importantly, how BI can simplify their operations and maximise yield.

ii. BI as a resource distributor

Resources are established based on the demand of the projects to ensure a positive result is attained. This is achieved by assessing the cost of the projects in contrast to the perceived benefits or realisable value. Then, based on this, the organisation can determine how many resources will be required to achieve a specific target. Also, the time it takes to develop the application to monitor and assess the new project must be considered.

What makes Company A's BI system particularly unique is the ability to generate a unique granular resource allocation insight through complex mathematics, machine learning predictions on sales, and other KPIs. Furthermore, historical data play a key role in predictive analytics, providing a solid platform for more accurate predictions used in planning and setting strategies. These accurate predictions permit Company A to do firmer planning and mitigate threats before causing an impact on the business, resulting in the organisation maintaining a high level of competitiveness. This is reaffirmed by ROA2 thus:

> *Daily revenue predictions using machine learning and granular budget allocations using advanced mathematics.*

In a dynamic environment such as the telecommunication sector, change is consistently reoccurring, and businesses should be able to detect these changes as soon as possible. Company A uses BI to monitor these changes by using performance trackers and trend analysis to ensure that the business remains competitive with customer feedback, where customers outline areas of dissatisfaction that the business regards as a change in demand.

Decision-making is crucial to strategy deployment and all-round auctioning. BI plays a crucial role in enabling this process. Company A's decisions are generated from daily KPIs performance insights, which are then communicated to executives as reasons to justify the course of action involved. To mitigate incorrect implementation, sample groups help test out a strategy or action and based on the cost and magnitude of action, a success rate is set to benchmark the outcome, and a decision can be made to spread the action to the rest of the organisation. This is reinforced by ROA3 thus:

Company A introduced personalized offers and pricing to respond to competition. Company A also introduces new deals and devices monthly to remain competitive. Tracking the performance of sales and usage daily at a granular level allows the business to assess its competitive responses. We also track churn with churn reasons and daily ports to determine if we are losing business to competitors.

To ensure a favourable outcome is generated from BI, Company A believes in making an adequate investment in developing a BI tool where executive management clearly understands the value to be realised. Furthermore, employee training and development are crucial as they represent the final users of the BI tools. Therefore, they better understand the newly developed or upgraded BI tools and the expected benefits of the new technologies.

The extent of BI use is somehow limited as not everyone can effectively use BI tools; recommendations for further training have been noted: "No, not everyone is well trained on the applications. To realise the value fully, more training is required". However, this is not a lack of effort on the part of the organisation as the organisation provides sufficient training and resources to ensure everyone understands the application and use of the new technology as well as the expected outcome (value). ROA3 clearly explains this:

The roll-out of BI capability with the necessary support in budgets and resources is made available, making it easier for teams to adopt BI for their respective areas.

This quote reaffirms executive management's commitment and faith in BI, which they have substantially invested in over the years, ensuring that it is consistently updated and in line with the organisational needs at different times. This is in line with the corporate IT strategy. Nevertheless, there have been opportunities highlighted for top management to completely automate any manual operations currently in use as it takes more time to gain insight, particularly the PowerPoint presentation still compiled manually compared to BI producing the insight. The interviewees highlighted that executive management also possesses the capability to sustainably support BI development despite some indicating that the BI teams could benefit from team enlargement, as explained by one interviewee:

> *…the team can be expanded further to support new areas like technology or customer operations*

iii. BI as an enabler of change

BI in Company A is carefully monitored using a customised tool that applies standardised matrixes and uses a singular source of information across the entire organisation. Furthermore, the organisation has central operational and support structures to aid in maintaining and monitoring organisational progress. As a result, BI has been credited with providing "automation and reducing manual effort" and helping to identify threats to the organisation. Furthermore, there is a belief that the organisation would not have achieved the targets and other KPIs set by executive management if it were not for BI. The point to show the how constant monitoring helps to facilitate change is explained by ROA1:

> *Tracking daily revenue, usage and effective rate are essential for making sure our pricing is effective or whether changes are required. Tracking daily sales can also indicate whether we are competitive or require deal price changes to stimulate growth.*

This realisation of the importance of BI to Company A came about after stakeholders noticed the acceptance of BI capabilities within operations and performance delivery against set KPIs using Agile BI. Furthermore, customer feedback on service delivery, pricing satisfaction, and convenience are commonly employed benchmarks. As a result, BV is characterised to encompass the following attributes:

- Degree of automation

- Production of clear, actionable insight

- Opportunity and threat identification

- Production of clear business and industry performances

- Prediction of future trends

BI has been labelled as a dynamic tool that constantly needs updating and maintenance. Due to these reasons, the respondents reinforced that improvement has to ensure that BI adds much more insight. This is especially true concerning customer satisfaction analytics and base station performances. This is reiterated by ROA3, who pointed out:

The BI world is evolving with new concepts, tools, dimensions, etc. An organisation like ours must keep updated and utilise these new items to release the benefits of their investment in BI to support the overall business

Table 6.4 summarises the findings associated with the DC theories, which provides a much clearer view of the findings.

Table 6.4. Summary of predefined themes associated with DCT for Company A

Theory Elements	Presence	Theme Count
BI as a change indicator	✓	3
BI as a resource distributor	✓	2
BI system setup within the organisation	✓	2

6.3.1.3. Predefined themes associated with TOE framework for Company A

i. BI system setup within the organisation

As a technological aspect of the organisation, BI is critical for Organisation A's operations as it has been integrated with all operations. BI has been adopted to aid every organisation's decision, from apportioning company resources to devising strategies. BI is at the centre of mitigating and enhancing the various capabilities identified as BI Capabilities. This is particularly evident when reviewing ROA3's perspective:

Most of the operations depend on the use of BI, but predominantly, it will be in the area of product sales, customer behaviour patterns and operational efficiency in serving or supporting the sale of products and services.

Further, the interconnectedness of the various functions due to the integration with BI has resulted in a connected network of overlapping information. Information between departments greatly influences some later operations requiring data from other departments to create additional insights for decision-making. As indicated by ROA2's explanation of BI influence:

All of the functional activities have so many overlaps between them. For example, sales depend on stock levels, and stock levels depend on the procurement lead times which support any marketing or Sales campaign.

BI's role in ensuring process efficiency is detailed in the amount BI applications set to monitor various KPIs of Company A. These key applications help to dictate any changes within the internal and external environment for appropriate strategies to counter or benefit from the identified threats and opportunities, respectively. This is mentioned by ROA1:

Company A tracks many indicators on a daily basis. We predict over 80 revenue and KPIs on a daily grain using machine learning in order to manage the business more effectively. We have over 50 qlik Sense (reporting tool) applications for the business units to manage performance at a granular channel, price plan, device type, and regional level.

BI of Company A also plays a critical role in ensuring that competition is kept at bay and the business maintains its hold on its respective market shares. For instance, Company A applies BI monitoring on even the smallest elements of the organisation's sales performance to establish market share dominance within a period. This is eloquently put by two respondents, ROA1 and ROA2:

Tracking sales performance and usage daily at a granular level allows the business to assess its competitive responses. We also track churn with churn reasons and daily ports to determine if we are losing business to competitors.

ii. Organisational alignment with BI

From an organisational standpoint, BI influences the entirety of the organisation, stemming from executive management support, which dictated the complete assimilation of BI. All respondents mentioned and recognised the executive management's support for BI adoption. This reaffirmed the density with which BI is perceived in Company A, as explained by ROA2 and others who share the view that:

> *Top management fully supports investing in the technology and setting the strategy to incorporate it as part of the IT and Business operational strategy.*

Executive management's commitment to adopting BI has allowed for the multi-functional production of insights. Also, embodying all functional departments that share and coordinate insights to provide better customer service and improve the organisation's general performance propels the organisation strategically towards organisational objectives. This is achieved through deploying various BI applications that all serve a specific KPI area which is later synthesised to provide insight on finance, resource deployment and utilisation, and prominently, within the customer service department. This is echoed by ROA4, who explains:

> *Commercial teams depend heavily on the applications and finance teams responsible for assessing performance against prediction and budget. We also have customer operations that depend on our applications to assess customer service levels and satisfaction. We also develop applications for the network team to evaluate the performance and utilisation of our base stations.*

Commercial sales departments were the pioneer adopters of BI within their operations, where Bi was mostly used to track commercial sales. This later evolved and spread to the rest of the organisation where, at the moment, the integration of BI reporting of key KPIs is under development and considered a priority in enabling daily operations.

iii. Environmental influence on BI application

One of BI's main responsibilities is ensuring that the organisation is always abreast of internal and external activities. As important as monitoring internal change, the external shift must always be examined to identify any shifts in activities and possession of the market share. Importantly, the external environment should also be monitored, according to Company A, to gauge customer perspectives on various products and services the organisation offers so that immediate adjustments can be made to counter or profit from the change if needed.

Other aspirations of Company A are to understand the market or industry trends, which can be further analysed to generate predictive analytics for budgeting and benchmarking.

By deploying BI within the external environment, Company A can assess organisational performance by comparing organisational performances with those of competitors. This is explained by RAO2, who suggests:

> *BI helps us understand the trends and patterns of key measures that determine how successful we perform in the market relative to our competitors. This we measure against industry trends to get a view of how we are doing as a business.*

Further, BI has been credited with aiding the business to inject effective strategies that provide a noticeable impact on the business. Applying BI within the external environment allows for accurate assessment of the organisation's stance, notwithstanding predicting the future stance of the business and how it aligns with the set objectives. This, therefore, permits for effective deployment of resources during the appropriate times, thereby ensuring the effective application of resources. RAO1 explicates:

> *It is understanding the business, industry performance or changes and predicting changing trends. This assists the organisations in putting in long-range plans and not having knee-jerk responses to a changing trading environment.*

Table 6.5 summarises the predefined themes associated with the TOE for Company B.

Table 6.5 Summary of predefined themes associated with the TOE framework for Company A

Theme	Presence	Theme Count
Business Intelligence System set-up within the organisation	✓	11
Organisational alignment with Business Intelligence	✓	11
Environmental influence on Business Intelligence application	✓	8

6.3.1.4. Predefined Themes associated with RBV for Company B

i. BI significance to operations

BI as a resource is very valuable to Company B as it is responsible for providing insights into the operations and performance of the business. This is particularly true in the customer department, where BI monitors and influences organisational performance. Sales performances, loyalty and score data are all supported on BI applications used to produce analytics and later adopted to guide Company B's decision-making process and strategy formulations. This was mentioned by ROB1:

> *We constantly use BI and the tools that it provides. So, sales data, loyalty data, and even our score data sit on various BI platforms we use. That is, we access data on various tools, either online tools or online portals, or we use excel systems called analysis Office.*

BI is recognised in Company B as an integral part of how the organisation operates through facilitating operations and assisting with understanding complex data where variable relationships and trends are realised. BI was initially adopted to cut costs because the organisation used to outsource their BI function from third-party outlets until BI became so holistically imperative in the entire organisation that it became financially logical to possess an internal BI department. ROB2 explains this:

> *BI plays a role in f facilitating our functions of reporting, analytics and complex data analysis. I think BI as a reporting function has been widely accepted as something required across all the functions of the business for some time. What particularly changed how we interact with BI and other people was actually probably initially driven by cost saving. Previously we outsourced a lot of that consulting and analytics and more science-driven data analysis to a good party.*

Company B possesses a customer-centric operational strategy where customer data is highly regarded. This data concerning customers is vast and presents the organisation with data to synthesise and generate insights that mould the organisational strategies. Further, coordination between departments enriches the data sets and, subsequently, the output of the collected data. Departments share data with the BI teams, which is

transmitted to the rest of the organisation. This close coordination and teamwork enable relevant information to be amassed and better aid in the decision-making process.

> *We are also co-creators of a lot of the BI output, so we would identify the need and actually work together to specify the exact requirements for their needs. I mean, over the course of a year, we modify, improve, implement, reinvent, and refine BI.*

ii. Business Intelligence as a scarce resource

The resources in Company B are not rare in the context of the RBV, as competitors possess or have employed BI applications to aid their operations. BI is mostly responsible for monitoring Company B's sales performance and customer satisfaction with set benchmarks and in contrast to the competition in the industry. Company B applies BI to assess the organisation's representation in the market, and it can be assumed that the competition uses the same tools and strategies as indicated by Company A, where BI is also applied to assess the company's positioning in the market.

Nonetheless, rarity can be in the form of creating various combinations of resources the organisation has at its disposal to produce new capabilities that improve its operational capabilities. The rarity of resources or combination of resources can be pointed out in Company B, where they employ inter-departmental support for the BI analytics development, improving the quality of analytics produced and, importantly, ensuring that the BI produced is still relevant to the needs of the organisation. ROB3 echoes this:

> *I think one unique thing about our area is a lot of other functions using whatever Bi is producing.*

iii. Difficulty in replicating

BI application in Company B cannot be replicated by competition as implementation requires adjustment and tool development to accommodate complex analytics. BI is predominantly applied in Company B as a tool to understand better sales performance and customer satisfaction, which are highly regarded metrics to aid the organisation's progress towards its objectives. The organisation has BI resources and capabilities that allow it to conduct agile analytics through its flexible tool designs. Further, the application of BI is holistic and encompasses the application of BI in all facets of the organisation.

The uniqueness of the BI system of Organisation B is explained by ROB2 who state,

I think one of the things that is unique about our area is a lot other functions are in uses of whatever Bi is producing .we would fall over without the ability to use what they are producing as well but we are also co- creators of a lot of their output, so we would identify the need and actually work with them to specify the exact of what is required I mean over the course of a year modify improve

iv. Availability of substitutes to replace the current system

Regarding substitutes for BI, there are very few replacements for BI in Company B, making it a very important resource within the organisation's operations. Contemporary business practices demand the use of BI as insights to guide the decision-making process and establish the impact of certain strategies on performance and identified KPIs. All these functions require the application BI to acquire measurable insights about the business operations. Further, the uniqueness of the application of the BI on different component of the organisation's operations creates unique capabilities that is difficult to replicate which would require similar Stock Keeping Units (SKU) and BI insights. These SKUs and insights interact in unique manner as well as compounding on additional insights shared between the organisations and suppliers create a competitive advantage through the magnitude of the variables considered for the insights which, few organisation can attain. This is explained through an example provided by ROB3 who says:

I'll give you an example so obviously, you hear we have a loyalty program, a smart shopper program. So, every time you use your card, what it does enables us to see, not what is just been sold and where but whom .and what else is the customer also buying and how often is he buying and has he switched from buying potatoes to sweet potatoes or from John Walker blue to John walker red it helps us put a customer into the equation. That has a lot of value for both the company and for the vendors that help them understand a lot around the shopping behaviour of the customers and get some insights from the company because they would normally have to go and do their marking research for. So, they make use of the tool that previously was outsourced and there is a rebate that they can provide a revenue stream that's quite important to the company coming through that .so when we in-house this capability

ourselves the customer insights team had to work closely with the bi team to rebuild this tool and make sure that it meets both our internals users requirements as well as our vendors. So you know it might be Unilever who wanted to understand what customers are buying deodorants, sunlight liquid and how is that different to those buying Maq washing liquid or whatever and so there is a very sizeable revenue stream that is attached to that tool in actual brand value terms rather than just so of a theoretical value and so we had to work hard to make sure they're still getting what they need out of that tool and the vendors continue to be satisfied with what they are getting and continue to subscribe to the tool and pay for the rebate that they agree as part of the commercial training terms of the company .it enables you to get information like our sales have gone down to be able to say the reason our sales have gone down is it because we have few customers or is it because we still have the same number of customers but they are suddenly buying not buying this product a lot because they are not going out you can understand what the Dynamics are .the revenue stream that we need to protect and provide a capability which previously has been provided by our third party now have to be created by ourselves together with the BI team.

Table 6.6 illustrates a summary of predefined themes associated with RBV for Company B.

Table 6.6. Summary of predefined themes associated with RBV for Company B

Theme	Presence	Theme Count
Business Intelligence significance to operations	✓	3
Business Intelligence as a scarce resource	✓	2
Difficulty to replicate	✓	1
Availability of substitutes to replace the current system	X	3

6.3.1.5. Predefined themes associated with DC for Company B

i. Business Intelligence as a change indicator

Company B applies BI in various ways, all of which are predominantly centred on customer service delivery. The information presented can be accessed through various BI tools within the organisation, primarily data sets such as sales performance data, score data and customer loyalty data. The data is conveyed using a combination of BI platforms based on an online platform or analysis office (excel based platforms). The data is then synthesised based on information needs and presented to the relevant departmental heads and practitioners. The organisation also runs large customer surveys where BI plays a parent role in distributing, sourcing, analysing, and reporting information. The information generated has been considered influential to the entire organisation. Other functional departments also play a role in substantiating and helping build comprehensive data sets from their respective departments. This is achieved by coordinating the BI needs for the respective department, and 'within a space of a year', the insight is further tweaked to align with varying circumstances the department may face.

Regular meetings are conducted to ensure the correct insight is excavated for trajectory synergy within the business and reaffirm the departmental or functional BI needs. This is affirmed by one of the respondents who pointed out that:

> …we probably spend three or four hours a week in meetings…working through whatever on what has been recently briefed, prioritising the multiple requests received from the entire organisation.

The insight process provided to the various departments is said to be of two kinds; in the first instance, insights are mined for a specific query for the department, and this form is normally a one-off situation. A functional department also heavily depends on the insight the BI team must work closely with to produce insight relevant to a specific time and is monitored and tweaked with progress.

The surge of BI within Company B stems from the organisation's need to reduce cost, which according to the respondent, was a function previously outsourced to third-party contractors. This was a customer-centric influence where the organisation was looking for means to help customers save more, and BI was the tool to aid in the revolution. With time and realisation, executive management decided to create an on-site advanced BI

analytics hub to provide insights to the entire organisation and further embed the organisational structure with the BI. The function of the BI teams is centred on three main functions: reporting, analytics and complex data science analysis. Additionally, BI reporting has been holistically accepted across the entire organisation as various departments realise its critical contributions to improving operation execution.

To further change, the BI KPIs are constantly monitored to guide the organisation to processes that can improve operational efficiency as stated by ROB2:

> *Customer insights as a function perform two roles .one is to really use all of the internal data that we have to understand how we performing relative to our angles of the company competition so that's sort of we have a rear view mirror and that's where BI plays a critical role it's using all of the internal data that we have on hand to measure and track our own performance relative to other internal goals that are been set or to benchmark that we have competition and that where bi really enable that measurement and drives action based on our output. Where BI plays a least of a role because they are less directly involved in the process is more or less looking on a rear view mirror and more looking on the windscreen and understanding what shifting in the industry what shifting in terms of how customer behaves or feel during shopping and that requires us an external third party to provide the insights I mean the analysis that usually be provided by BI*

ii. Business Intelligence as a resource distributor

BI is mainly applied to serve customers better through complex insights. BI plays a pivotal role in providing and collecting reporting for insight, and the uniqueness of BI within Company B can be noted to involve providing insights to the supply chain, mainly vendors. Doing so empowers the entire supply chain, subsequently providing better service to the final customers. Furthermore, information sharing along the supply chain has been credited by respondents as the veil to possible threats and opportunities against the business. As a result, the BI focus has been adjusted to the degree of a competitive-centric agenda where the organisation strives to be abreast of competition, if not better. This is affirmed by one of the respondents who pointed out that:

…interestingly one of the shifts that have been part of the change is that we have in-housed a tool that actually provides the capability to suppliers, and we sort of kinda see them as customers, and part of that process has made us more aware of what competition is or isn't doing...

While assessing internal and external change, the insight department assesses the organisational offering to the intended customers compared to set benchmarks. The identified KPIs are constantly monitored to evaluate the effectiveness of the operations in attaining a set objective. This is well explained by one of the respondents:

..Insight as a function plays two roles: i) is to really use all of the internal data that we have to understand how we are performing relative to the goal of the Organisation and ii) for competition. That's sort of a rear-view mirror view, and that's where I think BI plays a really critical role. Using all internal data, we had to measure and track our own performance relative to either our internal goals that have been set or benchmark competition.

The respondent cautions that there are still areas where BI plays a less prevalent role than in other instances where forecasting and prediction are concerned. Such capabilities are occasionally outsourced to third parties so that the third parties can conduct the insight and analysis of the data, which can help the business make decisions in line with highly probable instances. Based on the insights and analytics provided, a department can decide on this information which is then transmitted to their respective departments for implementation. Additionally, reviews are constantly conducted and actioned for micro-impact instances, while for more strategic impact scenarios, the review meetings are done less frequently and would require more variant participants from other functional departments.

The dispensation of resources is guided by the action plan or need set out where each department has a firm grasp of its objectives, and the department uses BI to gauge the level of resources required to activate a specific plan. In essence, BI would provide specificity to the action plan where each matrix is accurately measured, and reverse engineering can be conducted to measure the resources required to meet the benchmark.

iii. BI as an enabler of change

The necessary delivery of BI information has also changed over time across the entire organisation through the in-house BI hub. This was propelled by the further development of the in-house BI team, which has recruited key BI producers such as BI engineers who have set up an infrastructure capable of computing larger volumes of data. This capability allows the organisation to access its service delivery compared to the competition fully. Furthermore, emphasis has been placed on reporting as to how it influences auctioning within the entire business. This enables a grand organisational plan to pulse customer satisfaction speedily and efficiently. However, this progression comes with some challenges as the BI team becomes pressured to provide timely information, and in some instances, it is incapable of doing so due to the demand.

To action the insight generated, formal reviews are conducted. Action plans occasionally occur on a weekly or annual basis. The timeline varies depending on the action plan, operation, and urgency of the action plan to be adopted. Each department and operation dictate a specific review timeline which should synchronise with the departmental or functional needs at a given time.

The respondents firmly believe BI adds much value to the organisation. However, reporting was identified as an area needing improvement because some of the reports provided are considered to be inflexible. The data provided does not necessarily directly relate to individual departments, which ultimately causes the department to miss out on critical insights that could help their respective departments more, as explained by a respondent:

> *…I know a lot of people who would have preferred for the data to be tweaked slightly this way or that way to be more specific to their particular requirements but obviously, we have a relatively small BI team and a huge pool of BI users, so there is always more demand than there is capacity.*

Referring to the quote above, one of the major bottlenecks of BI within Company B is the high demand for BI but with limited capability to satisfy the demand. Also instrumental BI is to the organisation and how functional departments rely on the insight from the BI team to make informed decisions, the BI team still is small and incapable of providing the flexibility and capacity necessary to aid all departments. In certain situations, the timeline

pressures the BI teams when all functional departments make requests simultaneously. The BI team struggles to satisfy this demand for vendors at times. This is affirmed by a respondent who points out:

> *…one of the areas where there seems to be a much-specialised capability and not a lot of availability is data engineers and scientists who are responsible for the designing of the tools, which is a huge roadblock in terms of meeting capability*

Additionally, the business needs multipurpose tools that can accommodate various requests and present user-friendly information to motivate closer cooperation from departments with fewer resources to meet the needs of all BI stakeholders efficiently. Transparent and frequent communication is required to ensure that user expectations are managed and that the BI teams firmly understand the requests from the functional departments and the order of prioritisation of the various requests.

Another drawback noted by the informants is the human capital issues, specifically the ability of the end-user of the analytics to employ the information in the decision-making process. In some instances, users struggle to understand the BI, forcing them to put more pressure on the BI team to 'feed' them the information so they can employ it within their respective operations. Training and constant communication are constantly conducted to help end-users better use the BI, as expressed by one respondent who phrased it as:

> *…trying to help them fish rather than for them to ask for the fish*

In some scenarios, end-users tend to request further information for the different requests placed, which can be attributed to the small BI team that Company B currently depends on. However, it was also noted that this does not necessarily represent the entire organisation, but some employees find using BI still challenging. Therefore, the BI teams are tasked to:

> *Identify what's kind of the minimum viable product that we can produce, cost and time effectively that's going to meet the requirements of most of the users and enable them in a way that is user friendly to get to the answers they need and how can we serve others, some with complex requirements...*

Top management is said to support BI teams and has fully backed the development of the division within the organisation. However, there seems to be a misalignment in conceptualising the resources needed to achieve set requests and needs. Some requests may require more time and infrastructure that is not necessarily constantly available, which further pressures the BI team. A high degree of complexity consequently requires more time, money, and skill sets that are not guaranteed to be available in all cases.

> *Understanding the time requirement and investment …sometimes you have to put on a different hat and try and understand the technology and business operations processes so that you are able to provide justification for additional resources...which isn't necessarily part of our traditional skill sets*

Business value is recognised as the ability to serve customers well and retain profits aligning with the executive management's budgets and targets. This is in the form of information provided about customers and generating enough information to create 'personas' that can be targeted and further capitalised on to increase revenue and profitability. The information is also valuable for the vendors who tend to benefit from it as they can now accurately target and offer services and products more relevant to the customer's needs. The information shared with the vendors also offers another revenue stream through purchasing information generated.

Table 6.7 illustrates a summarised table of predefined themes associated with DC theory.

6.7. Summary of predefined themes associated with DC theory for Company B

Theory Elements	Presence	Theme Count
Availability of substitutes to replace the current system	✓	4
Business Intelligence as a change indicator	✓	2
BI as an enabler of change	✓	3

6.3.1.6. Predefined themes associated with TOE framework for Company B

i. Business Intelligence system setup within the organisation

BI as technology is instrumental to the operations of Company B as it is involved in the performance analysis of the organisation and ensuring that high customer service delivery

standards are maintained. Data is sourced from various BI-dependent tools orientated online, in excel documents and online systems. The data is analysed with the assistance of every BI member to produce insights for the various departments within the organisation. ROB4 reiterates this:

> *BI plays a role in terms of facilitating our functions through analytics and reporting. It also provides complex data analysis, and I think BI as a reporting function has been widely accepted and required across all the functions of the business for some time.*

BI reporting has been so successful that it has become a common request from the operations teams to enact strategies throughout the entire organisation. Its ability to compute and generate insights from complex data sets serves the operational teams so well that it has inspired great dependability on insights. Although the objective of adopting BI was inspired to save costs, BI has emerged as a critical tool within Company B, so much so that the insights are fuelling the BI influence past Company B's borders of operations.

Company BI's uniqueness, according to respondents ROB2 and ROB5, is its flexibility to apply to various departments. Since the BI process encompasses the contributions from all functional departments in the organisation, the data generated is vast and in great volumes that allow for clearer insights and possesses flexibility as the data is generated from various departments.

ii. Organisational alignment with Business Intelligence

From an organisation standpoint, Company B has adopted BI within its operations and has encouraged collaboration between departments to maximise BI output. To achieve this, departmental personnel and heads constantly meet with the BI team to discuss any BI needs that the BI department has to produce within the expected timeframes. In some of these meetings, the BI team also communicates with functional departments to establish a level of task prioritisation. ROB4 affirms this:

> *We probably spend 3-4 hours a week in meetings with the BI team. We are working through whatever has been recently briefed and what's required, prioritising multiple requests that they get from our team, .and sometimes just looking at how to prioritise.*

This is all facilitated by top management's support for applying BI, where organisational goals are aligned with the organisational objectives. The top management has cultivated a culture that stimulates the use and application of BI. With time, departmental heads and personnel have realised the significance of the application of BI. Departmental operations are all enabled by BI, along with the deployment of resources and return on investment on the deployed resources.

Consequently, the cultivated culture has created a spike in demand for BI, which the BI teams struggle to serve. The need by departments to acquire BI insights has created a surge in BI demands across the entire organisation, and the BI teams struggle to meet the demand. This, as a result, has caused latencies in BI deployments, affecting the functional departments' various performances.

Internal threats are also mitigated through the application of BI. Through BI applications, anomalies are identified in any of the observed KPIs. The changes are further analysed to identify the source of the change. Resources are then deployed based on the impact projection of the resources deployed.

iii. Environmental influence on Business Intelligence application

Company B extended its BI services to external entities such as suppliers and other first-hand stakeholders to improve operational efficiency. This initiative allows for the efficient alignment of operations where suppliers can better understand the final consumers that help provide commodities in demand with the target market. The sharing of insights also provides a subsequent income which helps generate additional income and helps maintain and develop the BI infrastructure. Also, sharing insight provides an efficient supply of commodities, allowing for more complex and thorough planning.

Competition is also monitored through BI. Any changes within the external environment are analysed to establish the impact on the business to undertake possible actions. This data is regularly analysed for quick action to be implemented, and changes can take effect with minimum latencies.

Further, BI also helps Company B better understand their target market, where constant customer satisfaction monitoring is conducted. This information is then employed in strategies for product offering and a better understanding of the customers' needs so that relevant commodities can be sourced at a value that meets their expectations.

BI is less of looking at a rear-view mirror and more of looking at the windscreen. Understanding what is shifting in the industry, what is shifting in terms of how the customer behaves or feels during shopping.

Table 6.8 summarises the predefined themes associated with the TOE framework for Company B.

Table 6.8 Summary of predefined themes associated with the TOE framework for Company B

Factor	Presence	Theme Count
Business Intelligence system setup within the organisation	✓	10
Organisational alignment with Business Intelligence	✓	17
Environmental influence on Business Intelligence application	✓	9

6.3.1.7. Predefined themes associated with RBV for Company C

i. Business Intelligence significance to operations

Company C also identifies BI as a valuable tool for the business's operational success as the organisation has restructured its operations to depend primarily on analytics. BI is integral to the functionality of Company C. All functions, regardless of their level of significance to operations, rely heavily on the application of BI, as stated by ROC2:

Depending on the specific business unit, day-to-day reliance and use of basic or derived business intelligence range from very little to substantial.
In areas like finance, fraud detection and prevention, security surveillance and monitoring, social media sentiment analysis, etc., there is a fairly high use of business intelligence as part of day-to-day operations. On the other end of the spectrum, in areas like large transformation or strategic initiatives, portfolio management, demand-supply management, throughput tracking via tools like JIRA, etc.

However, the application of BI daily is substituted by monthly and quarterly applications where the organisation's size hinders daily analytics monitoring. This is reinforced by ROC1, who points out that:

> *There is little day-to-day operational reliance and relevant business intelligence for monitoring purposes or decision-making as this is usually sought on a monthly or quarterly basis or often on an ad hoc basis.*

Departments commonly reliant on BI include finance, security, risk/ fraud and system monitoring, which will help the organisation act proactively and pre-solve ad-hoc issues. ROC5 adds on and explains:

Financial account reconciliations (i.e. money flows, deposits, withdrawals, etc.), application/system monitoring, digital traffic logging and monitoring, customer sentiment analysis, etc.

BI is applied to all facets of the organisation and primarily dictates the resources needed and inspires which combination of capabilities are employed to resolve company threats or capitalise on opportunities within the market. This is reinforced by ROC3, who explains:

> *There is a multitude of systems and KPIs that are carefully monitored as to the adequacy of key resources. Covid19 shutdown response was a good example that highlighted all these touchpoints, and a dashboard was created to bring a point of view across this wide range to give senior managers a single-pane perspective on these vital KPIs*

All these aspects reinforce the necessity of BI to Company C as part of the RBV.

ii. Business Intelligence as a scarce resource

As indicated in other cases, BI is common in most businesses in South Africa with varying degrees of applications. For Company C, the use of BI and its unique application is not universally conceptualised by all, as some staff feel there is no particular uniqueness of the BI application process despite the top management support. This is noted by ROC3, who explains:

> *Although data has always been considered a key strategic asset within the organisation, I don't know of any very unique, uniquely innovative or competitive advantage level BI processes at my organisation.*

The BI adoption in Company C is unique as its application design depends on feature teams that allow flexibility in making changes to the BI application design. This particularly flexible function empowers the company to source the particular data set needed in various parts of the organisation in less time, eventually reducing the analytics lead time and maintaining the integrity of the data. ROC5 mentions this:

> *Feature Teaming Framework for Agile at Scale - was tweaked to take specific context into account.*

iii. Difficult to replicate

How BI is applied in Company C is unique compared to the two cases explored earlier in this chapter. The focus was applied to the agility of the BI system to ensure that the business promptly mitigates any threats and capitalises on opportunities. Along with other factors, the BI system for Company C enables the organisation to be more adaptive and collectively produce value. This is mentioned by ROC2, who explains:

> *Our unique footprint, the way we are structured, the learning focus and the hiring process will all impact competitiveness. Corporate Culture, though, will be the aspect that is the most unique and has one of the largest impacts on success.*

iv. Availability of substitutes to replace the current system

Most BI systems cannot be easily substitutable as most BI systems are designed for specificity, and as a result, it makes substituting the system difficult. A unique combination of resources is required to create the idlest capability that tackles ad hoc business needs. This is reiterated by ROC2, who states:

> *The pursuit of actionable business intelligence is usually more context-driven by the need to solve an identified problem or because it is considered good practice or an industry standard.*

Further, the capability of Company C to synthesise a large volume of data and concurrently apply it to the information also complicates substituting BI, as there are very few substitutes that can embody resources to produce such action in South Africa. This point is illustrated by ROC4, who mentions the evolution of BI operations in the business:

Systems monitoring and cash levels at cash centres and branches
following the phasing out of the Vault Cash deduction for liquidity
requirements would have been big drivers for BI years ago. This
obviously morphs and focus shifts as new options and requirements
come about; for example, CX is measured daily in South Africa but
monthly/annually in the other countries we have a footprint in

Table 6.9 depicts a summary of predefined themes associated with RBV for Company C

Table 6.9. Summary of predefined themes associated with the RBV for Company C

Theme	Presence	Theme Count
Business Intelligence significance to operations	✓	6
Business Intelligence as a scarce resource	✓	3
Difficulty to replicate	✓	2
Availability of substitutes to replace the current system	x	3

6.3.1.8. Predefined themes associated with DC Theory for Company C

i. Business Intelligence as an indicator

Company C applies BI to operations to establish opportunities the business can capitalise on and mitigate any threats against the business. This comprised trend simulation that the business runs to establish anomalies or significant shifts in operational behaviour. This is supported by ROC3, who explains the function of Company C's BI system where they state:

BI will pick up trending info – but those are lag indicators. Wider access
to real-time externally focused BI is required to get better leverage from
BI in our organisation

Compounding advanced BI technology with comprehensive planning and performance delivery systems ensures that Company C is always ready to accommodate change. This is mentioned by ROC1, who insists that:

Robust strategic planning is then underpinned by delivery plans to
neutralise threats as well as Vexilla Scenario analysis

The company's BI system aids in identifying environmental changes, both internal and external. This is coupled with real-time information that gives the edge to this case. Analytics are produced and consumed in real time. ROC1 explains:

> *BI will pick up trending info – but those are lag indicators. Wider access to real-time externally focused BI is required to get better leverage from BI in our organisation*

Advancement in predictive analytics also empowers Company C to better prepare for any operational development that could impact the business. The business has invested in comprehensive and highly accurate BI tools that indicate employees with the highest possibility of resigning, thereby employing measures to mitigate such occurrences. Not limited to human capital recruitment, the advanced predictive analytics also provides an edge to Company C to better comprehend the company's spending and real estate capitalisation. This is explained by ROC1:

> *Tools like Visier are highly useful to help predict employees at risk of resigning and numerous other employee-based analytics and insights. These are also augmented with surveys and employee sentiment analysis. Other essential BI-based activities to keep a pulse on internal change include areas like finance (e.g. expense claims), real estate monitoring (for instance, return to office trends)*

ii. Business Intelligence as a resource distributor

Once a business identifies the source of the anomaly, a comprehensive discussion is conducted by departmental heads to digest the identified changes in operations. From there, a singular affirmed action is employed, and resources are dispatched where the performance of that operation is constantly monitored to identify change or improvement. ROC3 states that:

> *Progress (or lack thereof) on strategic measures is discussed at monthly management meetings, and remediation plans are discussed/ratified. From a delivery or operational perspective, the BI is used daily/monthly/quarterly to influence work prioritised*

Resource dispensation predominantly depends on demand and supply or capacity management capabilities, enabling the organisation to devote resources carefully across

the entire organisation. In essence, resources are allocated based on areas needing them and the capacity to accommodate the needs indicated in the different parts of the organisation. ROC2 explains:

> *Within the context of areas like Engineering, all required change is analysed through demand and supply or capacity management processes which include business intelligence lenses across dimensions like money/investment and people/skills.*

Further, the organisation has various BI tools that help compute the utilisation of resources to ensure that the limited resources are adequately utilised. This follows up the explanation by ROC2 above, where the limited resources are adopted based on demand and supply. Key resources are carefully monitored to ensure the maximisation of outcomes, resulting in the construction of unique capabilities that can increase the organisation's performance yield. ROC3 reaffirms that:

> *There is a multitude of systems and KPIs that are carefully monitored as to the adequacy of key resources. Covid19 shutdown response was a good example that highlighted all these touchpoints, and a dashboard was created to bring a point of view across this wide range in order to give senior managers a single-pane perspective on these vital KPIs*

iii. BI as an enabler of change

Transforming essentially embodies continuous renewal or improvement of operations to achieve the dynamism of the various capabilities of an organisation. This is not the case with Company C. According to ROC4, Company C has yet to impose a homogenous system that allows for a coordinated effort to evolve accordingly to circumstances continuously. There is a silo mentality to the application of BI, where departments work independently to attain goals despite meetings and other coordination efforts done communally. ROC4 illustrates this point:

> *There is great potential to leverage business intelligence to optimize processes, but the actual value derived is often limited due to factors such as a lack of systems thinking (i.e. siloed analysis and resultant solution).*

This point is reinforced by ROC5, who mentions the reluctance of departments to unify and coordinate efforts, especially if the measurement of BI efforts is unknown or processes or exercises may require additional administration, resulting in limited cooperation and support.

> *There is a huge take-up of BI tools across the organisation, but there is a lot of push back on measurements and anything that results in additional admin overhead, so it is a constant struggle/challenge*

Table 6.10 summarises the findings of predefined themes associated with the DC Theory for Company C.

6.10. Summary of predefined themes associated with the DCT Theory for Company C

Theory Elements	Presence	Theme Count
Business Intelligence as a change indicator	✓	3
Business Intelligence as a resource distributor	✓	4
BI as an enabler of change	x	3

6.3.1.9. Predefined themes associated with the DC Theory for Company C

i. Business Intelligence system setup within the organisation

From a BI perspective, Company C heavily depends on technology for the short, medium and long-term attainment of set goals. This is especially true with Business As Usual (BAU) processes that require BI in the generation to establish which operations require immediate attention and others that can be temporarily paused depending on resource availability. ROC1 explains:

> Business *Intelligence is an integral part of business as usual (BAU) processes; thus, it's how things are done with a large focus on monitoring and reporting/visualisation.*

ROC2 expands and explains that the entire organisation depends on the application of BI in varying degrees, depending on the department. According to the response, there is an inverse relationship between the use of BI technology frequency of use and the role the information plays. The organisation considers the operations heavily depending on regular BI monitoring as less priority, while more complex and strategic-oriented operations are less monitored. ROC2 submitted that:

> *Depending on the specific business unit of area, day-to-day reliance and use of basic or derived business intelligence range from very little to substantial. In areas like finance, fraud detection and prevention, security surveillance and monitoring, social media sentiment analysis, etc., there is a fairly high use of business intelligence as part of day-to-day operations. On the other end of the spectrum, in areas like large transformation or strategic initiatives, portfolio management, demand-supply management, throughput tracking via tools like JIRA, etc., there is little day-to-day operational reliance, and relevant business intelligence for monitoring purposes or decision-making is usually sought on a monthly or quarterly basis or often on an ad hoc basis.*

This is due to the production and information implementation turnaround time, which, owing to the nature of the data, requires more time to synthesise the information and deploy it into strategy.

The statement by ROC1 above laments the company's dependability on BI technology regularly and its efforts to develop BI tools to ensure that operators have ready access to real-time information on the various processes conducted at regular intervals. This was amongst the reasons BI was considered for the enterprise, together with the shifts in operational strategies that compelled management to develop BI tools directed to resolving a particular KPI, which in certain instances stands parallel to the status quo. ROC2 explains:

> *Systems monitoring and cash levels at cash centres and branches following the phasing out of the Vault Cash deduction for liquidity requirements would have been big drivers for BI years ago. This obviously morphs, and the focus shifts as new options and requirements*

> *come about; for example, CX is measured daily in South Africa but monthly/annually in the other countries we have a footprint in.*

This is supported by ROC4, which also lauds BI's necessity for the functions outlined above as the company aims to detect fraud and other threats against the organisation proactively. ROC4 points out:

> *Financial account reconciliations (i.e., money flows, deposits, withdrawals, etc.), application/system monitoring, digital traffic logging and monitoring, customer sentiment analysis, etc.*

Company C has improved the BI technological capabilities to allow more flexible BI systems that allow quick changes in the operational set up of the system. Employing feature frameworks allows organisations to gain agility with their BI applications, requiring constant adjustments to meet specific organisational needs. This is mentioned by ROC3, who explains:

> *Feature Teaming Framework for Agile at Scale - was tweaked to take specific context into account*

BI technology influence is noticeable in many departments across Company C. This is not limited to customer satisfaction and cash dispensation, amongst various functions, but also human capital. In the spirit of proactive planning and risk mitigation, the organisation computes staff satisfaction exercises through BI, which help guide the company to know future employee turnover. Based on certain matrixes, the system computes the probability of an employee leaving the organisation. Based on this outcome, actions can be employed to either ensure that the employee's newly discovered needs are met or the organisation can introduce a legacy process to identify a direct replacement and develop the replacement into the role. Similar operations are adopted in other departments, such as finance, where BI governs expenditure control. Through this system, the organisation can accurately predict future expenses, which would help management attain pragmatic projections on performance.

ii. Organisational alignment with Business Intelligence

The organisation reengineered its structure to enable a BI-centric philosophy which promoted the use and dependability of BI. This was not an outcome of influence or threat of competition but an independent aspiration to innovate and improve processes

execution. This is affirmed by ROC2 and ROC4 (respectively), who both confirm this point:

> *Very little, I would say. Greater prevalence of the pursuit of actionable business intelligence is usually more context-driven by; the need to solve an identified problem or because it is considered good practice or an industry standard rather than a direct response to a competitor's use of insights to compete with us.*

> *Maybe indirectly at most, but more in a **what** we measure aspect than in a **why** we measure aspect. We do look at benchmarking information*

Both affirmations underpin the ethos of Company C, whose focus is on the innovative development of internal operations and the monitoring of key KPIs. New BI tools are developed mainly to resolve identified issues within the organisation, and external influence contributes marginally to the development of BI tools.

This does not mean that external influence is non-existent, as BI monitoring is also placed on ensuring that the organisation remains competitive within its industry. This would involve monitoring industrial KPIs and comparing them to the organisational performances where any significant deviation would warrant an investigation of internal processes and resources. Further, the strategic goals set by top management also greatly influence the actions employed by the organisations. In some instances, if external change does not threaten the business's strategic objectives, the anomaly can be paused or temporarily ignored, depending on resource availability.

Management support is documented as an instrumental element in achieving BI value realisation as they dictate the areas the business should be focusing on (Paradza and Daramola, 2021). Company C aligns with this initiative as top management is involved in aligning and enforcing the application of BI in various functional departments and operations. Most respondents acknowledge the support of top management, the most vocal being ROC2 and ROC3:

> *Some top management has been wonderful with supporting the use of BI. Yearend bonus pools are also now impacted by key strategic measures that top management contracts on, so there is an improved*

level of support for the use of BI from management that was on the fence with BI

Management is usually highly supportive. Follow-through and making difficult decisions based on the gathered and synthesised business intelligence is a different matter.

The top management has also adopted an incentive structure to persuade BI resistors into applying BI within their processes.

From a BV perspective, the organisation still struggles to establish value from BI investments despite the significant BI investments. There is a lack of a holistic evaluation of the organisational BI investments, which fails to establish the level of influence of BI on the entire organisation. However, the organisation does evaluate the specific KPI outcome generated from BI, such as customer service levels and expense control. This is the perspective of ROC2, who states:

The organisation does measure things like 'client value created through the use of data', but I am not aware of any specific and direct measures surrounding the effectiveness of ROI on BI.

The value realisation is described differently by ROC4 based on the usability of BI within the organisation. The respondent notes that the organisation generally perceives application as value and success of the BI adoption, which is not necessarily the case. In ROC4's words

Usability of it, usage by all employees and whether it can be used to make data-driven decisions

As indicated in the literature review, BV is more than application and use; it empowers the organisation to achieve efficiency and account for the efficiency attained. Eventually, the investment has to be tied to profitability and BI as an investment portfolio is not different; the influence should be realisable given the necessary conditions.

iii. Environmental influence in Business Intelligence application

The organisation keeps a keen eye on the fluctuation in KPIs within the industry to ensure that it stays abreast of trends in play. BI plays a critical role in monitoring and reacting to the fluctuations in trends and significant deviations between company KPIs and the

industries. The executive management decides on the strategy to ensure that the threat is mitigated or the organisation capitalises on the opportunities based on the significance of the fluctuation and available resources. ROC5 explains:

> *BI has given the ability of management to make data-driven decisions; it provides a mirror to self-reflect on the successfulness of plans and gives more real-time information that can be used to correct the course before wasting more time, resources, and effort.*

The influence of competition on operations and technology adopted within the industry is limited or indirect, based on Company C's philosophy. Inherent actions and desires heavily influence the organisation. This is exposed when the respondents indicated why Company C adopted BI; they revealed that the company aimed to improve its operational capability and offer better customer service. It was outlined that outside influence in the form of competition had little to no influence on the motivation to adopt BI.

Table 6.11 Summarises themes associated with the TOE framework for Company C.

Table 6.11 Findings of themes associated with the TOE framework for Company C

Factor	Presence	Theme Count
Business Intelligence system setup within the organisation	✓	9
Organisational alignment with Business Intelligence	✓	11
Environmental influence on Business Intelligence application	✓	7

Table 6.12 depicts a case cross-analysis on predefined themes associated with RBV, DCT and TOE, where the themes are compared to show the similarities and differences between the cases.

Table 6.12: Cross-Case Analysis of Predefined Themes

	Company A	Company B	Company C
Predefined themes associated with RBV			
BI significance to operations	✓	✓	✓
BI as a scarce resource	✓	x	✓
Difficulty to replicate	✓	x	✓
Availability of substitutes to replace the current system	x	x	x
Predefined themes associated with DC Theory			
BI as a change indicator	✓	✓	✓
BI as a resource distributor	✓	✓	✓
BI as an enabler of change	✓	✓	x
Predefined themes associated with TOE Framework			
BI system setup within the organisation	✓	✓	✓
Organisational alignment with BI	✓	✓	✓
Environmental influence on BI application	✓	✓	✓

6.3.2. Similarities in Predefined Themes

i. BI significance to operations

All three cases indicated that BI is important to the respective companies' operations, reflecting the steady adoption and implementation of BI in South Africa. Most operations heavily depend on BI to provide insights employed in decision-making for strategy formulation to attain BV. This affirms the level of significance posed by BI, where most operations, if not all, depend heavily on BI analytics, reflecting the culture and organisational commitment to BI.

ii. Availability of substitutes to replace the current system

BI as a technological entity cannot be replaced thus far in South Africa mainly because the technology is still applied conservatively without achieving its true potential and lacks actual substitutes for the technology. All the cases attempt to vary on organisational investment capability and align with the long-term strategies the three cases wish to achieve. Further, the development of BI is directing the three cases towards advanced analytics, and the employment of unique agile BI tools further cements the significance of BI in the operations of the business.

iii. BI as a change indicator

BI is applied in all three cases as a change aggregator, which allows for identifying any anomalies within the set KPIs of the cases. BI is instrumental in informing the executive management of any opportunities and threats for and against the business, thus stimulating the reaction of deploying resources to the needed areas. Further, BI is credited with helping the cases establish organisational competitiveness with the rest of the industry so that efforts can be employed for the cases to stay abreast with the trends.

iv. BI as a resource distributor

BI is also instrumental in distributing resources despite the various process methods. BI helps the cases to establish the level of resource investment required to achieve the desired outcome. Further, BI aids the cases in understanding the level of value achieved from the various projects, which is especially important when reviewing resource input and outcome and can be utilised in making future decisions on related projects.

v. BI system setup within the organisation

BI has been adopted in all three cases, despite differences in its application and use. In the case of Company A, BI was adopted to improve the organisation's sales performance by providing insights into consumer buying practices. The same applied to Company B. Company C applied BI in packaging service products to the desired consumer group. This shows that sales performance is the primary motivator for adopting Bi, which is slowly evolving into new capabilities within companies.

vi. Organisational alignment with BI

All three cases have shown perfect symmetry within the organisation where long-term decisions are based on BI, and executive management fully supports its adoption and application within all facets of the organisation. Further, executive management nurtures and promotes the use and application of BI within the organisation. The executive management also encouraged departments to share information where playing and provision of data are departmentally coordinated, and insights harvested are shared to all corners of the organisations.

vii. Environmental influence on BI application

In all three cases, the external environment, to varying degrees, propelled the organisations to adopt BI for sales performance. The need for all three cases to stay abreast of competition justified the adoption of BI. Companies A and B adopted it to improve sales figures directly, while Company C aimed to improve their product offering.

6.3.3. Differences in Predefined Themes

i. BI as a scarce resource

Companies B and C revealed that the BI functions were more complex in functionality and use, making it difficult to replace as a capability. In the case of Company B, the organisation has managed to develop in-house BI tools production that allows for the production of needs-specific Bi tools Company C also has in its arsenal. Company C can adjust the BI tools to suit the specific monitoring needs of the organisation. This would result in accurate insight since the data and tools adopted are specifically aligned with the need being investigated. Further, Company B applied advanced BI tools that provided more insights and relationships between variables that would have been difficult to realise without applying BI. On the other hand, Company A applied BI in its basic form and

function with a focus still centred on improving sales performance despite improving efforts of the organisation's BI application.

ii. Difficulty in replicating

Company B has a BI system that can be replicated by competition with over-the-counter BI products available in the market. With a few changes to these products, competition can replicate the BI system and attain similar results to the cases. Despite the advances in the functionality of the BI system, as in Company B's case, it extended the BI functionality to partners and members of their supply. In Companies A and C, it is more difficult to replicate as the BI systems are heavily customised to suit the needs of the businesses, which therefore requires specific information on the cases for the model to be replicated.

iii. BI as an enabler of change

Due to Company C's structure and operational processes, the effect of BI as an enabler of change is marginalised as the organisation sometimes operates independently, which significantly reduces BI's impact. In Company A and B cases, BI mobilises efforts to continuously improve the operations of the businesses so that the organisations can stay abreast of the competition. This involves coordinating the rest of the organisation to align critical processes and maximise BV outcomes.

6.3.4. Undefined Themes Analysis

This section of the chapter displays the undefined themes uncovered during the three cases' data analysis. It also provides a -case analysis of these undefined themes to illustrate the similarities and differences between the cases.

Table 6.13. Cross-Case Analysis of Undefined Themes

Theme	Company A	Company B	Company C
Business Intelligence adopted on grounds to improve sale performance	✓	✓	✓
Need to instil a data-led culture	x	x	✓
Trivial activities monitored regularly	x	x	✓
Complex activities monitored over long periods	x	x	✓
Centralised BI Platform		✓	x
Business Intelligence improved organisational performance	✓	✓	✓
BI information developed through functional collaboration	✓	✓	x
Internal change is monitored daily through the examination of internal KPIs	✓	✓	✓
Regular monitoring and meeting are conducted to ensure quality insights	✓	✓	x
External change is also monitored through the application of BI on market trends and patterns	✓	✓	✓
BI is used to fend off competition by constantly monitoring trends and patterns	✓	x	x
Undefined themes			
BI previously outsourced	x	✓	x
BI efforts extended to partners	x	✓	x
BI mostly applied on requests	x	✓	x

BI planning functionally coordinated	✓	✓	✓
Advanced BI capability	✓	x	x
Resource deployment is guided by a complex algorithm	✓	✓	x
Resource deployment is dependent on resource availability and need			✓
Some level of intuition applied along with BI	x	x	✓
Resource deployment success is based on the outcome of resources distributed	✓	x	x
Decision-making processes are conducted through a daily meeting	✓	✓	x
BI is adequately invested in	✓	✓	✓
BI human resource capital is still in scarcity	✓	✓	x
Need for more BI insights	x	✓	x
Training and clear communication are instrumental in improving BI use	✓	x	x
Management plays a critical role in the employment of BI	✓	✓	✓
Flexible centralised BI tool	✓	x	✓
Clear BV structure	✓	x	✓
Rigid reporting affecting operational efficiency	x	✓	x
BV from BI unknown	x	x	✓
BI system uniqueness not clear	x	x	✓
Compartmentalisation of BI to achieve BV	x	x	✓

6.3.4.1. Similarities in the cases

i. Business Intelligence adopted on grounds to improve sale performance

The main determinant in adopting BI in all three cases was to improve sales performance as, during the period of BI adoption, the main function perceived to be of benefit from BI adoption was the improvement of sales performance. BI was employed to create personas for the customers so that the organisations could better understand the needs and preferences of their respective customer bases. This later led to further uses of BI within the respective organisations, which was applied to all facets of operations.

ii. Business Intelligence is adequately invested

BI is heavily invested in as it is recognised for its contributions to the business's operations. Since all three cases perceive BI to be instrumental enough to rely heavily on it in all their operations, it requires the business to secure its respective operational capability. The level of investment can differ between the three cases, as application and use are also different, which subsequently requires a varying level of investment and maintenance.

iii. Management plays a critical role in the employment of BI

The BI investment is supported by top management support of the application of BI, which involves the adaptation of a data-led culture. Top management is instrumental in mobilising the application and dependency on BI to achieve set goals. In all three cases, management plays an important role in institutionalising the constant use of BI to generate insights employed in decision-making. Top management also ensures the collaboration of departments to feed information from one another and cultivate a spirit of unity to ensure that planning and execution are holistic. Close coordination ensures that the organisation moves in one direction.

iv. Emphasis on data quality to achieve Business Value

Data quality is highly valued within all three BI case systems, with additional efforts employed to ensure that the synthesised data is accurate. This is achieved through constant meetings and cross-departmental collaboration of data deployment, ensuring that the data quality is reserved, and decisions are based on accurate information.

v. BI information developed through functional collaboration

In sequence with the point above, BI is generated through the collaboration of departments to generate data for processing. Companies A and B promote the

collaboration of departments to ensure that the data sets provided can be employed universally across the entire organisation and also help departments realign with the organisation's goals and processes.

vi. Regular monitoring and meeting are conducted to ensure quality insights

Regular monitoring is conducted to assess any changes in the KPIs so that further investigation can be conducted to deduce the specific areas needing attention. This is then followed up by the meeting of departmental heads of the organisation to establish the impact on the business and other possible threats to the organisation. The correct data is then generated to mitigate the gaps within the operation so that the best-informed decision can be made.

vii. Internal change is monitored daily through examination of internal KPIs

Constant monitoring enables the organisation to pinpoint deviations from normal operating standards in all three cases. These deviations are then scrutinised to assess the change's impact and identify the areas that will be affected within the organisation. This triggers a series of events, including planning, strategising and deploying resources to capitalise on the opportunity or mitigate the threat.

viii. External change is also monitored through the application of BI on market trends and patterns

As with internal change, external change is also closely monitored, which is a significant deviation from internal KPIs with the industry averages, and all three cases depend heavily on BI to establish these changes. Same with internal change, the external changes are then investigated to fully conceptualise the impact of the change, which will be imposed through the gathering of departmental heads. This will eventually lead to releasing resources to mitigate the threat or capitalising on the opportunity.

ix. BI planning functionally coordinated

In all three cases, organisational planning is conducted on a departmental level which is later integrated into a holistic plan with the rest of the organisation. Frequent meetings are conducted to ensure the constant realignment of data between departments and cross-functional staff. The coordinated planning is then sent to executive management for sign-off, triggering the resource deployment.

x. Resource deployment is guided by a complex algorithm

Companies A and B use a complex algorithm to determine the level of resources to be dispatched to ensure that the desired result is achieved. After an established need,

both companies depend on BI to generate insights to meet the outlined objective. After dispensing the resources, a review is conducted to assess the impact of the BI efforts, which will later feed into future considerations for resource deployment.

xi. Decision-making processes are conducted through a daily meeting

The daily meeting anchors the decision-making processes that need to be frequently done. BI has empowered organisations to make better-informed decisions as they can acquire deeper insights that would not be easily identifiable. The same has applied to Company A and B, where daily meetings are conducted to ensure that the generated analytics is converted into an effective strategy that can attain BV.

xii. BI human resource capital is still in scarcity

Business Intelligence human capital is in short supply in Organisations A and B, resulting in the constant need for BI support. ROCA2 and ROCB3 explained the constant need for BI insights and how they cannot meet demand in some instances, resulting in prioritising regular operational activities over ad-hoc requests.

xiii. Business Intelligence improved organisational performance

In all three cases, BI is perceived to have improved organisational performance in various ways, primarily due to the constant availability of data that feeds into organisational decision-making. All three cases can react to internal change fast enough to capitalise before competition or mitigate before serious harm is caused. This, as a result, provides an edge to all three cases as they can operate in a real-time fashion, which the current business environment heavily demands.

xiv. Flexible centralised BI tool

Company A employs flexible centralised BI tools that quickly process and report critical information. The information is centred on one platform such that when management makes a strategic decision, it can easily source critical information and deploy resources to attain the agreed and desired outcome. By employing the Feature Team framework, Companies A and C can tweak the BI tools to increase the reaction rate of the business, capitalise on opportunities, and mitigate identified issues. Further, projects can be completed quicker, and the outcome and relationship between variables of the projects can be affirmed sooner, thus providing opportunities for maximising the output of the projects.

xv. Clear BV structure

Companies A and C have established clear BV structures anchored on a data-led culture and top management support. These components are crucial to achieving a

clear BV structure as all facets of the organisation are invested in the culture, and top management fully supports and cultivates the desired culture. Company B considers BV improvements in customer service delivery and sales performance, while Company A identifies BV as return on investment on BI, essentially pointing to any improvement achieved to BI investment made.

6.3.4.2. Differences in the cases

i. Need to instil a data-led culture

Based on the comments provided by ROC4 and ROC2, Company C requires a data-led business culture where critical operating functions of the organisation should be aligned with analytics to ensure that KPIs are effectively monitored. There has been mention of top management enforcing and incentivising the application of BI, which also reaffirms the need for a data culture within the organisation.

ii. Trivial activities monitored regularly

Due to the nature of smaller BI activities or requests, this activity normally takes less time as it requires less complex execution. In Company C, such activities are conducted daily with a structured process to synthesise data significantly and reduce the latency period.

iii. Complex activities monitored for long periods

Inversely, in Company C, the more complex activities tend to require more time as processing structures will need to be developed to accommodate the complex process activities. These activities are conducted quarterly to provide adequate processing time to the BI department.

iv. Need for a centralised BI Platform

Company B indicated that its BI system requires a centralised BI platform that provides analytics on all departments and critical projects. This is expected to support inter-departmental coordination, where planning can be executed with knowledge of the current operating capacity of the business and subsequent performance. Resource deployment also benefits from a centralised BI platform because the information from all corners of the organisation is fully recognisable, and that helps with distributing required resources.

v. BI is used to fend off competition by constantly monitoring trends and patterns

Amongst the many reasons BI adds value, BI also aids in fending off competition by equipping management with the necessary insight to make an affirmative decision.

Affirmative action allows Company B to be competitive and offer better products in a timely fashion, thereby gaining an edge over the competition.

vi. BI previously outsourced

Company B used to source its analytics from a third party when business operations did not require much analytics. During this time, most business activities were based on institution and previous experience where management 'hoped' the employed would generate the desired result. This later changed when the benefits associated with BI were realised, and the organisation consistently needed more insights to make informed and well-grounded information which led to the development of the department within the organisation.

vii. BI efforts extended to partners

Company B understands the importance of a holistic picture when analysing business activities by extending the BI reach to its partners. Through this initiative, Company B can react to any shifts within the industry and aid its partners in identifying certain relationships that can help either company save money or improve operational capability.

viii. BI mostly applied to requests

In Company B, BI predominantly processed and produced requested information, except for regular analytics. This information is occasionally for specific projects where special dashboards and tools are needed to decide on specials and ad-hoc product performances. As a result, considering that every department makes such requests, the BI department is overwhelmed with requests.

ix. Advanced BI capability employed

Company B also adopted advanced BI by applying advanced mathematics and machine learning to generate accurate forecasting for the business. The business has focused its efforts and investment on improving its BI capability, and they have invested in BI infrastructure that allows for more complex processing of data, creating or discovering relationships once overlooked. The BI investment also applies to specialised experts who need to operate and run the simulations with the acquired infrastructure.

x. Resource deployment is dependent on resource availability and need

Company C's resource deployment system depends on the organisation's availability and current needs. In the other two cases, Organisation A and B's resource deployment is assessed in a more traditional sense where project prioritisation is

based on the ready availability of resources with limited application of BI as a secondary necessity.

xi. Some level of intuition applied along with BI

BI replaces human intuition by providing precise information that helps management make effective and efficient decisions. Organisation C still uses a certain level of intuition when making decisions which also signifies the level of data culture currently employed in the business. This is different from Companies A and B, which are heavily dependent on BI when making decisions, where every decision made within the organisation is substantially supported by analytics.

xii. Resource deployment success is based on the outcome of resource distributed

Organisation C employs a return-on-investment policy when disturbing resources amongst needed projects. An investment in resources is expected to return a specific outcome likely to be achieved through the project. The information generated from the activities is stored and reincorporated into future decisions. Companies A and B apply other methodologies to the resource deployment processes, as indicated in other areas of this section.

xiii. Training and clear communication are instrumental in improving BI use

To curb the limited supply of skilled personnel, training has been leaned on by Company A through a talent identification and nurturing. Further, by establishing clear lines of communication, Organisation A can effectively deploy strategies employed through BI exercises and meetings. This process is particularly significant as it allows for the transfer of information into action, and the clearer the information is received, the more effective the strategy is and, ultimately, the outcome.

xiv. Rigid reporting affects operational efficiency

Company B indicated the necessity of flexible reporting platforms that provide information that promotes coordination and accommodates ad-hoc requests from various entities across the organisation. According to ROB3, this level of rigidity affects the business as it cannot efficiently operate since all reporting components are structures, and any request beyond what is provided will require additional time, which could affect the operational efficiency of the business.

xv. BV from BI unknown

Company C has outlined that the BV attained from BI is still difficult to establish as there is no direct, measurable correlation within the company structures in place at the

moment. This complicates understanding the impact of BI on business operations, as pinpointing the BV gained is unclear. This differs from Companies A and B, which have a structure for measuring the BI efforts and can be correlated to the business's organisational performance.

xvi. BI system uniqueness is not clear

Company C also conceded that there was no apparent uniqueness of their BI system, meaning the system currently employed could be effective for the business's operational needs. However, it has no uniqueness to its nature to produce competitive advantage capabilities. This speaks to the necessity of this research as it shows the opportunity for South African businesses to understand better how to maximise value from BI investments. BI system uniqueness represents the possibility of a competitive advantage which cements the organisational position in the industry and ensures the business's future with continuous improvement.

xvii. The compartmentalisation of BI to achieve BV

Due to the lack of uniqueness of BI system functionality, ROC5 indicated that Company C would benefit from creating segments within the organisation and, in those segments, evaluating the BV achieved without mixing with the rest of the organisation. The emulsification of BI efforts with the rest of the organisation complicates the evaluation process of BI efforts as it becomes complex to follow through the process from BI investment to the point where BV is attained.

6.4. Chapter Summary

The chapter comprehensively discussed the findings from the three cases narratively to make all information about how BI is applied within the respective cases easily comprehended. Furthermore, the chapter also discussed the various types of cases and the justification of the selection of the chapters, which was an extension to the case study discussion covered under the methodological strategy applied for this study.

Chapter 7: Interpretation of Findings

7.1. Introduction

The chapter provides the interpretation of findings by applying RBV, DC and TOE theories as lenses based on the cross-case analysis presented in the previous chapter. By doing so, an elaboration of key nuances which facilitates BI-infused capabilities to attain BV from the perspective of the selected theories used as a lens is presented.

7.2. Theory-based Elaboration of Findings

The summary of themes highlighted in Table 6.12 shows the three cases from the previous chapter, which identifies all the key factors or themes inherent per case and analyses the theme similarities and differences. This section will apply the findings to the identified theories and illustrate the similarities and differences from a theory perspective.

7.2.1. Elaboration of Findings from Resource-Based View Perspective

Table 7.1 depicts a cross-analysis of the findings based on the lens of RBV.

Table 7.1. Summary of Findings from a Resource-Based View Cross-Case Analysis

RBV Factor	Company A Presence	Company B Presence	Company C Presence
Valuable	✓	✓	✓
Rare	✓	X	✓
Imperfectly imitable	✓	X	✓
Non- substitutable	X	X	X

7.2.1.1. Business Intelligence as a valuable resource

All three companies have indicated how imperative BI is to operational capabilities. Companies A, B and C all use BI on all functional levels of the organisation despite varying application levels. BI is consulted in all facets of the business to ensure the maximum return is attained. This notion is supported by Arias-Pérez et al. (2021) and Paradza and Daramola (2021), who all concede to the importance of BI in an organisation, and this statement also stands true in South African organisations. Arias-

Pérez et al. (2021) claim that organisations still in the early stages of t BI adoption stand to gain at least between 15 and 23% growth in sales and customer service, respectively.

The reasons for adopting BI are closely related to how organisations perceive BV as those aspirations reflect the objective of what and how a business seeks to achieve. Despite both organisations extensively using BI, the reasons for the adoption differ. In Company A, the motive for adopting BI was to maintain a healthy level of competitiveness and protect the market share that was occupied, while Company B was focused on continuing to improve customer service delivery by better understanding the target market. Company C applied BI solo, which dilutes the intended impact on processes and subsequently on BV despite applying it to all organisational functions. However, with time, Company B realised the potential to use BI to protect its market where, inevitably, through constant surveillance, it could better track industry performance and ensure it remains competitive. Inversely, although Company A's BI adoption reasons were centred on aiming to fend off competition and increase sales revenue, customer service was also imperative to the adoption and use of BI. Company C employed BI to maximise operation capacity and achieve control within specific key components since resources are strictly monitored.

This underscores the imperative for BI adoption and use within various companies in different industries, especially in the telecommunications, Fast Moving Consumer Goods (FMCG) and bank. BI can be considered a valuable resource since most aspects of business operations are heavily dependent on BI insights, whether to monitor internal and external change or provide forecasts which can help drive new product development. For example, as indicated by the case of Organisation B where BI is now incorporated with vendors which as a result realise more complex and intricate insights. This indicates the imperativeness of BI as the same can be argued for Organisation A and C who also heavily infused BI with their respective operations which as result has influenced the structure of operations and measures to adapt to change.

7.2.1.2. Business Intelligence as a rare resource

As indicated, BI is essential to the daily operations of the respective cases. However, from a rarity perspective, BI is fairly common in modern-day South African companies

(Atsu, Ahlijah Yonney, 2022; Atsu Ahlijah Yonney, 2022). As a resource, BI cannot be regarded as rare; however, adopting elements of the Dynamic Capabilities which involve the assortment of a combination of resources, can create a competitive advantage.

Nevertheless, all cases have adopted BI in different ways, and as such, that can create a unique capability that maintains and improves firm performance and, subsequently, BV. For instance, all cases have embedded BI within their respective operations in varying degrees which, due to the different industry classifications, values and objectives, demand different BI operations capabilities. This makes BI Capabilities rare, particularly for Companies A and C. Company B's BI resources can be considered generic since BI's application mainly improves the organisation's sales performances, which can be replicated.

7.2.1.3. Business Intelligence as an imperfectly imitable resource

BI as a resource can easily be implemented in various operating systems as various over-the-counter BI system packages are available. South African businesses have options. In fact, most of the available over-the-counter applications are now delivered with standard analytics dashboards for easier reporting and understanding (V- Count, 2022). At this stage in South Africa, it is easy to adopt BI as there are many variations users can select from that best suit their operations and needs.

This is not the case for Company A, which adopts complex analytics to identify unique variable patterns within their respective KPIs. These efforts are a product of intensive investment and disciplined culture, resulting in a sophistication that provides a sustainable competitive advantage for the organisation. This, subsequently, highlights that adopting BI within an organisation can be mundane.

Further, in the case of Company B, they were able to increase their BI applications, so much so that they managed to create a BI application to improve the organisation's sales performance. The process of BI development and adoption is fairly simple enough that some organisations resort to many BI applications that can be replicated in the case of Company B.

The same can be documented in Company C. Regardless of the uniqueness of the BI system adopted to combat changes and ensure the enterprise stays abreast of trends

and changes across its axes; the system can be recreated given the right conditions. It does not require much for an organisation to copy the BI system adopted by Company C, which makes it imitable.

7.2.1.4. Business Intelligence as a non-substitutable resource

At this stage, to the researcher's knowledge, there is no direct non-rare substitute for BI, especially considering how vastly all three cases adopted different BI. BI has increasingly become integral in all cases' operations to varying degrees. In all cases, BI dictates the operations in both businesses, where core KPIs are monitored constantly to identify operational anomalies that threaten the businesses or serve as an opportunity to satisfy better the targeted customer base.

Further, BI is imperative for predicting, diagnosing and prescribing organisational operations, all the hallmarks of a contemporary business. Businesses nowadays strive to understand better how their respective organisations operate and how they should operate in the future. BI is a useful tool in this perspective as it provides close to an accurate reflection of how businesses can be in the future. This is why all cases consistently improve their respective BI infrastructure to achieve maximum BI output.

7.2.2. Elaboration of findings based on Dynamic Capabilities Perspective

From the five themes associated with DC, the three organisations agreed on two, specifically themes related to 'sensing' internal and external changes of the organisation, pointing to a more structured means of mitigating threats and identifying opportunities within the respective organisations.

Table 7.2. A summary of the findings under the lens of DC indicates the application of BI to help dictate changes in the internal and external environment.

Table 7.2. Summary of Dynamic Capabilities Cross-Case Analysis

Theory Elements	Occurrence in Company A	Occurrence In Company B	Occurrence In Company C	Combined Theme Count
Sense	✓	✓	✓	10
Seize	✓	✓	✓	8
Transform	✓	✓	X	8

7.2.2.1. Internal Changes Monitoring (Sensing)

All three organisations pointed to constantly monitoring KPIs periodically to assess any internal and external performance changes or trends. According to informants, periodically checking the insights on organisational performance is a critical process for assessing internal performance against set benchmarks and, importantly, aids in assessing organisational performance against industry benchmarks. Any extreme variations in the benchmarks can either represent an undercapitalised opportunity since it would have been recently discovered or pending threats the organisation needs to mitigate abruptly. This is systematic to Torres et al. (2018), who clarify that organisations employing BI can benefit from sensing (a component of DC) to ensure it achieves a competitive advantage. As an extension of RBV, this affirms the need to focus on resources and depend on these unique resources to gain a sustainable competitive advantage. Teece et al. (1997) and Torres et al. (2018) argue that emphasis should be placed on operational capabilities (ordinary capabilities) where the operational capabilities are reinvented to mitigate changes in circumstances, both internal and external.

7.2.2.2. Resource Deployment (Seizing)

A critical component of BI systems is deploying resources to 'Seize' the opportunities and threats indicated by BI insights. All three organisations conduct this process differently. However, they are similar when reviewing the essence of the process. Company A employs advanced analytics and machine learning to produce the exact quantities needed to achieve the desired outcome. Adding advanced analytics mitigates resource waste, subsequently improving process efficiency.

On the other hand, Company B deploys a resource-based system while considering the expected outcome in contrast to the resources needed. Both processes are effective means of deploying resources, which in their refined nature, point to the maximisation of resources adopted. Teece et al. (2018) explain that adequate resources are imperative to seizing opportunities and neutralising threats. He further explicates that it is challenging to attain and realise consistent BV results without adequate resources.

Company C's deployment of resources is mainly dependent on the crisis on the circumstances at hand. Where a consensus amongst executive management is

achieved, the resources are deployed. The deployed resources are realised with the expectation that the problem should be resolved. Further, prioritisation plays a key role in allocating resources to the challenge because challenges or 'crises' occasionally tend to occur concurrently. Henceforth, the most potentially damaging circumstance is given precedence over others.

Company A employs a collective effort strategy for BI systems where departments make the data available and discuss the analytics, they wish to gain from it to enable informed decision-making and strategy formulation. These meetings help ensure quality analytics are attained for the various operational processes that need action. At the same time, Company B's BI teams have a structured overview of the information required from the various departments, allowing for planning and quicker reporting timelines. Mishra et al. (2018) indicated the necessity to configure BI capabilities to simplify data availability. This seems necessary with the current BI structure in Company B. Company C employs a different process from Company B where, regardless of the unified planning within the organisation, BI requests and applications are occasionally conducted in silos where each department applies BI how it sees fit. As a result, this tends to hinder the overall impact of BI as the organisation pulls in different directions. A comprehensive BI culture needs to be instated within Company C to ensure that all BI efforts materialise in a specific and agreed upon BV.

BI has witnessed vast development since its early emergence a couple of decades ago. Since then, BI has been a term that has emerged with other BI-related activities that were once classified independently. For example, Big Data, a term used to describe the nature of data, has metamorphosed into Big Data Analytics (Bhosale & Ukhalkar, 2020; Teece et al., 2018). This evolution epitomises the true nature of BI, which is dynamic in its core nature and offerings, which is why advanced analytics is a favourable step towards BI development.

This is the case with Company A, where advanced analytics and machine learning have been boarded to the business's operational processes. This represents a commitment to accuracy and proficiency of operations and a desire for accurate predictions that aid strategic planning and positioning of the organisation (Abai et al., 2019). Company B developed its in-house BI teams, whose main function is to adhere to the BI needs of the organisation and its stakeholders. This creates significant

pressure on the BI teams to produce large volumes of analytics in a limited timeframe. However, despite all the pressure, the organisation has a system to adhere to the company requirements. Company C is compelled by the availability of resources and prioritisation of projects with the highest possibility of producing a required outcome.

7.2.2.3. Transform

According to Teece (2018), to transform involves adopting the set strategies into the business's operations, which requires restructuring the organisation's structures and reviewing the culture as a result. This also involves aligning capabilities and reforming or designing new capabilities to ensure a sustainable competitive advantage. All three cases restructured the respective organisations to be data-led, which embodies a culture of analytics-led decision-making. However, the critical difference in all three is the holistic application of BI to the rest of the organisation. Companies A and B have achieved that, and the entire organisation coordinates, compiles data, and uses the analytics harvested within the organisation's various functions. Case C is different, especially in focusing on coordinating BI efforts in the organisation. According to the respondents, the BI efforts within the organisation can be conducted in silos, which heavily dilutes the impact of BI's lack of coordination of efforts. Information that could be useful for one department might be overlooked if it is not shared with the rest of the business.

7.2.3. Elaboration of findings based on the Perspective of the TOE Framework

Table 7.3 indicates findings under the TOE framework, summarising and categorising them under three factors of the TOE framework.

Table 7.3. Summary of the findings under the TOE framework

Factor	Description	Theme Count
Technology	Flexible data sets through collaboration	6
	Deployment of multiple BI applications to monitor KPIs	5
	BI-enabled competition monitoring	4
	Use of complex data to help operation teams	4

	Access to real-time information	4
Organisation	Top management support	12
	BI centric organisation	3
	Sales teams as pioneers of BI adoption	3
	Competition pressure as an influence on BI adoption	3
	Collaboration between functional departments	4
	Lack of BI skills sets	5
	Lack of BV realisation structure	3
Environment	Competitive presence	6
	Comprehension of trends and the industry	2
	Effective external strategy deployment	2
	BI Capability remittances	3
	Better understanding of the customers base	4

7.3.3.1. Technology

i. Flexible data sets and tools through collaboration

Companies A, B, and C employ data sets from all departments for processing and reporting, holistically allowing for insights that provide a broader reflection of the organisations' operations. This allows for better planning and operational coordination, influencing firm performance and BV. To achieve flexible data sets, constant meetings are conducted with all departmental heads where the type of data, timeframes and volumes are discussed, and importantly, prioritisation of BI tasks is also done. This is applied in both cases where vast data is sent to the BI teams for processing, where the insights generated can be adopted in various facets within the organisation. Further, not only is there an emphasis on data quality in Company C, but there is also data flexibility to suit various circumstances in the organisation's departments. The notion is to ensure that the data integrity is preserved so that quality information can be generated to employ in strategy. Further, the company invests in developing flexible

BI tools and infrastructure so that changes in the BI tools can be conducted quickly to achieve the desired outcomes.

ii. Deployment of multiple BI applications to monitor KPIs

Also, Companies A, B and C possess multiple BI applications dedicated to monitoring key KPIs and helping to monitor and manage performance changes. These applications allow for ad-hoc reactions to changes within the environment, whether internally or externally. Despite all cases possessing multiple BI applications, in Company B's case, there have been requests for an amalgamated reporting structure that provides all the BI KPIs under a singular reporting dashboard.

iii. BI-enabled competition monitoring

BI as a tool to improve an organisation's competitiveness is heavily mentioned in the literature but with varying degrees of mention and significance. Interestingly, Return on Investment (ROI) and other financial benefits are mentioned more as influencers of BI's adoption and the expected outcome from BI investment and adoption. According to Paradza and Daramola (2021), improving organisational financials such as ROI, sales growth, and other revenue growth are indicated in the literature as the main determinants of BI adoption, while competitiveness is considered the fourth most influential factor for the adoption of BI (Paradza & Daramola, 2021). Both organisations also consider profit attainment instrumental in retaining BV and subsequently in determining the general significance of BI within individual cases.

Additionally, Company A added other matrixes when viewing BV attained from BI influence, such as the degree of automation, production of clear, actionable insights, opportunity and threat identification, clear business and industry performance analysis, and the degree of accuracy of prediction of future trends. All these BV variations are associated with operational efficiency, also mentioned in various literature as a form of BV (Chen & Lin, 2020; Popovič et al., 2018; Seddon et al., 2017). Company A and B's responses seem to indicate that they have a uniform conceptualisation of BV, which may lead to questions of the BI maturity within the organisations. According to Torres et al. (2018), the confusion around value gained through BI is partly due to the lack of a unified means of realising BV, which would also require a standard matrix to measure BV. Organisations creating a trajectory to attain BV without a consistent and uniform matrix can result in difficulty in consistently

achieving BV from BI adoption. Company C lacks a defined structure to realise BV as it has indicated that the BI system employed currently lacks the uniqueness to reveal the BV achieved. This undermines the significance of BI and its impact on the business as its set-up would be generic, resulting in generic outcomes.

iv. Use of complex data to help operation teams

BI by-products include different forms of BV discussed earlier in this chapter. However, automation is a subsequent result of adopting BI and Company A has realised advanced results of this benefit, including automation of action for some of the organisation's operational processes. For instance, there are set BI indicators that report changes in key operations, which, when deviated from, automatically send instructions on actions required to rectify the anomaly. This subsequently helps relieve pressure on operators as the action would automatically get implemented.

Companies B and C have yet to implement BI automation as operators need to facilitate the action presented by the BI teams. The organisational department requests the BI teams to process the acquired data into the desired analytics later applied to various departmental strategies. Through automation, the BI team can be allowed more time and space to focus on more complex analytics and generate unique patterns and relationships that can subsequently become a competitive advantage. The sentiment is also shared by Ylijoki & Porras (2019), who state that "automation makes it possible to harvest and process more data in almost real-time" (pp: 1091). Additionally, through automation, the organisation can benefit from the latest insights, which can allow the organisation to manoeuvre swiftly.

v. Access to real-time information

Data quality is important in utilising BI, and the fresher the data, the better the information to use for the design of processes and strategies. Company C holds this sentiment true and has invested in ensuring that the information obtained is real-time, meaning that the changes within the organisation or externally are dealt with promptly. This is in line with the perspective of Paradza and Daramola (2021), who explain the importance of data integrity within the confines of BI, where fresh data sets represent the latest picture the data sets seek to unveil. If these data sets are incorporated into the organisation's decision-making process, the strategies conceptualised are bound to make a more notable impact compared to old data sets.

7.3.3.2. Organisations

i. Top Management

All three cases indicated the importance of having BI accepted by the entire organisation to maximise output. According to the respondents, all functional departments use BI to varying degrees. This can be accredited to the management's role in supporting and enforcing the application of BI in daily operational processes. Management support has been mentioned and confirmed by both organisations, indicating the realisation of the significance of BI in South African organisations. This aligns with the literature where Paradza and Daramola (2021) Dong and Yang, (2020); El-haddadeh et al. (2020); and Trieu, (2017) all identify management support as instrumental to effective BI adoption and the realisation of BV.

ii. BI-centric organisation

All three organisations agree on certain perspectives of BV as the centre of all the operations. The BI-centric approach heavily influences the definition or parameters of BV. The three organisations differ on other perspectives of BV; for example, Company A also considers the degree of automation provided, production of clear, actionable insights, opportunity and threat identification, clear business and industry performance analysis, and degree of accuracy of prediction of future trends as forms of BV. Company B is focused primarily on customer experience and satisfaction as a form of BV. According to Paradza & Daramola (2021), perspectives from the three cases are affirmed in literature as a form of BV with other organisations worldwide in varying degrees. Company C focuses on improvement in product offering through sales performance analysis, which is similar to Organisation B, which also orients BV on sale performance with a critical difference of lack of direct structure that leads to sales improvement.

iii. Influencers of Business Intelligence Adoption

All three organisations have different processes dedicated to decision-making which fuelled the adoption of BI. In the case of Company A, competitive pressure forced the organisation to adopt BI to remain competitive and acquire the necessary equipment to protect its market share. Company B was pressured to improve sales performance and acquire a firmer understanding of its customer base. Company C adopted BI due to the necessity of improving operational efficiency throughout the organisation. These

motives were all centred on improving decision-making processes within their respective organisations.

In the case of Company A, it uses email correspondences to detail the action required and the plan to employ to achieve the desired results. On the other hand, Company B conducts periodical meetings depending on the nature of the process needing action and complexity as well as Company C. All three organisations have a different way of communicating between departments to take action on the generated analytics that works for the respective organisations. Decisions must be inspired by quality analytics that allows the organisation to implement effective strategies to generate BV (Wilkin et al., 2020) regardless of the means of channelling communication. This is true during the COVID-19 era, where various forms of interactions emerged to connect people geographically distanced.

iv. Lack of BI skills sets

Companies A and B indicated the necessity to expand their respective BI operations after realising a high demand for BI insights. Varying between specific requests and standardised analytical reporting, the BI teams have to produce quality information, sometimes with very short deadlines. Since BI operates as an independent capability in both organisations, most, if not all, operational processes heavily depend on BI tools to plan and make informed decisions to implement a strategy. This, therefore, bombards the BI teams with larger requests they cannot satisfy. The expansion would include an addition of skilled personnel to mine the data and present the information on BI tools. An organisation's BI capability is instrumental in attaining BV, as explained by Arias-Pérez et al. (2021), who reinforce the importance of BI capability in achieving BV. BI Capabilities are instrumental to organisational success, and the current surge towards BI adoption and advancement has firmly cemented BI Capability significance. Company C has indicated that its BI Human Capital is sufficient to meet its needs as they do not have any skills deficiency. This results from applying BI to analyse the probability of staff turnover and counter the threat before it germinates into a problem.

Strategies adopted to help mitigate the lack of skilled human capital are to upskill staff with the necessary skills to understand better the analytics generated for their respective processes and facilitate confidence in the tool. This is true of Companies A and B, which have insisted on training their respective organisations on BI value. Since

BI has been generally accepted as an operational tool, it is equally important to equip staff with the knowledge and ability to capitalise on the tools (Jeble et al., 2019).

The lack of BI personnel has been heavily documented in the literature and reaffirmed in this study as both Company A and B indicated that the BI teams require more skilled personnel to mitigate the high volumes of requests the department receives. Furthermore, Company A and B also indicated that the level of understanding of BI analytics varies in the various departments, with some staff members struggling to understand the analytics, thereby requesting further deconstruction of the information, which requires more time from the BI teams, who are also overwhelmed with requests. There is a need to train and simplify BI insights so that it is easier for all end users to gain value from BI-infused operations.

BI human capital has been documented as scarce, with authors indicating the resource as a priority to achieve an efficient BI system and culture (Aljumah et al., 2020; Jeble et al., 2019; Torres et al., 2018; Seddon et al., 2017). This is the case with Companies A and B; human capital is limited, and both organisations can benefit from increased BI capital. Without adequate BI capital, organisations struggle to produce adequate insight to help them benefit. Importantly, BI human capital is significant because it is considered one of the critical BI capabilities an organisation should have in its arsenal (Aljumah et al., 2020).

Companies A and B both reiterated the necessity of supporting BI application and use. Most importantly, investment in BI activities such as infrastructure development, HR capital hiring, and sourcing of technologies can enhance BI processing and offering to the entire business. Even within different contexts of BI investments, one organisation sought to expand to alleviate pressure on BI demand. In contrast, the other organisation emphasised the need to continually upgrade the BI infrastructure to keep abreast of current trends, fend off competition, and maintain market share. This is in sync with the rhetoric in literature where authors emphasise the significance of BI investment. This statement holds so much that BI investment has been highlighted as essential for effective BI systems and BV (Gu et al., 2021; Raguseo & Vitari, 2018; Trieu, 2017).

v. Lack of BV Structure

Company C established that there are no recognised means of measuring BV as the organisation has yet to employ a BV structure to measure its BI efforts. The basis of the argument of this research is to establish the nuances of BV, and in the paper by Paradza and Daramola (2021), it is unveiled that specific components need to be present depending on the various theories employed by the organisations. Company C needs to establish a BV philosophy that aligns with its strategic goals and ensures a perfect balance between desired outcomes and available resources.

7.3.3.3. Environment

i. Competitive presence

As indicated by all three cases, competitive presence is an issue the organisations are wary of. In the case of Company A, competitive pressure forced the organisation to adopt BI, cementing the significance of the influence of competition in BI maturity within organisations. The stiffer the competition, the more likely an organisation will invest in maintaining competitiveness and relevance in a specific market. Company B deployed strategies that allow for sharing insights, improving the company's operational efficiency. Sharing insights allows for more effective planning and positioning since the suppliers receive the same information used in deploying strategies in Company B, thus reducing bureaucratic red tape between the two entities. Company C pointed to the presence of competitive pressure. However, the pressure was not the determinant of the adoption of BI and its application across the entire organisation. Company C applies BI to stay abreast of the competition by improving its operational capabilities through constant monitoring.

ii. Effective external strategy deployment

Due to the deployment of BI, all three cases can adjust and counter any impact of competitive pressure. Companies A, B and C designed effective counter systems that ensure that all threats are neutralised, and opportunities are exploited. This is through consistent monitoring of the various KPIs, which allows for sensitive external environment monitoring. Company A has invested heavily in BI infrastructure so that complex relationships between variables in the business's external spectrum are further scrutinised, allowing for more accurate prediction and counter strategies. As for Company B, BI is mostly applied to focus on customer retention, where BI pinpoints

changes in customer preferences to improve performance, thereby improving BV. Company C monitors the industry's KPIs against the organisation's internal KPIs to identify any significant fluctuations that can negatively or positively affect the business, depending on the circumstance.

iii. BI Capability remittances

BI Capability is an asset to any business regardless of the adoption stage to realise BV. To offer better service and more benefits to the customers, Company A offers BI value-added services to its partners in the supply chain (mostly suppliers) and shares analytics related to the offering provided for the organisation. The organisation provides analytics to better equip the suppliers on critical products that help improve customer satisfaction. In exchange, the supplier provides a financial benefit. Razaghi & Shokouhyar, (2021) explain the importance of organisational management sharing insight with the supply chain to improve the offering and catalyse strategy deployment so that the organisation can keep up with the level of dynamism epitomising contemporary business environments. Companies B and C do not externally share their insights with their partners. However, emphasis is placed on ensuring that all departments support one another to achieve BV, despite some latencies with Company C, where departments still operate in silos. Departments provide data, and the BI teams synthesise the data to provide insights that can be adopted into strategy.

7.3.3.3.4. Better understanding of the customer base

Despite Company B's centricity of customer satisfaction and sales performance, all cases, to a degree, naturally, monitor customer satisfaction. Company A monitors customer satisfaction, promotion performance, and offerings compared to the competition and acquires data on an ongoing basis. The notable difference between the cases is that for Company A, monitoring encompasses customers, products and competition, while for Company B, the focus is centred on sales performance, which is a year-on-year comparison and customer satisfaction gauged via the surveys and purchasing behaviour of customers. Company C structures services based on the insights provided by BI, ensuring that better alignment can be achieved, and customer satisfaction can be strongly established.

7.3. Chapter Summary

The chapter provided a detailed analysis and comprehensive discussion of the key similarities and differences between the BI applications of the three case studies through the adoption of a cross-case analysis. Based on the three capability categories explained earlier in the study, the similarities and differences were grouped under operational, dynamic and BI capabilities. Furthermore, literature was consulted to confirm the viability of the processes adopted by the organisations in contrast to BV realisation guidelines. The final chapter of this study will encompass the conclusions, contributions and recommendations based on the analysis.

Chapter 8: Conclusions, Contributions and Recommendations

8.1. Introduction

This chapter provides a comprehensive discussion of the key findings discussed in the previous chapter and aligns with the research questions depicted in the first chapter. This section's objective is to answer the research questions with the findings discussed to ascertain the influence of BI on operational capabilities in South African companies. Furthermore, contributions amassed from this study will also be deliberated under the segments of theory, methodology, and practice to indicate the extent of value generated from this study. Recommendations for the three cases as sample representatives of BI-infused organisations in South Africa are also provided.

8.2. Answers to Research Questions

8.2.1. Answer to Research Question 1

As expressed in the cross-analysis section in the previous chapter, BI capabilities have proven to be paramount in pursuing BV from a literature and practical perspective. As such, the following BI capabilities were indicated to be pivotal for BV generalisation. As indicated in the previous sections, the research question was explored using the RBV theory.

i. Expanded BI Teams (Increase HR Capital)

BI Teams expansions were mentioned by Company A and B as critical components to the realisation of BV as they were highlighted too, amongst others, as limitations in both organisations, hindering maximum BV yield in the respective organisations. Both organisations have infused BI within their core operations, placing BI as a core function of both organisations. With this in mind, an organisation possessing adequate HR capital possess the potential to yield mass BV, which can better place an organisation in a strategic position to increase market shares, improve customer satisfaction and/or increase revenue. Company C has managed to manage the Human Capital deficiency through the application of BI on employee turnover probabilities which has helped the business stay abreast of this scarcity trend.

BI human capital is so pivotal that it has been consistently highlighted as a major BI capability for organisations in literature (Jeble et al., 2019; Jayakrishnan et al., 2018; Torres et al., 2018). BI human factor enables the processing of data as well as the implementation and an organisation with capable HR capital to maximise the return of

BI, amongst many responsibilities. BI capital represents the drive of BI as the application and use of BI requires human interaction. Organisations' operational processes heavily depend on the human factor to facilitate the production and action of BI-infused strategies.

Organisations require a capable BI human resource team that can produce the required insight in the required capacity to help various functional departments achieve the set goals. Interestingly, despite the lack of adequate HR Capital, one case emphasised the necessity of training to help curb the deficiency of HR capital, while the other did not mention it. Since there is a universal scarcity of BI capital, internal training and development can help mitigate the scarcity, benefit from retaining HR capital familiar with the business culture and operations and help save recruitment costs associated with acquiring new HR capital.

ii. Need for adequate investment

The investment enables capability in various forms necessary for attaining BV by mechanising the nuances necessary to achieve BV. BI Investments enables the effective deployment of resources and other necessary tools to produce transformational insights. All three cases indicated the necessity of investment and affirmed management commitment to BI projects by providing adequate investment to acquire new BI infrastructure and expand BI teams, which all require investment. Furthermore, in one of the cases, respondents insisted on consistent investment and BI infrastructure capability development, ensuring that the organisations stay abreast with competition and can satisfy varying BI requests.

According to Vitari and Raguseo (2019), BI investment is critical to BI realisation, where the authors establish a direct correlation between BI investment and BV. Furthermore, the authors were able to establish a direct relationship between BI investments with financial KPIs increments as well as customer satisfaction. Reviewing the results provided and analysed, the same is true with the three cases where they understand the value of BI investment and the necessity to possess adequate investment to maintain a healthy BV realisation.

iii. Development and use of advanced analytics

BI has enabled organisations to maximise output through executing informed decisions based on BI insights provided. However, as the popularity of BI stems from the various industries within South Africa, all three cases will require considering more leveraging BI tools that can improve the BI capabilities and separate the three organisations from the rest of the competing organisations. By developing advanced analytics, an organisation can produce new valuable insights and analytics that the organisation was unaware of by identifying new patterns and relationships. From these unique insights, an organisation can cultivate new strategies and offerings which can render it unique, thereby presenting a competitive advantage.

Furthermore, advanced analytics can assist in various components of an organisation, such as resource deployment, as shown in one of the cases. The advanced analytics show great detail and more specific and accurate predictions, which help with the planning and executing core processes that subsequently aid organisations in realising BV.

Advanced analytics projects constructive steps towards process automation and Artificial Intelligence (AI), which help mitigate BI needs pressures and, subsequently, assist organisations in saving costs and reducing reaction time. Furthermore, through automation, organisations can focus on more important strategic management since some or most operational processes would have been mitigated or capitalised on depending on the circumstance (Wamba-Taguimdje et al., 2020).

iv. Management Support

Management support is mainly critical to BV for two reasons, including creating the necessary culture that supports the application of BI and providing resources, mainly investment and time, to facilitate the adoption and holistic use of BI. In all three cases, management support was highlighted as essential in realising BV as guidance, financing and management of BI activities are spurred by top management's direct or indirect influence. Without management support, BI adoption would either be poorly executed, or non-existent, as other opportunities would have been prioritised over BI adoption. Consequently, management prioritising BI understands the value it provides and BI positioning within contemporary business sciences.

Suša Vugec et al. (2020) affirms the necessity for management support in the deployment and harnessing of BI to attain BV as management influences the

alignment of the strategic process to realise BV and allow the disposition of funding to facilitate BV. The authors also point to the duty of management to establish a coherent BI vision that helps direct the trajectory of BI efforts to realise BV. Also, the operatives reporting BI structures comprise top management. This process is necessary to allow communication between various participants to occur.

8.2.5. Relationship of BI capabilities to VRIO

Regarding RBV, this resource embodies all the pillars of RBV, namely VRIO factors. BI human resource capital (BI Teams) has consistently shown that they are valuable as all three cases heavily depend on the BI capabilities to execute daily processes. Without them, it would probably result in operational failure. Additionally, BI human capital has been distinguished as a scarce component within organisations, with Companies A and B indicating the necessity to increase BI human capital to meet operational demand. The inimitability of BI human resource capital is two-sided in that BI is a fairly adopted tool within organisations, and the possibilities of mimicking the BI team's operational processes are high. However, the operational structure and interactions of the BI capabilities with the operational capabilities are bound to differ depending on organisational values and objectives. Company C, as mentioned earlier, has managed to apply BI so that they can be informed prior to the resignation or any possibility of staff leaving the company. The final pillar of the VRIO is organised, which represents the ability of the organisation to utilise the BI teams fully, and also seems to be the case, given the structural re-engineering process all three cases conducted to allow BI adoption. According to Burnley (1991), an organisation possessing all variables can attain a sustainable competitive advantage by adopting BI.

On the other hand, adequate investments lack various capacities to be considered sustainable competitive components for BI, as organisations with strong financial capabilities can easily imitate the resource. Furthermore, the resource is not rare. Countless South African businesses possess the financial capabilities like the cases in this study, if not more, which depicts the resource as common. Despite this, the ability of an organisation to generate adequate investment in BI is paramount to BV as the resource is valuable since BI infrastructure and personnel can be recruited, and the organisation can distribute the finding where required effectively.

Regarding developing advanced analytics and automation, this resource is instrumental not only in the benefits associated with upgrading BI capability to this stage but also in creating a sustainable competitive advantage. According to Wamba-Taguimdje et al. (2020), BI automation and AI benefit organisations through cost savings, flexibility, and timesaving as organisations can focus on important strategic planning. Advanced analytics are valuable as they help organisations save money and free up personnel, resulting in higher productivity. Furthermore, advanced analytics and automation are still rare currently. Most organisations in South Africa focus on effective BI adoption, which provides organisations currently employing advanced BI a competitive edge. Additionally, one of the three cases has achieved automation, meaning that the organisation is organised enough to benefit from the resource as a sustainable competitive tool. Nevertheless, the resource is imitable given enough investment. This means that the resource can only provide a short-term competitive advantage.

Management support is frequently indicated in the literature as necessary for realising BV (Paradza & Daramola, 2021). As explained earlier, without management support, an organisation can achieve little regarding BV, especially in resource deployment, BI operating structures and systems to realise BV. Subsequently, this automatically classifies management support as valuable as it directly influences the generation of BV and facilitates the organisation's utilisation of BI capabilities in an organised fashion. However, in investment and BI automation, management support is no longer unique as other South African organisations comprehend the extent of the benefit of BI. Therefore, they are more likely to allow the effective and complete adoption of BI to realise BV.

Table 8.1 depicts VRIO against the key BI capabilities necessary to achieve BV

Table 8.1 Resource-Based View of Key BI Capability resources

	Value	*Rarity*	*Imitability*	*Organisation*
HR Capital	Yes	Yes	Yes	Yes
Adequate BI investment	Yes	No	Yes	Yes
Development and use of advanced analytics	Yes	Yes	Yes	No
Management Support	Yes	Yes	Yes	Yes

Source: Researcher

All BI capabilities included on the list in Table 8.1 are imitable, meaning that from Burnley's (1991) perspective, they cannot provide a sustained competitive advantage. However, with the development of DC, an organisation does not necessarily require focussing on resources as a sustainable source of competitive advantage. Focus and emphasis should be placed on restructuring the operational capabilities and available resources to generate the capability to identify macro and micro changes within the operating stratosphere of the organisations and provide a sustainable competitive advantage.

8.2.2. Answer to Research Question 2:

The BI capabilities discussed in the first research question can be categorised under BI HR Capital, BI Infrastructure, and BI Management, each representing a spectrum highlighted as instrumental by Torres et al. (2018).

i. BI HR Capital

Based on the three cases, BI HR Capital contributes to firm performance in various ways (Kim et al., 2021; Torres et al., 2018), one of which revolves around the production of BI analytics for BI needs. Depending on the BI needs, which can be of two natures, i) BI needs to be invoked by a specific circumstance or situation which has led to the necessity to investigate further or ii) BI analytics provided as a system protocol for executive management feedback on the progress of the entire organisational departments.

BI analytics is provided for scenario (i), where the analytics are provided as a means of emergency. It requires action, executive management, or the responsible department formulates a suitable strategy to mitigate or capitalise on the newly discovered circumstance, which results in the deployment of resources. Depending on an organisational BI capability, the resource deployment process is guided by advanced analytics to determine the type and quantity of resources needed to achieve the desired objective.

In circumstances where scenario (ii) is enacted, human capital plays a pivotal role in producing daily or periodic reporting where information is provided on key benchmarks that an organisation utilises for various reasons, profit centres and KPI points. The reporting aims to monitor operational activities output where daily benchmarks are set, and operational performance is monitored against these benchmarks. Further investigation is employed for any anomaly or significant deviation from set benchmarks or historically set standards to verify the degree of change and the possible consequences remitted.

BI Human capital can also encompass BI operational execution, where operational management executes the decision employed by management. This includes comprehending the information presented and devising operational strategies or tactics necessary to achieve process performance. An example of such a process case includes customer satisfaction matrixes where analysing points include year-on-year product sales where negative growth can resemble pricing or competition influence resulting in negative results. This insight is sent to the BI department as a request for further examination and probably causes a negative effect. When adequate information is gathered and synthesised, more detailed information on possible causes of the negative performance is filtered to the relevant departmental managers, where strategies are developed to mitigate the situation.

ii. BI Infrastructure

BI infrastructure is equally as important as the other BI capabilities to realise BV as these components enable the production of BI insights. BI infrastructure represents the data quality provided to produce the necessary information and the BI system adopted to achieve the desired outcome. Data quality is instrumental in deriving quality information as quality information directly correlates to verifiable quality data provided,

which should be within an acceptable quantity to provide necessary outcomes. Furthermore, systems quality is closely related to data quality as systems quality intervenes with the type of data required to produce specific storage and management systems (Torres et al., 2018).

This is the case in one of the organisations where a gathering of quality data is an entire organisational effort where departments also help verify the information gathered by the BI Teams. By verifying the data source, the BI teams can process quality raw data, resulting in quality information. Furthermore, the BI implementation system is responsible for 'seizing' the opportunities and threats dictated.

Additionally, systems quality ensures that all necessary equipment to store and process complex data is available. In one of the cases where advanced analytics is utilised, high-powered BI processors are stipulated as well as the storage capability and capacity. Without BI infrastructure capabilities, organisations would struggle to process or store the information, resulting in unexploited opportunities.

iii. BI management

BI management encompasses managing related BI processes where resource deployment and use are carefully monitored. The management must reduce internal political drag, which hinders BI process success and compromises data and system quality. BI management is also responsible for culture development and implementation by establishing necessary values that connect to the culture and vision of the organisation. Moreover, BI management is responsible for attracting the necessary talent and expertise to administer the project functionality (Torres et al., 2018).

In all three cases, BI management is pivotal to the respective system that the organisations use. For instance, creating a culture and structure centred on BI use and application. Process rhythm is dictated by BI management, where the operational and reporting structures are outlined by management. This encourages and supports the use of BI in various respects. Furthermore, BI management communicates with stakeholders on the organisational goals and thereby points to the type of information required to achieve the set goals. BI management possesses an overview of the BI equipment and capabilities necessary to achieve the set goals where budgets and resource deployment are identified.

Another example of BI management influence is the deployment of training activities to help curb inefficiencies in utilising the BI tools. As indicated, BI HR capital is a scarce resource in South Africa (Department of Labour, 2021), and staff training is pivotal to gaining traction on BI adoption and application. Training allows personnel within the organisation who have limited skills and knowledge around BI adoption and application to be educated to improve organisational performance by delivering necessary insight and executing processes (Teece et al., 1997).

8.2.3. Answer to Research Question 3

The question is compartmentalised into three main categories following Teece et al.'s (2018) approach, which segments BIDC as sensed, seized and transformed to allow the organisation to achieve flexibility.

i. Sensing

In all three cases, BI is applied to monitor key KPIs occasionally, which helps notify the organisation of any anomalies. According to Teece et al. (1997), sensing is where the organisation monitors internal and externally influenced operations to dictate any significant changes in performance or competitor behaviour that can hinder the organisation's interests. This process is true in all three cases where daily reporting is provided on key benchmarks, and this information is shared with key stakeholders.

The anomalies can result in two conclusions, indicating changes in customer preferences or shifts in demand in the key divisions. BI also shows shifts in industry patterns where key benchmarks are monitored against industry performances, and anomalies are highlighted as a shift in competitiveness, loss, or increase in market share and offer.

The processes discussed in this chapter strive to inform the business of its operating performance internally and externally, which provides a guide to performance success. Furthermore, the processes included in this discussion depend on BI capabilities which play critical roles in collecting data, processing and managing BI capabilities to identify shifts in the operating environment.

ii. Seizing

Seizing encompasses deploying the necessary resources and implementing BI decisions into strategies from information gathered during sensing (Teece et al., 1997). After sensing, the relevant departments are notified of a shift in performance or the emergence of a situation that contributes to an opportunity or constitutes a threat to the business. At this stage, the relevant stakeholders must converse and formulate decisions and strategies to mitigate or capitalise on the scenarios.

The priority becomes to formulate viable strategies to ensure the organisation capitalises on or mitigates the scenarios provided. BI management must identify the processes affected by the intended change and the possible consequences of choosing the respective opportunity cost. Furthermore, a cost-benefit analysis is conducted to ascertain the benefits associated with the various decisions or projects the department can implement at that given moment.

Resource deployment is attributed to BI; however, the type and nature of the BI may differ depending on organisational BI capability. For instance, in one case, resource deployment is heavily influenced by the expected outcome as well as the significance of the outcome in contrast to the resources needed to implement the strategy. If the outcome benefits the organisation more than the resources needed, the strategies are adopted, and the operational department can commence with the briefing and implementation. Alternatively, in the other case, resources are deployed with advanced analytics, which prescribes specific resources and quantities necessary to capitalise or neutralise a situation. By doing so, an organisation can save costs and employ accurate planning. Furthermore, advanced analytics can also help determine which project is worth pursuing through detailed cost and benefit analyses.

iii. Transforming

Transforming includes re-engineering operational processes, implementing strategies recommended by operational management, and employing the resources deployed (Teece et al., 2018) based on the various matrixes an organisation prefers to use. Operational managers' responsibility is to enact the vision of the executive management based on the directions and resources provided to produce the desired result.

Once the operational processes have been redesigned to attain the desired outcome, further monitoring is conducted to confirm if the redesigned processes are achieving the desired outcome. If not, the relevant stakeholders should convey new instructions and resources, and the process commences as a cycle.

Fig 7 demonstrates dynamic capability processes adopted in the cases.
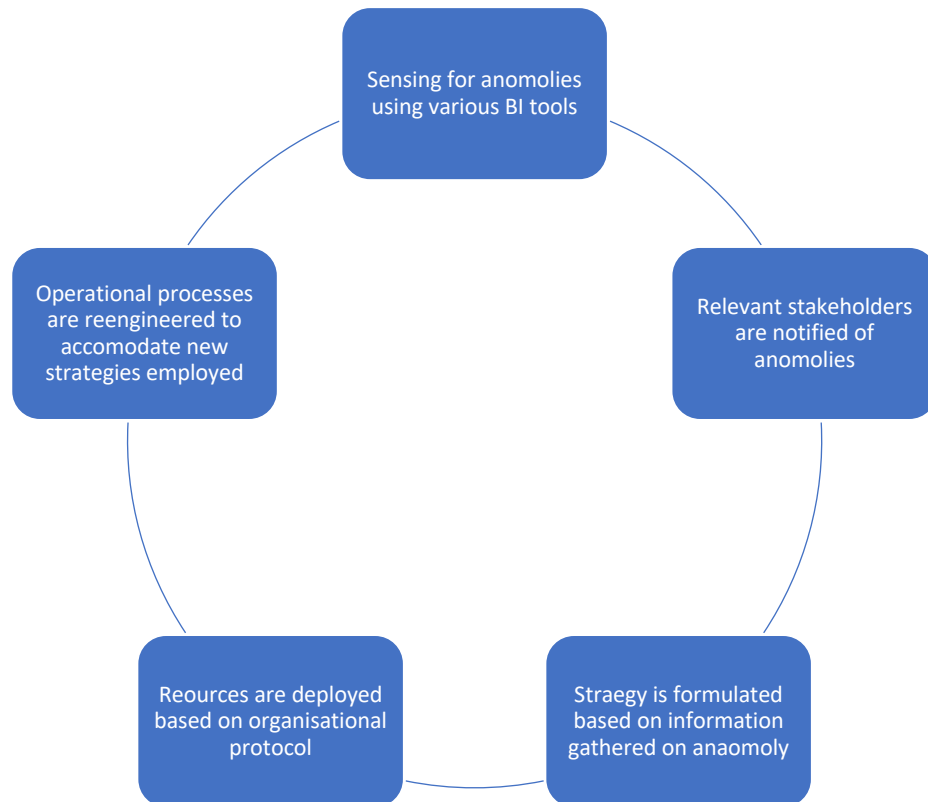
Fig 8.1: BI Capability effect on DC (Source: Researcher)

8.2.4. Answer to Main Research Question

BI as an IT tool has drastically changed the view of organisational technology, resulting in the need to acquire technology infusible with BI since various organisations holistically adopt it. As indicated in Company A, BI technology requires constant updating and upgrading of the systems instrumental in producing information. As discussed, BI Systems are overwhelmed by requests from various corners of the organisation since, in all three cases, the organisational structures have fully immersed BI and the organisational culture to a notable degree. The technology requires an increase to accommodate Companies A and B, indicating that BI needs capacity as a necessity for the continuous growth of the organisations. This view is in line with Kim et al.'s (2021) evaluation, where the authors insist on the need for

adequate BI HR capital and the individual characteristics of the capital employed for the various roles. Alternatively, Cases A and B can benefit from developing BI tools that can help project employee turnover, depending on the organisational demand and capability that Company C has developed.

Furthermore, BI systems are intertwined with BI data quality (Torres et al., 2018), which, when not invested in, can result in stagnant operations and a singular perspective of reviewing organisational performance. Unfortunately, stagnation can result in the organisation losing territories to competition, influencing BI adoption and development. According to respondents, despite competition influencing adoption on a secondary basis, it ultimately dictates the rate of organisational BI capabilities an organisation envisions adopting. Competition is highlighted in the literature as one of the key drivers of the adoption of BI technology (Paradza & Daramola, 2021).

Regarding innovation development to aid BI systems, South African organisations can benefit from the use of advanced analytics and automation to help curb the heavy dependency on BI teams and operational managers (Ashrafi & Zare Ravasan, 2018). Furthermore, with planning and efficient resource deployment, the organisation can guarantee cost-saving and increase the chances of operational success. Advanced analytics can also help create undiscovered patterns and relationships pivotal for understanding the various areas of interest and allowing management to capitalise on the newly discovered information. This fact is also acknowledged in literature by Wamba-Taguimdje et al. (2020), who point out the power of advanced analytics and AI to realise added value.

Additionally, all three cases possess in-house BI tools developed for numerous KPIs for significant firm performance. Despite the three cases possessing different BI reporting structures, Companies A and B applied a universal BI tool for regular reporting, while in the other case, BI tools were developed to ascertain specific BI benchmarks. Based on the feedback from the respondents, a universal platform for BI information is rigid. It does not necessarily accommodate all departmental needs due to the necessary infrastructure that allows for rapid system development. Companies A and B do not have this in their arsenal, resulting in departmental operations managers seeking further clarification from BI teams. Company C has developed a centralised means of reporting BI insights that can be applied anywhere in the

organisation despite the silo mentality. With an appropriate culture, Company C can develop its BI system to harness more sophisticated and in-depth analytics, which can benefit decision-makers.

Consequently, BI teams become overwhelmed by the various demands, and because the BI teams are still incapable of accommodating larger requests and lack the infrastructure to accommodate advanced analytics, the BI department is stretched to capacity. Organisations should devise BI reporting tools dedicated to specific KPIs to allow flexibility to the BI material and aid the independence of BI teams and various organisational departments. Jayakrishnan et al. (2018) declares this context, explaining the necessity to update BI systems to achieve firm performance and, subsequently, BV.

BI heavily influences human resource capital as it aids the execution of BI needs, consequently enabling the reporting of BI focus areas. As indicated in the previous section, HR capital has been highlighted in both Company A and B cases as scarce. This point is also affirmed in literature (Paradza & Daramola, 2021; Kim et al., 2021; Torres et al., 2018) and requires organisations to devise innovative means of curbing scarcity economically to meet BI needs. This is different from the case of Company C, which has harnessed the BI tools to inform the organisation of any critical possibilities of labour turnover that can hinder the production of much-needed analytics.

In one case, training has been employed as a resource to mitigate this gap. However, little is covered on the influence of BI on training activities leading to the realisation of BV. Furthermore, BI personnel also need expansion to meet the departmental needs generated to improve organisational performance.

BI management is influenced to structure BI-related operations that enable support and application by the entire organisation. Management's responsibility is to ensure BI application is holistic across the entire organisation so that related operations can synchronise and add operational value by mutually depending on each other. The co-dependency subsequently furthers analysis between related operations resulting in the development and realisation of patterns and relationships. Moreover, BI management helps in creating and policing BI-related values which feed the organisation's BI culture and objectives. With time, an organisation fully immersed in BI culture operates in a BI-related fashion that prioritises its use in all facets of the

organisation. The management of BI activities is guided by the subsequent culture and values adopted as operations are monitored towards the set benchmarks and expectations.

Fig 8.2. demonstrates an updated version of the conceptual overview based on the new information incorporated from the findings gathered. The critical difference is the influence of the environment on the BI Capabilities and vice versa. Based on the findings discussed in Chapter 7 and the discussion covered in Chapter 8, the environment has played a critical role in the influence of BI and vice versa, which therefore demands the inclusion of the aspect into the update framework.
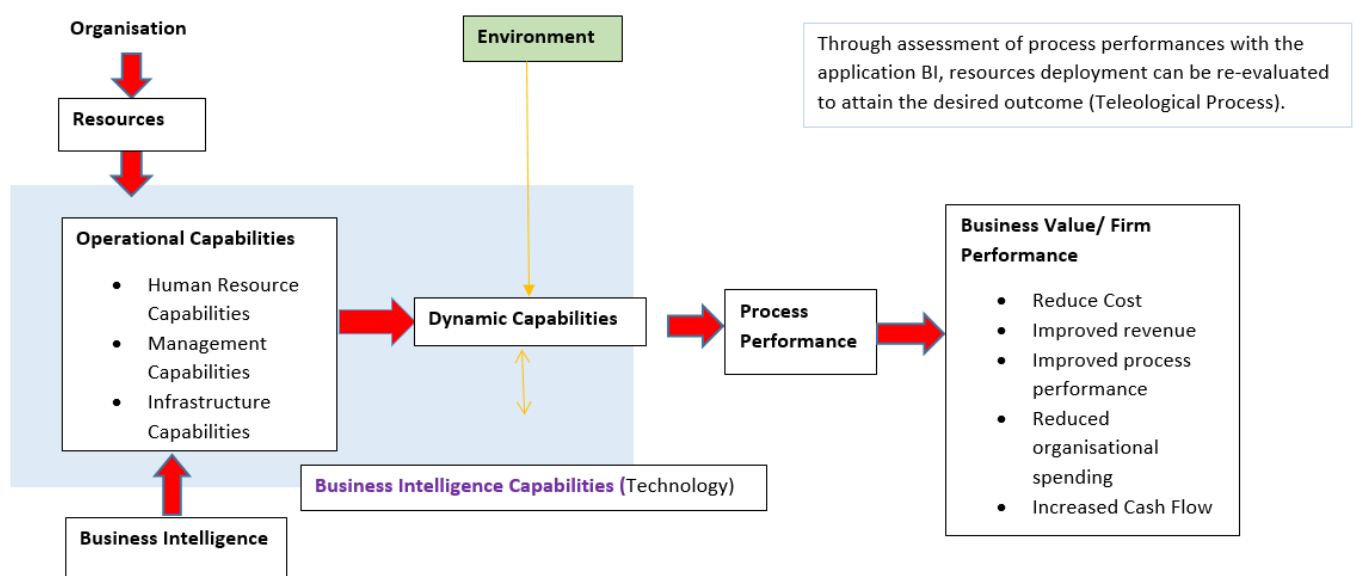
Fig 8.2. Updated Conceptual Framework

8.3. Contributions

8.3.3. Theoretical contribution

This study theoretically contributes in the form of new empirical information concerning the realisation of BV generation from adopting BI in South African organisations. Few studies cover empirical investigations into the nuances responsible for realising value and identifying key components necessary for a South African business to attain BV (Paradza & Daramola, 2021). This study contributes towards this scarcity and provides different perspectives to the findings generated under different lenses identified to help to understand better BV creation from BI initiatives.

8.3.1. Methodological contribution

The methodological implication includes a conceptual framework based on a combination of three (3) theories: RBV, DC, and TOE, as a lens for the study. This offers a new perspective relative to what was done previously on understanding the relationship between BV adoption and the operational capabilities of organisations.

The thesis also covered the various forms of BV adopted by South African organisations, which are critical to the realisation of BV generated from BI efforts. Further, the information answers the call of Paradza and Daramola (2021) for a collaboration of forms of BV. This information helps build a concise overview of processes leading to BV since a repository of forms of BV has been gathered and verified.

8.3.2. Practical contribution

The findings from this study can aid practitioners within various industries in South Africa. As indicated by Yonney (2022), South Africa's BI implementation is still in its infancy and has yet to become a tool that can generate the much-anticipated BV fully. By applying the findings in this study, South African organisations can forge BI systems that can harvest BV from various key components and operations depending on industry and business model. This finding is especially important given that investing in BI infrastructure is financially demanding, and subsequently, organisations would expect a healthy return on their respective BI investment.

8.4. Future Work

The opportunities for further research on this topic include the following:

i. South African context on BV

The study covered how BI influences operational capabilities to establish BV, which required the research nature to be qualitative. The findings in this study should be explored on a larger sample group to validate the indicated relationship from a quantitative perspective. As a result, the findings presented in this study can be confirmed and generalised to the South African context (Marija et al., 2021; Nenzhelele, 2016; Nithya & Kiruthika, 2021).

ii. Similar BV-related studies

Similar studies are also a requisite as they would provide broader coverage and add new information, especially applying traditional data collection methods unrestricted by social distancing. Despite the extent of the effects of applying social distancing measures during data collection being unknown to research of this magnitude, having a comparative study of the results which would have adopted traditional qualitative data collection methods would prove the extent of the virtual interactions (Lateef & Keikhosrokiani, 2022; Nithya & Kiruthika, 2021; Paradza & Daramola, 2021).

iii. BI HR Capital needs

As highlighted in the literature and this study, BI HR capital is in limited supply, evident in the Company A and B cases explored in this study but curbed by Company C through the sophisticated application of BI on HR Capital. This finding motivates the need to investigate the current landscape regarding BI personnel on a larger scale. The value of this information can benefit organisations currently employing BI and organisations facing BI personnel scarcity. Furthermore, the capacity of training within a BI context is limited, which could assist in mitigating the scarcity within BI HR (Bhatiasevi & Naglis, 2020; Mneney & van Belle, 2016).

iv. The use of under-explored theories to investigate the relationship between BI and BV

In this study, RBV, DCT and TOE were adopted to establish the nuances that help facilitate the realisation of BV from BI efforts. As indicated by Paradza and Daramola (2021), more theories have been commissioned in the literature to establish how BV is attained from BI, which should be investigated. Due to the variation of BV, the theories applicable are vast and should be equally tasked to establish BV so that other notable perspectives on the realisation of BV can be achieved (Bhatiasevi & Naglis, 2020; Paradza & Daramola, 2021).

8.5 Limitations of the Study

Working within the spectrum of intelligence of any nature highlights security as one of the major concerns of modern businesses (Lamba & Dubey, 2015; Wang et al., 2019; Maroufkhani et al., 2020) as any compromise of security could mean a detrimental outcome for the designated organisations or institutions. This concern negatively aided

the progression of this research as most organisations were reluctant to participate despite constant reassurance from the research team on the safe handling and storage of acquired data.

Subsequently, the initially expected completion timeframe for this research was further prolonged as the researcher had to identify and secure the participation of organisations and institutions that meet the set parameters of the research.

As with any intelligence in the world, whether government, instructional or personal, intelligence requires a significant degree of discretion which can hinder an organisation when exposed. Because of this, gaining access to the desired organisation currently employing BI on a large scale was challenging. This challenge further compounded the discourse, making the researcher lose time and negatively affecting the set timeline and the overall completion of the research.

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10. Appendixes

Appendix 1: Systematic Review Protocol

1. Objective of Paper Review:

2. Data Sources

    a) Online:

    b) Print

3. Databases

    a) Google Scholar

    b) Science Direct

    c) Emerald

    d) Sage

4. Inclusion criteria:

    a) Date – 2010-2021

    b) Type – Peer-reviewed journal papers only

    c) Topic – Matching search strings on sustainability

    d) English Language

5. Exclusion criteria:

    a) Date – Papers outside 2010-2021

    b) Type – Reports, Conference proceedings

    c) Topic: Generic papers, non-sustainability papers

    d) Non-English

6. Search strings – Business Intelligence, Business Analytics, Big Data Analytics, Business Value, Firm Performance

7. Report structure

Journal	Authors	Title	Year	Pages	Volume	Problem	Approach/ Method	Findings/ Results	Critique

8. Data Synthesis

9. Report

Appendix 2: Interview Guide

Title: The influence of business intelligence on operational capabilities of organisations: Case of selected organisations in South Africa

To whom it may concern

Thank you for accepting to be part of this study. All the information collected from this interview will strictly be used for academic use only.

Please note that as a participant in this study, you are entitled to the following rights:

1. To decline to answer questions you feel uncomfortable answering or feel violate employment integrity.

2. Request further clarity before answering a question that feels unclear or misleading.

3. Decide to discontinue the interview and leave at any point during the discussion.

4. To deny permission to record or transcribe information you wish not to include.

Yours sincerely

Dignity Paradza

D-Tech: Informatics and Design

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Interview Questions

1. How much does your business use business intelligence in your day-to-day operations?

2. To what extent did your competition influence the decision to use BI?

3. Which operations in your organisation heavily depend on the use or applications of BI?

4. Which daily functional activities, such as daily procurement, stock levels or customer satisfaction, influenced your organisation to consider the adoption of BI?

5. Which BI-based activities are essential for identifying and adapting to internal change?

6. Which processes would you consider as unique to your organisation?

7. To what extent do you think your unique processes and resources aid in maintaining a high level of competitiveness in your industry?

8. How does your organisation deal with changes in the organisation, such as the adoption of BI?

9. How does your organisation identify or realise external threats?

10. To what extent does Business Intelligence help in identifying internal and external change?

11. How are decisions composed from Business Intelligence supported into action?

12. How is your organisation able to measure the adequacy of the resources deployed to deal with either internal or external change?

13. How does the organisation ensure that it generates a favourable outcome from Business Intelligence?

14. To what degree does Business Intelligence help your organisation in making their processes much easier to obtain results?

15. In your professional opinion, what is your perception of BI use in your organisation?

16. Does everyone expected to use BI within their daily duties use it correctly?

17. To what degree does top management support the use of BI within your organisation?

18. In your own opinion, do you think your organisation has enough to properly support and use BI on a day to day activities?

19. To what extent do administrative activities related to BI help in achieving a positive process performance?

20. In your professional opinion, do you think BI has added any value to your organisation?

21. Do you think there are areas your organisation can improve to use BI in your organisation, whether for day-to-day use or for long-term vision?

22. How does your business gauge the success or effectiveness of BI?

23. What does your organisation consider as value gain from the use of BI?

Appendix 3: Sample of signed Consent form

Dear **Dignity Paradza**

I, Wilton Matthysen , the Manager: Customer Business Unit of this company grant permission to collect data at this site for your research project titled, *the influence of business intelligence on operational capabilities of organisations: Case of selected organisations in South Africa.*
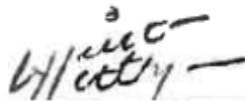
I grant this permission as the authorised person to so in the company and am aware of the following;

1. The study is conducted as a CPUT research and remains the property of CPUT.
2. All data and information collected will be solely in the procession of the researcher.
3. I will <require>, <not require> feedback of the research.
4. The research may be published in the public domain under the supervision of the supervisor.

In addition, the company's name may or may not be used as indicated below. (Tick as appropriate.)

	Thesis	Conference Paper	Journal Paper	Research Poster
Yes				
No				

I wish the best and success in this research.

....
Signature

Appendix 4: Ethics Approval Letter

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80 Roeland Street, Vredehoek, Cape Town 8001

Office of the Research Ethics Committee	Faculty of Informatics and Design

12 February 2020
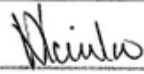
The Faculty Research Ethics Committee grants ethics clearance to Mr Dignity Paradza,

student number 209201231, for research activities related to the PhD in Informatics at the

Faculty of Informatics and Design.

Title of thesis:	The influence of business intelligence on operational capability of organisations: Case of selected organisations in South Africa

Comments

Research activities are restricted to those details in the research proposal.

Data collection permission is required for this study and a formal letter of consent should be submitted to the Faculty Research Ethics Committee.

[signature]	12\2\2020
Signed: Faculty Research Ethics Committee	Date

RESEARCH ETHICS COMMITTEE
INFORMATICS AND DESIGN
ETHICS APPROVAL GRANTED

1 2 FEB 2020

Cape Peninsula
University of Technology

Appendix 5: Interview guide- Research Question Alignment

S/n	Interview Question	Research Question	Base Theory	Concepts/Constructs
1	How much does your business use business intelligence in your day-to-day operations?	SR1	TOE	Technology
2	To what extent did your competition influence the decision to use BI?	SR1	TOE and Dynamic Capability	Environment and Sense
2	Which operations heavily depend on the use or applications of BI?	SR1	TOE and RBV	Organisation and Valuable
4	Which daily functional activities, such as daily procurement, stock levels or customer satisfaction, influenced your organisation to consider the adoption of BI?	SR1	RBV	Non-substitutable resource
6	Which BI-based activities are essential for identifying and adapting to internal change?	SR1	Dynamic Capability	Sense, Seize and Transform
7	Which processes would you consider as unique to your organisation?	SR1 and SR2	RBV	Valuable
8	To what extent do you think your unique processes and	SR2	RBV & TOE	Imitable and Environment

	resources aid in maintaining a high level of competitiveness in your industry?			
9	How does the organisation deal with changes in the organisation, such as the adoption of BI?	SR2	Dynamic Capability	Sense
10	How does the organisation identify or realise external threats	SR1	Dynamic Capability	Sense
11	To what extent does Business Intelligence help in identifying internal and external change?	SR1	Dynamic Capability	Sense
12	How are decisions composed from Business Intelligence supported into action?	SR2	Dynamic Capability	Seize
13	How is the organisation able to measure the adequacy of the resources deployed to deal with either internal or external change?	SR2	Dynamic Capability, RBV & TOE	Seize, Environment and Non-substitutable resource
14	How does the organisation ensure that it generates a favourable outcome from Business Intelligence?	SR3	Dynamic Capability, RBV & TOE	Transform, Non-substitutable, Organisation

15	To what degree does Business Intelligence help the organisation in making their processes much easier to obtain results?	SR2	Dynamic Capability and RBV and TOE	Transform, organised to capture value, Technology and Organisation
16	Is BI easy to use for daily operations?	SR1	RBV & TOE	Valuable and Organisation
17	Does everyone expected to use BI within their daily duties use correctly?	SR3	RBV & TOE	Valuable and Organisation
18	To what degree does top management support the use of BI within the organisation?	SR3	Dynamic Capability, TOE and RBV	Seize, Organisation and Rare
19	In your own opinion, do you think the organisation has enough to properly support and use BI on a day-to-day activity?	SR2 and SR3	TOE and RBV	Organisation and Rare
20	To what extent does administrative activities related to BI help in achieving a positive process performance? Process performance?	SR2 & 3	Dynamic Capability and TOE	Seize and Organisation
21	In your professional opinion do you think BI has added any value to your organisation?	SR3	TOE and RBV	Organisation and Value

22	Do you think there are areas the organisation can improve to use BI in your organisation, whether for day-to-day use or for long-term vision?	SR3	TOE and RBV	Organisation and Rare
23	How does the business gauge the success or effectiveness of BI?	SR2 & 3	TOE and RBV	Technology and Value
24	What does the organisation consider as value gain from the use of BI?	SR3	TOE and RBV	Organisation and Value

Appendix 6: Plagiarism certificate

PhD Thesis