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Exploring the digital maturity of a global engineering firm in the South African mining industry

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A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business

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ABSTRACT

The mining sector has long been perceived as a conservative innovation industry which is labour-intensive. However, this notion is rapidly changing, based on the sector's level of innovation and digital disruption. Studies show that digital technologies increase a firm's profits by 20% to 45%. Given this digital shift, most companies in the mining sector are investing heavily in digital transformation to drive growth and increase efficiencies. According to reports by Minerals Council South Africa and PwC, digital is becoming a game changer in the South African mining industry by increasing the use of innovative and latest technologies to run more efficient operations, improve health and safety, reduce maintenance and extraction costs, as well as bringing about skills improvement.

Despite visible positive results, the South African mining industry's digital transformation journey has not been smooth. While some companies have successfully embraced digital transformation to enable sustainable business growth and efficiency, others have grappled with achieving the same results. The challenge for most organisations is to justify the massive investments by demonstrating the impact of digital maturity on the sustainable competitive advantage of their organisations. Therefore, this study aims to explore the effect of digital maturity on an organisation's sustainable competitive advantage through the lens of the dynamic capability theory. The literature review focused on digital transformation and maturity, sustainable competitive advantage and the dynamic capability theoretical framework. The research design method was qualitative; data collection was through semi-structured interviews with eight portfolio managers, five digital managers and the chief information officer selected from within the organisation. The data analysis was based on the thematic analysis process to deliver the initial codes, initial themes and the final themes emerging from the study.

The study's findings demonstrate that mining organisations using dynamic capabilities (sensing, seizing and transforming) have a higher digital maturity, enabling the agility to scan and explore market and technology opportunities better than organisations with low digital maturity. They also have a high renewal

and reconfiguration rate that poise them to successfully take advantage of the market and technology opportunities and respond to threats. Therefore, high-level dynamic capabilities (sensing, seizing and transforming) offer a sustainable competitive advantage to an organisation in a changing market environment. However, mixed findings on the association between dynamic capabilities and organisation performance warrant further research. The first is the unclear conditions and the mechanisms under which dynamic capabilities affect organisational performance. Secondly, a detailed analysis of the high-level dynamic capabilities is required to establish the dynamic capabilities with the most effect on an organisation's sustainable competitive advantage.

Keywords: Digital maturity, digital maturity models, digital pivots, digital transformation, Sustainable competitive advantage and dynamic capability theory.

DECLARATION

I, Benedict Chaila, declare that this research report is my work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: Benedict Chaila Signature: 

Signed at Centurion on the 16th day of March 2023

DEDICATION

To my wife, Lubona Chaila, and my children, Niza Faith Chaila and Chaila Benedict Chaila JR thank you for your support and encouragement. As I embark on my PhD journey next year, I challenge my children, nephews, and nieces to strive to set the bar even higher.

To my late Mother, you departed the same month I started my studies, making it difficult for me to cope with them. I found strength knowing that you would not have wanted me to fail. I wish you had witnessed me get my second master's degree.

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LIST OF ACRONYMS

Acronym	Description
AI	Artificial Intelligence
COVID-19	Coronavirus Disease 2019
DM	Digital Maturity
HDSA	Historically disadvantaged Individuals
IoT	Internet of Things
IT	Information Technology
M&A	Mergers and Acquisitions
R&D	Research and Development
SCA	Sustainable competitive advantage

CHAPTER 1: INTRODUCTION

1.1 Purpose of study

This qualitative study explores the effect of digital maturity on the sustainable competitive advantage (SCA) of a global engineering firm in the South African mining industry.

1.2 Background of study

The mining industry has long been perceived as a conservative industry where innovation takes a secondary priority (Sánchez & Hartlieb, 2020). However, this notion is rapidly changing, going by the industry's level of innovation and digital disruption. The mining industry is changing how mining is done by transitioning from manual operations to autonomous and semi-autonomous remote-controlled operations (Sánchez & Hartlieb, 2020). Other examples where digital technologies are disrupting the mining industry include big data, analytics, the internet of things (IoT), artificial intelligence (AI), digital workers and drones(Sganzerla et al., 2016).

Given this digital shift, companies worldwide are investing heavily in digital transformation initiatives to drive growth and increase efficiencies (Sganzerla et al., 2016). Armstrong & Lee (2021) state that firms are motivated to transform to deliver enhanced and digitally sustainable financial performance (be it in revenues, profits, or shareholder value) directly or as a consequence of improved customer experience and reduced cost. The mining industry is no exception, as it is at the centre of digital transformation, driving considerable differentiation and competitive advantage (Sganzerla et al., 2016).

The digital transformation wave has yet to spare the South African mining industry. According to a joint report by Minerals Council South Africa and PwC, digital is becoming a game-changer in the South African mining industry by increasing the use of innovative and latest technologies to run more efficient operations, improve health and safety, reduce maintenance and extraction costs,

as well as bringing about skills improvement (Terblanche, 2021). According to a report from a survey of 23 executives across 19 Minerals Council member companies, the Covid-19 pandemic has accelerated digital transformation within the South African Mining industry through digitalising work processes and adopting automation and other innovative tools (Terblanche, 2021). Andries Rossouw, PwC Africa Energy Utilities & Resources Leader, expects digital transformation within the South African mining industry to be significant in the next ten years. Improvements in technology and innovation will propel what is currently in the mining industry (Dunleavy, 2021). The companies strategically embracing and leveraging the technology will win (Dunleavy, 2021).

Despite visible positive results, the digital transformation journey for the South African mining sector has not been smooth. While some companies have successfully embraced digital transformation to enable growth and efficiency, others have struggled to adapt to the new technology and trends affecting their business models (Graham, 2022). Achieving transformation through digitisation often requires significant investment in infrastructure and systems and coordination across value chain partners. For example, some mining companies have invested billions of dollars in digitising their operations, including deploying smart sensors, remotely operated vehicles, automated equipment and powerful computing capacity for data analysis (Graham, 2022). These investments have enabled competitiveness and ensured continued success through increased productivity, cost reduction, and efficiency. However, other companies in the industry have not been very fortunate due to a lack of financial capacity (Graham, 2022).

Other digital transformation challenges in the mining industry include no sense of urgency, insufficient funding, limitations from legacy IT systems, unclear roles and responsibilities, a lack of vision, unclear business case, a culture resistant to change, regulatory challenges, and institutional setups (Zulu et al., 2021). Goa et al. (2019), cited in Dragičević and Bošnjak (2019), believe that while digital transformation accelerates change, many organisations are not agile enough to respond to digital transformation changes. According to Goa et al. (2019), cited in Dragičević & Bošnjak (2019), lack of competency (resistance to radical change,

lack of staff commitment and goal uncertainty (outdated skills and governance model, vague expectations and scope of change, lack of focus), technological limitations (poor connectivity, cyber threats, lack of IoT standards, immaturity of technologies, redundancy due to mistrust) and external constraints (complex operating environments, safety, legislation, social responsibility) are some of the impediments to digital transformation in the mining sector.

1.3 Research problem

Most organisations in the mining industry are investing in digital transformation to improve business performance across all functions, from exploration and development to supply, production, distribution, sales and trading, including mine closure (Livitsanis et al., 2021). Livitsanis et al. (2021) believe that digital technologies increase firms' profits by 20% to 45%. It is against this background that mining industry executives embark on the digital transformation journey (Livitsanis et al., 2021).

This view is supported by the findings from a Deloitte survey that greater digital maturity can be linked to better financial performance (Gurumurthy et al., 2020). Gurumurthy et al. (2020) further state that higher-maturity companies have a three times higher chance than companies with lower maturity to report revenue growth and net profit margins much higher than their industry average. The superior financial performance of higher-maturity digital companies is enabled by digital transformation business benefits such as product and service quality, employee engagement, efficiency and revenue growth (Gurumurthy et al., 2020). However, doubts about how digital technologies can effectively make a difference and how to get there overshadow digital transformation expectations. Even more important is the fact that only a few companies have been able to show the disruptive effects of digital transformation in their corporate performance (Sganzerla et al., 2016).

The extent to which a higher level of digital maturity impacts business performance is a subject in many organisations (Sganzerla et al., 2016). The real challenge for most organisations is to show the impact of digital transformation

on their business performance (Sganzerla et al., 2016). Lack of demonstrated impact of digital maturity on organisation performance can impact the level of investment and focus that business executives direct towards digital transformation. Limited or no funding of digital transformation initiatives in the organisation would result in little or no digital transformation. Therefore, the study explores the effect of digital maturity on an organisation's sustainable competitive advantage (SCA) through the lens of the dynamic capability theory.

1.4 Research objectives

The following are the objectives of the study.

- To analyse the influence of sensing opportunities for sustainable competitive advantage.
- To analyse the influence of seizing opportunities for sustainable competitive advantage.
- To analyse the influence of organisation transformation for sustainable competitive advantage.

1.5 Rationale

The extent to which a higher level of digital maturity impacts organisation performance is a subject in many organisations. The real challenge for most organisations is to show the effect of digital transformation and resultant digital maturity on their performance (Sganzerla et al., 2016).

This study is essential for the mining sector policymakers to gain insights into how mining policies can be enhanced to promote the adoption of digital technologies and drive digital transformation in the mining industry to improve the health and safety of the employees. For the practitioners in the mining industry, the study will help them understand how leveraging dynamic capabilities (sensing, seizing and transforming) can help them stay ahead of the competition by constantly changing or modifying business models. The case study will also contribute to building or affirming the theory on the effect of transforming

capabilities for digital transformation on digital maturity and the resultant sustainable competitive advantage.

Finally, using the lens of the dynamic capability theory, this case study explores the effect of digital maturity on the sustainable competitive advantage of a global engineering firm in the South African mining industry.

1.6 Delimitations of the study

This qualitative case study focused on a global engineering firm in the South African mining industry. The researcher's exploration of digital maturity's impact on an organisation's sustainable competitive advantage was delimited to the dynamic capability theory framework. The dynamic capability theory helped the researcher understand how an organisation gains a competitive advantage by sensing opportunities in the market and technologies, seizing the opportunities, renewing and reconfiguring company processes, and maintaining their relevance to consumers to create sustainability and innovative growth.

1.7 Definition of terms

This study contains some key concepts used throughout the study. This section provides definitions of these terms. Accordingly, the definitions are as follows:

1.7.1 Digital maturity

Digital maturity details a company's achievements from its digital transformation initiatives and how it comprehensively plans to adjust to technological disruption to stay competitive and relevant (Teichert, 2019). Other definitions of digital maturity include the ability of an organisation to adjust to continuous change in a digital business environment, where change is driven by evolving technologies (Eremina et al., 2019). Remane et al. (2017) and Thordsen et al. (2020) define digital maturity as a measure of business benefits derived from business benefits.

The definition of digital maturity by Teichert (2019) is adopted for this study because it aligns with the study's aim to explore the effect of digital maturity on the sustainable competitive advantage (SCA) of an organisation

1.7.2 Digital transformation

Literature provides varied definitions of digital maturity, and non is commonly accepted (Schallmo & Williams, 2017). Armstrong & Lee (2021) define digital transformation as all the organisational change initiatives responding to technology-induced changes. According to Chanias et al. (2019), digital transformation is associated with the adoption and effect of digital technologies on firms, industries and society. Ebert and Duarte (2018) define digital transformation as adopting disruptive technologies to increase productivity, value creation, and social welfare. After an extensive literature review on digital transformation, Sánchez and Hartlieb (2020) defined it as "a process that uses a combination of information, computing, communication, and connectivity technologies to trigger major changes to a firm's properties to enhance them. Henriette et al. (2016) suggest defining digital transformation as a change process that is disruptive or incremental. It starts with using digital technologies and then evolves into a full transformation of an organisation. Morakanya et al. (2017), cited in Teichert (2019), compared several definitions of digital transformation and gave their view. They defined digital transformation as "a change process that takes advantage of digital capabilities and technologies to enable business models, operational processes and customer experiences to create value".

The definition of digital transformation by Morakanya is adopted for this study because it focuses on customer value creation which is critical to attaining sustainable competitive advantage and aligns with the study's aim.

1.7.3 Sustainable competitive advantage

Buckley & Ghauri (2015) define sustainable competitive advantage as implementing a value-creating strategy that no existing or potential competitor implements and copying the strategy benefits is impossible. Newbert (2008) describes sustainable competitive advantage as the firm’s ability to produce higher customer benefits for the exact cost of competitors, which implies a competitive differentiation advantage. Similarly, producing similar benefits for lower costs implies an efficient competitive advantage (Newbert, 2008).

Newbert's definition of sustainable competitive advantage is adopted for this study because it focuses on customer value delivery, which is critical to gaining a sustainable competitive advantage.

1.8 Assumptions

- The participants in the study will have a good understanding of the subject matter under research. The assumption is that the participants will be senior-level employees involved in digital activities.
- The participants will answer questions without bias. This assumption is on the basis that the participants can be sure that the information will solely be for academic purposes.
- Data from the previous digital maturity survey will be available to assess the organisation's digital maturity level.

1.9 Chapter outline

Table 1-1: Outline of the study

Chapter one: Introduction	Chapter one of the study outlines the statement of purpose, the background of the study, the research problem, the research objectives and the study rationale.
Chapter two: Literature Review	Chapter two is the literature review of the study. The chapter will provide a comprehensive review of existing literature on digital transformation, digital maturity and digital pivots to explore the impact of digital maturity on the sustainable competitive advantage of an organisation.
Chapter three: Research Methodology	The research methodology chapter outlines the study approach, design, methods, and tools used to gather data. The chapter also shows the study population and sample, the research instrument, the procedure for data collection, data analysis strategies and interpretation, possible limitations and challenges of the study, quality assurance and ethical considerations.
Chapter four: Results	Chapter four will present the results obtained from the data analysis of the interviews.
Chapter five: Discussions, conclusions and recommendations	Chapter five will discuss the results and findings of the research based on chapter four and provide conclusions, recommendations, limitations, and suggestions for future research.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter reviews existing studies on digital transformation, digital maturity, digital pivots, sustainable competitive advantage and dynamic capability theory to explore the effect of digital maturity on the sustainable competitive advantage of an organisation.

The first section will start by providing definitions and purposes from the literature on digital transformation. The literature review on digital maturity focuses on the distinction between digital transformation and maturity, then looks at digital maturity frameworks, how to measure digital maturity, the effect of digital maturity on sustainable competitive advantage, and digital maturity models. The second section focuses on prior studies of digital pivots and their impact on business benefits. The last section will look at the analytical framework of the study.

2.2 Definition of topic or background discussion

Implementing digital technologies in the mining industry, like the Internet of Things (IoT) and automation, is seen as having a transformative effect on mining. Digital technologies have made mining safer, more productive, efficient, sustainable, profitable and better able to deal with the mining challenges (Husseini, 2018). These challenges include exploiting new deposits in more complex scenarios: lower ore grades, deeper deposits, more complicated rock mass, and high-stress environments (Sánchez & Hartlieb, 2020). In these complex mining scenarios, digital technologies offer a cost-effective way to increase profitability because the average cost of producing minerals such as copper has risen by 300% in the last 15 years while the grade has dropped by 30% (Husseini, 2018).

Therefore, this case study will explore the effect of digital maturity on the sustainable competitive advantage of an organisation. It will also look at the digital

pivots that deliver the most business benefits. The literature review for this research will focus on the following areas.

- Digital transformation and Maturity Review
- Sustainable competitive advantage and digital maturity
- Digital Pivots
- Dynamic capability theory

2.3 Exploring the effect of digital maturity on SCA

This section explores the effect of digital maturity on sustainable competitive advantage. The focus will be on reviewing digital transformation and maturity, digital maturity models, digital maturity dimensions, factors and outcomes. The last focus will be on sustainable competitive advantage.

2.3.1 Digital transformation review

Digital transformation has several definitions, and none is commonly accepted in the literature (Schallmo & Williams, 2017). Armstrong & Lee (2021) define digital transformation as all the organisational change initiatives responding to technology-induced changes. According to Chanias et al. (2019), digital transformation is associated with the adoption and effect of digital technologies on firms, industries and society. Ebert and Duarte (2018) define digital transformation as adopting disruptive technologies to increase productivity, value creation, and social welfare. The definition of digital transformation by McKinsey states that digital is about how the company runs its business and not any one process(Dorner Karel & Edelman David, 2015). These definitions are split into customer value creation, optimisation of processes directly impacting customer experience and enablers for the overall business initiatives (Dorner Karel & Edelman David, 2015). After an extensive literature review on digital transformation, Sánchez and Hartlieb (2020) defined it as "a process that uses a combination of information, computing, communication, and connectivity technologies to trigger major changes to a firm's properties to enhance them. Henriette et al. (2016) suggest defining digital transformation as a change

process that is disruptive or incremental. It starts with using digital technologies and then evolves into a full transformation of an organisation. Morakanya et al. (2017), cited in Teichert (2019), compared several definitions of digital transformation and gave their view. They defined digital transformation as "a change process that takes advantage of digital capabilities and technologies to enable business models, operational processes and customer experiences to create value".

What is synonymous across most of the definitions of digital transformation in the literature review is the change that results in organisational value creation. The notion of digital transformation as a value creator is supported by (Schallmo & Williams, 2017). According to Berman (2012), two activities are cardinal to succeed in digital transformation. They are changing customer value propositions and using digital technologies to transform operations to improve customer interactions and collaboration. According to Schallmo & Williams (2017), digital technologies must create additional value for customers, the business and essential stakeholders. Therefore, implementing digital technologies in process improvement is a subset of enterprise digital transformation (Schallmo & Williams, 2017).

2.3.1.1 The purpose of digital transformation

According to the definition of digital transformation by Henriette et al. (2016), the purpose of digital transformation is viewed as the technological transformation of an organisation to create value. According to Armstrong & Lee (2021), the purpose of digital transformation is to support the organisation in achieving its strategic objectives and organisation purpose. It, therefore, needs to deliver business outcomes rather than technological outcomes. The business outcomes include financial goals such as revenue, profit, and shareholder wealth; customer objectives like growth, engagement, and referral; or even social purposes, like job creation and social well-being (Armstrong & Lee, 2021).

This view on the purpose of digital transformation by Armstrong & Lee (2021) aligns with the research argument that firms digitally transform to deliver

enhanced sustainable financial performance, directly or indirectly, through improved customer experience/loyalty or reduced cost (Armstrong & Lee, 2021).

2.3.2 Digital maturity review

Digital maturity has spread definitions in the literature, and existing definitions vary widely (Armstrong & Lee, 2021). For this reason, digital maturity and transformation are sometimes used interchangeably without considering the differences (von Leipzig et al., 2017). Therefore, it is essential first to establish the difference between digital maturity and digital transformation. According to Mettler & Pinto (2018), cited in Pinto et al. (2023), digital maturity is a continuous adaptation to a fast-changing digital environment that is a long-term goal. Armstrong & Lee (2021) refer to digital maturity as how well an organisation is digitalised at a specific time in its digital transformation journey, as depicted in figure 2-1. Digital maturity details a company's achievements from its digital transformation initiatives and how it comprehensively plans to adjust to technological disruption to stay competitive and relevant (Teichert, 2019). Other definitions of digital maturity are below:

Digital maturity is the ability to adjust to continuous change in a digital business environment, where change is driven by evolving technologies (Eremina et al., 2019).

The current status of digital transformation (Remane et al., 2017; Thordsen et al., 2020).

Digital maturity measures business benefits derived from digital transformation (Gurumurthy et al., 2020).

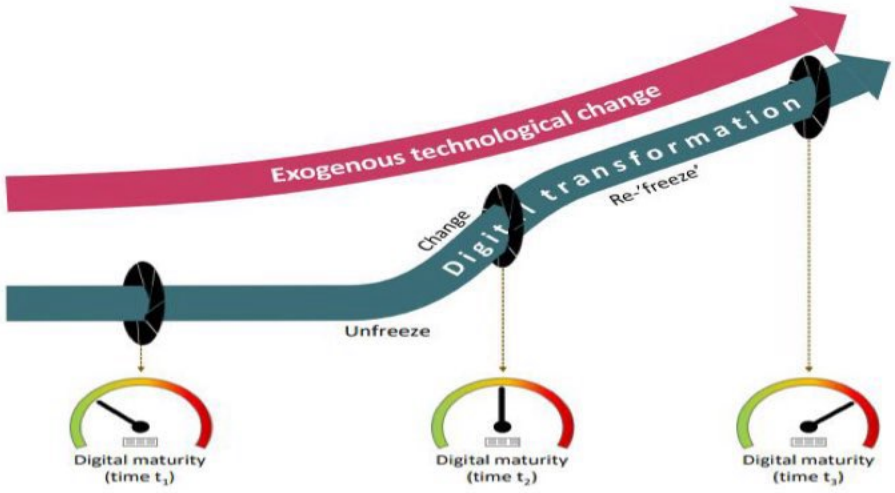

***Figure 2-1**: Illustration of digital transformation and maturity* (Armstrong & Lee, 2021).

The researcher will adopt Teicher's (2019) definition of digital maturity for this study because it aligns with the study's aim to explore the effect of digital maturity on the sustainable competitive advantage of an organisation. This definition of digital maturity means that the more benefits an organisation derive from digital transformation, the higher the digital maturity level. Therefore, the main distinction between digital transformation and digital maturity is that digital transformation is the process of responding to continuous external technological disruptions. In contrast, digital maturity measures how proficiently an organisation reacts to technological change as it progresses on its digital transformation journey (Armstrong & Lee, 2021). The more digitally mature an organisation is, the more likely it is to respond to technological change and derive more benefits from digital transformation (Armstrong & Lee, 2021).

2.3.2.1 Digital Maturity Framework

There are many digital maturity frameworks. For this study, Westerman's leading digital maturity model is adopted because it best meets the requirements of validity based on the assessment conducted by Thordsen et al. on 17 digital maturity models, as depicted in Figures 2-2 (Armstrong & Lee, 2021). The Thordsen assessment makes the Westerman digital model one of the most reliable digital maturity constructs. In addition, the Westernman digital maturity

model is one of a few models demonstrating a relationship between digital maturity dimensions and business outcomes.

The Westerman model has two digital maturity dimensions, digital and leadership capabilities. Digital capability focuses on applying digital technologies in core organisational functions and processes. The leadership capability focuses on enabling organisation structures like vision and mission to drive digital transformation, governance structures, and the extent to which the organisation is engaged and mobilised (Westerman et al., 2014).

Digital maturity model reference		Freiderich et al (2011)	Westerman et al (2011)	Westerman et al (2012)	Becker et al (2013)	Catlin et al (2014)	Berger et al (2015)	Arreola et al (2016)	Berghaus et al (2016a)	Berghaus et al (2016b)	Gell et al (2016)	Valdez-de-Leon (2016)	Lichblau et al (2017)	Remane et al (2017)	Colli et al (2018)	Deutsche Telekom (2018)	Salviotti et al (2019)	Ifenthaler et al (2019)
Observation	Definition of the phenomenon	1	1	1	0	0	2	0	1	1	0	1	1	2	1	0	2	1
	Definition of target domain	2	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2	2
	Defined measurement procedure	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	2
Generlizability	Measurement approach	0	2	2	2	0	1	2	2	2	2	1	2	2	2	2	2	2
	Sample size of independent observations	2	1	2	1	2	1	2	2	2	2	1	2	2	1	2	2	1
	Degree of standardization	2	0	2	2	0	0	0	2	2	2	0	2	2	1	1	1	1
Theory-based	Theoretical basis of the model	0	0	0	0	0	0	2	1	1	0	2	0	2	2	0	2	2
Extrapolation	Assumed connection to other constructs	2	0	2	0	2	2	2	2	2	2	0	0	0	2	0	0	0
	Plausibility of inferences	1	0	1	0	1	1	1	2	1	1	0	0	0	0	0	0	0
Implications	Justification of steps towards maturity	0	2	2	0	0	1	1	2	2	1	2	1	2	2	0	2	2
	Overall assessment	12	10	16	8	8	9	13	17	16	13	10	11	15	15	8	15	13

***Figure 2-2**: Validity of different digital maturity models* (Thordsen et al., 2020)

The Westerman digital maturity model presents digital maturity levels into four categories, beginners, conservatives, fashionistas and Digirant, as depicted in figure 2-3 (Armstrong & Lee, 2021). An organisation lacking more digital capabilities is classified as a beginner and considered in the experimentation stage of digital maturity. Management is sceptical about the business generated by digital technologies. An organisation with advanced digital features needing an overarching digital vision and siloed digital culture is classified as a fashionista. A conservative digital organisation has an overarching vision but might be underdeveloped. It has solid digital governance across silos and actively working toward building digital skills and culture. The last digital maturity level is the digirati. An organisation in this digital maturity quadrant is classified as a digital

leader. It is digitally mature, good at driving value through digital transformation, and has a solid digital culture and excellent governance across silos (Armstrong & Lee, 2021).

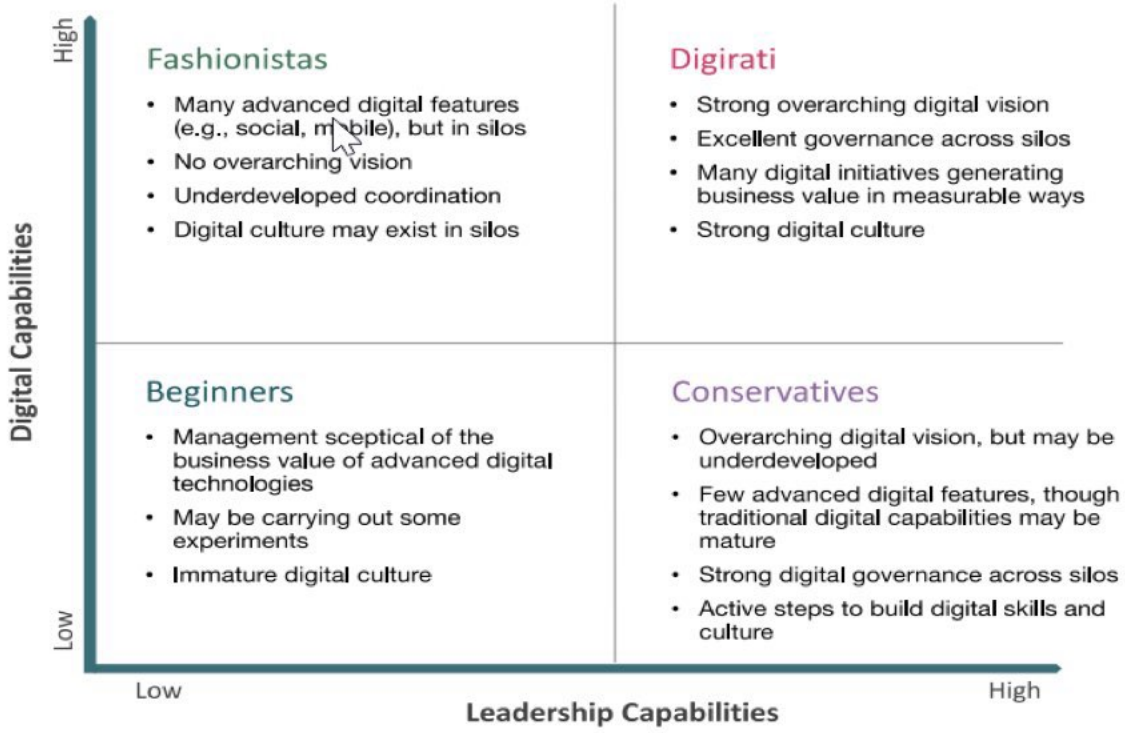

***Figure 2-3**: Westerman's representation of digital maturity* (Westerman et al., 2014)

2.3.2.2 Measuring the digital maturity level

Several digital maturity models exist that help to measure the digital maturity level of an organisation. Some models define three, four, or even five levels of digital maturity (Dieffenbacher, 2022). Depending on the selected digital maturity model to measure the digital maturity level of an organisation, the levels can include higher, medium, lower, beginner, intermediate, advanced, and expert, or traditional, emerging, engaged, competitive, and maturing (Dieffenbacher, 2022).

According to Armstrong & Lee (2021), each digital maturity model provides an instrument for measuring digital maturity. Westerman et al. (2014) use a 7-point Likert-type scale to rate each of the 36 questions in the model. A 3-level qualitative multiple-choice question instrument is used by Ismail et al. (2014) and Evans (2017) for each factor, where the first choice is the least desirable, and the

third choice represents a digital target state for the organisation (Armstrong & Lee, 2021).

2.3.3 Sustainable competitive advantage and digital maturity

Buckley & Ghauri (2015) define sustainable competitive advantage as implementing a value-creating strategy that no existing or potential competitor implements and copying the strategy benefits is impossible. Newbert (2008) describes sustainable competitive advantage as the firm's ability to produce higher customer benefits for the exact cost of competitors, which implies a competitive differentiation advantage. Similarly, producing similar benefits for lower costs implies an efficient competitive advantage (Newbert, 2008). The expectation is that the benefits translate into improved financial performance for a company, empirically validated by (Newbert, 2008) and (Lin & Wu, 2014). In this view, the company's competitive advantage can be linked positively to its financial performance (Newbert, 2008).

Digitally mature organisations enjoy wide-ranging digital transformation benefits. The benefits are customer satisfaction and enhanced product quality, which drive improved financial performance (Gurumurthy et al., 2020). The benefits are enabled by the coordinated integration of digital pivots across an entire organisation resulting in successful digital transformation.

A study by Gurumurthy et al. (2020) found a link between higher digital maturity and improved sustainable business performance. In the survey sample data, organisations with higher digital maturity were three times more likely than those with lower maturity to report yearly revenue growth and net profit margins higher than their industry average, as depicted in figure 2-4 (Gurumurthy et al., 2020). The effect of digital maturity on sustainable competitive advantage emanates from product and service quality, efficiency, employee engagement, revenue growth, customer satisfaction, and increased focus on growth and innovation (Gurumurthy et al., 2020).

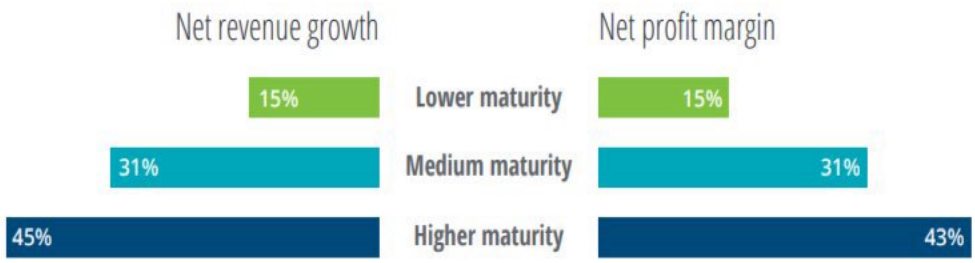

***Figure 2-4**: Illustration of the effect of higher digital maturity on financial performance* (Gurumurthy et al., 2020).

The study conducted by Westerman et al. (2012) provides evidence of the link between higher levels of digital maturity and an organisation's competitive advantage in revenue, profitability and shareholder value. The study analysed about 184 publicly traded companies that were digitally mature with less mature companies, revealing apparent differences as depicted in figure 2-5.

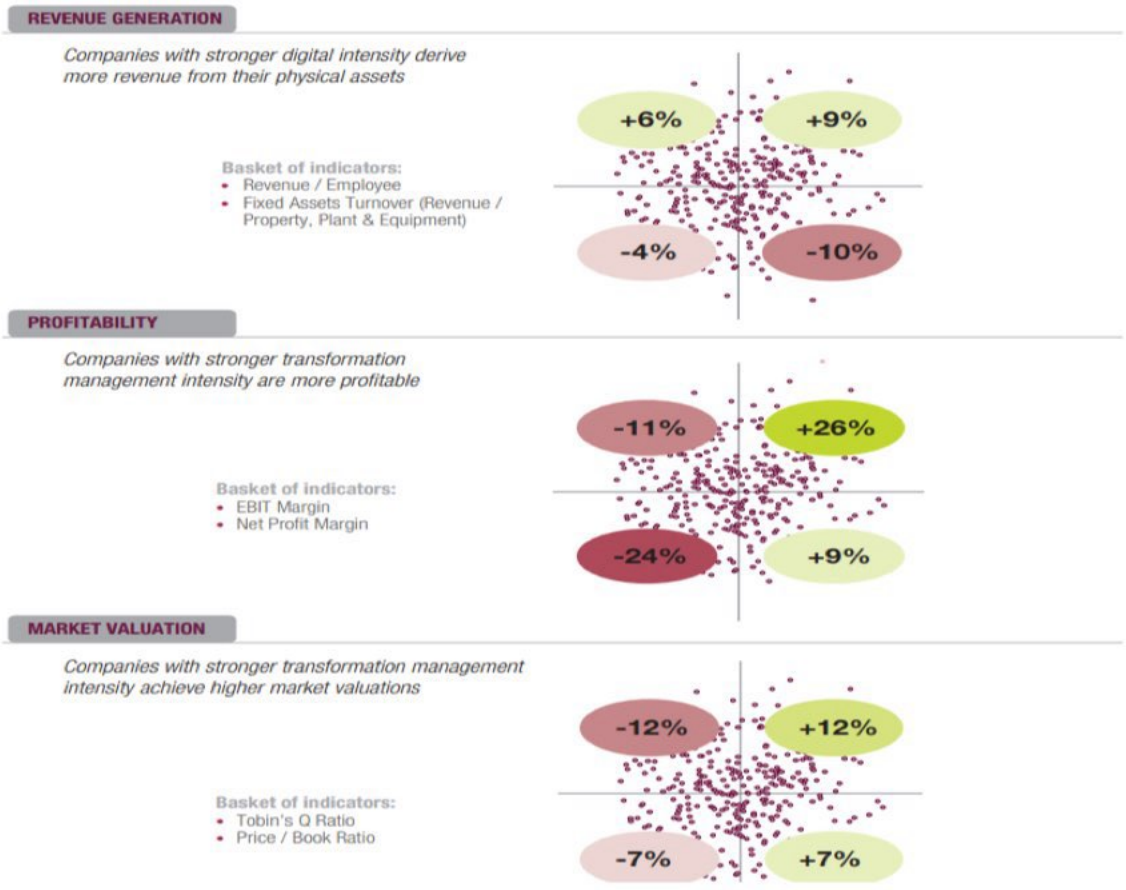

***Figure 2-5**: Financial performance* (Westerman et al., 2012)

Companies with mature digital intensity fall within the fashionistas and Digirati quadrants, drive more revenue from their physical assets and outperform average industry performance by 6% to 9%. Companies with more vigorous transformation management intensity fall under the Digirati and conservative quadrant and exhibit higher profitability and market valuation. These companies have average profitability and market valuation of 9% to 26% and 7% to 12%, respectively. Mature digital and transformation management companies outperform all their competitors and fall within the Digirati quadrant. These companies are 26% more profitable than their industry competitors and generate more revenue and market value.

The research conducted by Eremina et al. (2019) on the Baltic-listed companies' digital maturity also found some relationship between digital maturity and corporate performance. Munro's (2018) research supports the digital maturity link to the organisation's financial performance theory, which states that the higher an organisation's digital maturity, the greater the financial performance independent of the industry. Munroe demonstrated this by surveying 407 business leaders on 16 digital maturity pivots (Munroe, 2018). Four of the 16 characteristics had a high correlation with revenue growth, like clear vision and dedicated leadership, engaged employees who are intrinsically motivated, and the ability to leverage data for insights and digital interactions that are convenient and effortless, as depicted in figure 2-6 (Munroe, 2018).

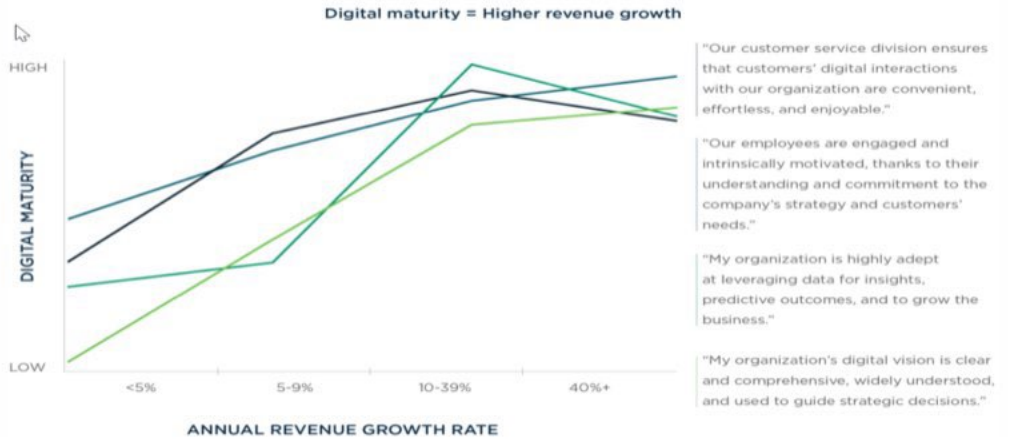

***Figure 2-6**: Digital maturity = Higher revenue growth* (Munroe, 2018)

In summary, digital maturity affects an organisation's performance, which is supported in the literature by (Gurumurthy et al., 2020; Munroe, 2018; Eremina et al., 2019 and Westerman et al., 2012).

2.3.3.1 Sensing opportunities for sustainable competitive advantage

The dynamic capability theory's sensing capabilities involve constantly scanning and exploring new opportunities across markets and technologies (Armstrong & Lee, 2021). It also entails identifying, developing, co-developing and assessing technological opportunities concerning customer needs (Teece, 2014) cited in (Ellström et al., 2021).

An organisation that cannot sense opportunities and threats in the market is marginalised and eventually out of business (Armstrong & Lee, 2021). An example of a company that suffered this fate is Nokia which missed the smartphone revolution by failing to sense the evolving needs and opportunities in the market. Therefore, an organisation needs to build sensing capabilities to understand better and respond to unplanned developments in a changing business landscape and take actions to manage the change (Jacobi and Brenner, 2018; Warner and Wager, 2019) cited in (Ellström et al., 2021). To meaningfully sense and explore opportunities, an organisation needs to be aware of its entire ecosystem in terms of its immediate surroundings, direct competitors and threats from new market entrants and competing activities.

2.3.3.2 Seizing opportunities for sustainable competitive advantage

The seizing capabilities enable the firm to respond to identified opportunities and threats through, but not limited to, introducing new products and customer experiences, transforming cost structures and adopting new business models. Seizing capabilities involves selecting and implementing enterprise structures, procedures, designs and incentives to successfully enable the firm to exploit identified opportunities or threats (Armstrong & Lee, 2021). Often, organisations sense opportunities but fail to seize the value due to a lack of commitment, low-risk appetite, or lack of financial capacity (Teece, 2007) cited in (Ellström et al., 2021). The mitigation for the highlighted shortcomings is to improve the rules and routines and strengthen organisational leadership and strategies to understand,

capture and evaluate potential business opportunities (Teece, 2007) cited in (Ellström et al., 2021). Therefore, seizing capability is critical for organisations to realise value from new prospects and remain sustainable.

2.3.4 Digital Maturity Models

Digital maturity models give organisations direction on digital transformation and suggestions for change (Berghaus & Back, 2016). They are tools that enable an assessment of the current digital maturity state (Becker et al., 2009) cited in (Armstrong & Lee, 2021)and an ideal growth path to the wanted position (Paulk et al., 1993; Poppelbu et al., 2011) cited in (Armstrong & Lee, 2021). According to Armstrong & Lee (2021), digital maturity models provide an objective and quantifiable measure of the digital transformation status of the organisation.

The Purpose of digital maturity models is to measure the organisation's performance concerning the factors of digital maturity and not the business outcomes. Figure 2-7 depicts the distinction between digital maturity and business outcomes.

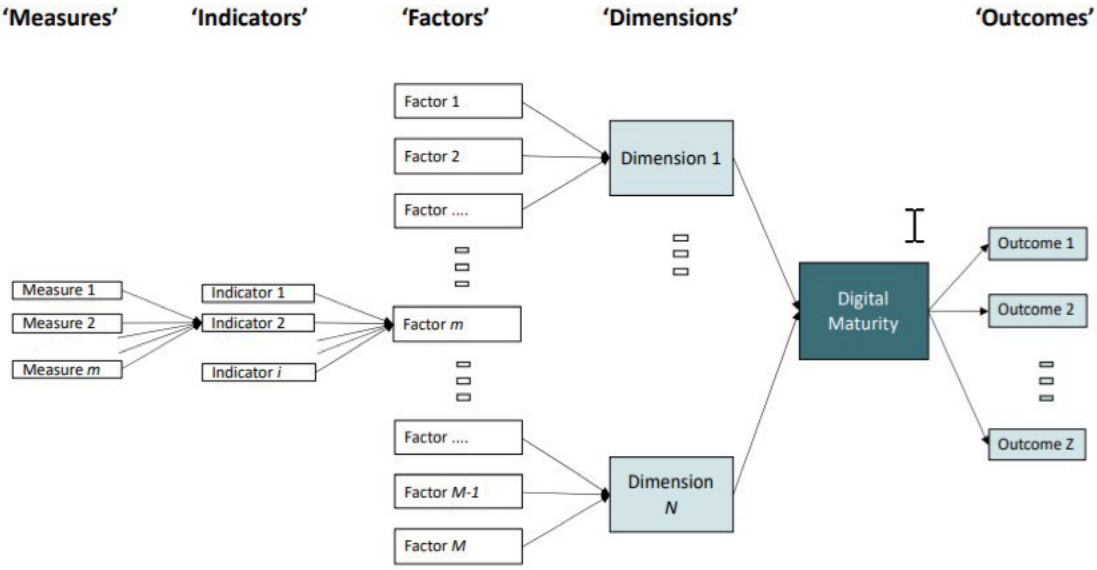

Figure 2-7: *Digital maturity factors, dimensions, and outcomes* **(Armstrong & Lee, 2021)**

2.3.5 Digital Maturity Dimensions, Factors, and Outcomes

Literature offers a spread of factors and dimensions of digital maturity, but there is no joint agreement on a set of factors and dimensions for assessing digital maturity. Each digital maturity model has its factors and dimensions constituting digital maturity. Some factors and dimensions are unique to each model, and some are similar across different models (Armstrong & Lee, 2021).

Digital maturity models consist of dimensions describing action areas and measures at various levels indicating the devolution path toward maturity (Berghaus & Back, 2016). They are precise, quantifiable and unconstrained components that reflect a significant, fundamental, distinct aspect of digital maturity and describe an action area (De Bruin et al., 2005).

Due to its varied nature, several factors influence an organisation's digital maturity. The factors are grouped into digital maturity dimensions (Armstrong & Lee, 2021). These dimensions include leadership and strategy and digital enablement and adoption. Each dimension comprises several factors which influence the status and performance of the organisation for that dimension. For example, the leadership and strategy dimensions include vision and intent, culture and engagement, governance and organisation, new value streams and business models and investment and innovation factors (Armstrong & Lee, 2021). It is, therefore, essential to measure the status or performance of the organisation concerning each factor. The performance measurement achievement is by considering all the indicators that collectively describe the extent to which an organisation performs well or poorly in each factor (Armstrong & Lee, 2021). For example, the indicators of the new value stream and business models factor would include the extent to which data is a strategic asset and platform business model used and the evolution of the value proposition.

Finally, to measure the performance or status of the organisation, the measures for each indicator must be identified. These measurements refer to things that can be rated numerically to represent the organisation's status quo (Armstrong & Lee, 2021).

2.3.6 Proposition 1

Research objective 1: Analyse the influence of sensing opportunities for sustainable competitive advantage.

Proposition 1: Scanning and exploring opportunities in the market and technologies lead to sustainable competitive advantage.

2.3.7 Proposition 2

Research objective 2: Analyse the influence of seizing opportunities for sustainable competitive advantage.

Proposition 2: Value generation from identified opportunities is a sustainable competitive advantage.

2.4 Digital Pivots

The following chapters will focus on digital pivots that increase business benefits through digital transformation.

2.4.1 Impact of Digital Pivots on Business Benefits

According to the survey of 1200 executives conducted by Schatsky (2020), the following are the business benefits that digitally mature companies enjoy;

- Improved efficiency,
- Higher revenue
- Enhanced product/service quality
- Better customer satisfaction
- Increase employee engagement

Further business benefits from digital maturity include revenue growth, profitability, shareholder value (Westerman et al., 2012, 2014), and higher revenue growth and profit margins (Munroe, 2018). Different digital pivots enable the above-identified business benefits. However, mixed evidence exists

regarding the digital pivots that deliver the most benefits (Gurumurthy et al., 2020). According to Munroe (2018), the biggest challenge for organisations is knowing digital pivots that drive revenue, and when and how to implement them to respond to the digital world.

According to the literature, the table below highlights some digital pivots that increase business benefits.

Table 2-1: Digital Pivots

Gurumurthy et., 2020	Armstrong et al., 2019	Westerman et al., 2012;2014	Munroe, 2018
• Flexible, secure infrastructure • Data Mastery • Digitally savvy, open talent networks • Ecosystem engagement • Intelligent workflows • Unified customer experience • Business model adaptability	• Vision and strategy • Cultures • Organisation and Governance • Digital Ethics • New value streams and business models • Innovation and investment • Customer orientation and engagement • Digital product innovation • Workforce enablement and performance • IT excellence • Results	• Vision and intent • Culture & engagement • Governance & organisation • New value streams and business models • Investment and innovation • Customer orientation and engagement • Workforce enablement and skills • Operations and core processes • Technology and data embeddedness • Results	• Clear vision and dedicated leadership • Engaged employees who are intrinsically motivated • Ability to leverage data for insights • Convenient and effortless customer digital interactions • Leverage technology in core business processes • Development of digital skills • Adept at change management • Predicting customer needs and desires • Ensuring the organisation values data • Increase customer engagement • Organising around the customer • Improve existing products and services • Getting the suitable infrastructure in place for data collection and use • Get the organisation ready for a digital vision • Best-in-class security defence systems

Gurumurthy et al. (2020) believe that all digital pivots are essential to delivering business benefits and must be implemented. However, three of the seven digital

pivots are identified as foundational and must be prioritised to enable the execution of the other pivots more effectively. They also have broad applications in many business functions. These digital pivots are data mastery, flexible and secure infrastructure and talent engagement in the transformation journey. Two digital pivots, data mastery and intelligent workflows, account for half of the business benefits, employee engagement, product and service quality, efficiency, customer satisfaction and revenue growth, as depicted in figure 2-8 (Gurumurthy et al., 2020).

The conclusion by Gurumurthy et al. (2020) is that organisations should focus on all the digital pivots rather than a selected few because organisations that execute digital pivots more broadly across business functions tend to achieve higher digital maturity and resultant business benefits.

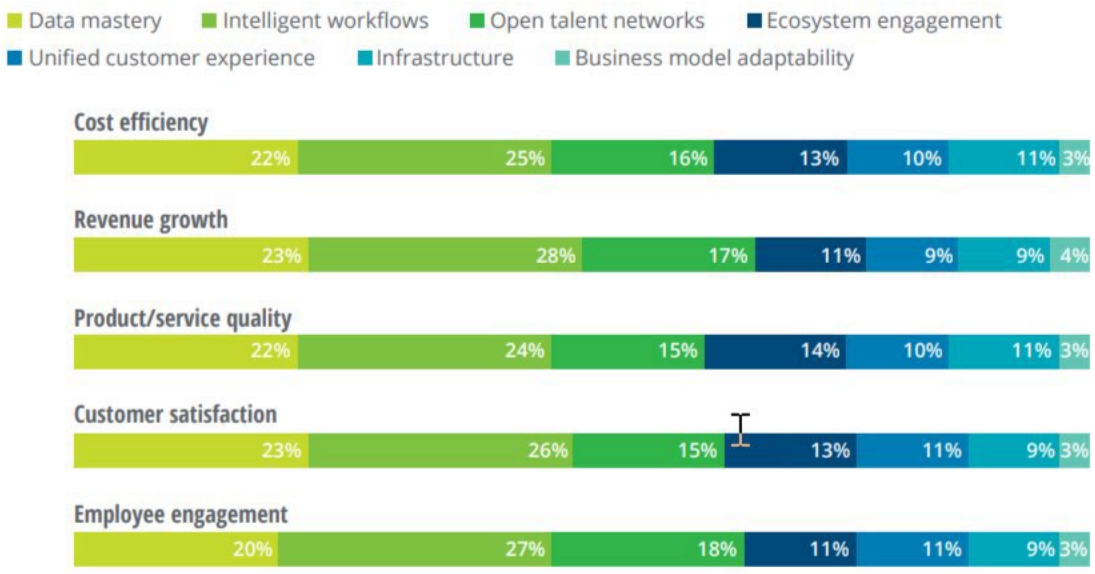

***Figure 2-8**: Digital pivots with the most quantifiable impact on business benefits* (Gurumurthy et al., 2020)

According to a study by Munroe (2018), four digital pivots drive higher financial performance. Clear vision and dedicated leadership; 67% of digitally mature organisations agree that they have a clear digital vision, and only 2% of digitally immature organisations have the same view. Regarding employee engagement and intrinsic motivation, 73% of digitally mature organisations firmly agree that their employees are engaged and intrinsically motivated, and only 10% of digitally immature organisations have the same view. 82% and 70% of digitally mature

organisations firmly agree that they can leverage data for insights and have digital interactions that are convenient and effortless for customers, respectively. While only 2% of digitally immature organisations have the same view on both statements.

Armstrong & Lee (2021) consolidated and condensed digital pivots from different digital maturity models to develop a unified digital maturity model. The unified model was developed because no single digital maturity model covers all the digital pivots based on the assessment performed by Thordsen on digital maturity models. Armstrong & Lee (2021) identified the factors of digital application and impact as directly affecting business results, namely customer orientation and engagement, product innovation, workforce enablement and performance, core process digitalisation, new value streams and business models and digital ethics. Figure 2-9 depicts the impact.

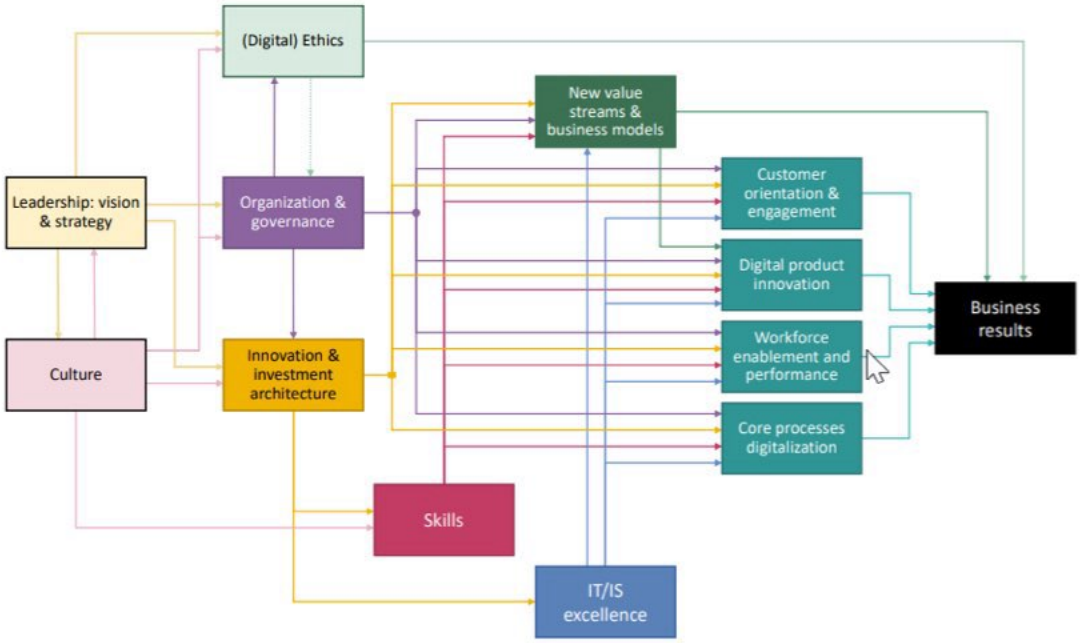

***Figure 2-9**: Digital pivots that drive business results* **(Armstrong & Lee, 2021)**

2.4.2 Reconfiguration for sustainable competitive advantage.

Organisation renewal is a firm's ability to deliver learning and innovation outcomes (Kianto, 2008). The outcomes include new products, processes and insights. The results enable the organisation to adapt to external changes and

create internal change. Organisations with high renewal capability outperform competitors with similar resources by developing, changing, modifying and reorganising resources, knowledge assets and routines (Kianto, 2008). Teece shares the view by Kianto that organisations with high renewal capability gain a competitive advantage. According to Teece (2007), cited in Ellström et al. (2022), organisation structures and assets are transformed by reconfiguration capabilities as the firm grows, and the environment changes. Therefore, organisation transformation is critical to sustainable and profitable growth.

Literature on renewal capabilities, as proposed by a theoretical model Kianto (2008), can be categorised into six key themes, strategic competence, leadership, exploiting time, connectivity, managing knowledge and learning orientation. However, changing business routines can be risky and costly (Teece, 2007) cited in (Ellström et al., 2022). The frequency of market condition changes must determine the size of the reconfiguration (Helfat et al., 2007) cited in (Ellström et al., 2022).

2.4.3 Proposition 3

Research objective 3: Analyse the influence of organisation transformation for sustainable competitive advantage.

Proposition 3: Organisation renewal capability leads to sustainable competitive advantage.

2.5 ANALYTICAL FRAMEWORK

The study focuses on exploring the effect of digital maturity on the sustainable competitive advantage of an organisation and understanding the digital pivots that drive the most business benefits.

Provided below is a theoretical and conceptual framework of the study.

2.5.1 Theoretical Framework

In the wake of digital disruption, an organisation's digital transformation and maturity needs analysis can be conducted through the lens of the dynamic capability theory (Teece, 1997) cited in (Ellström et al., 2022). In today's business environment, business sustainability and performance are continuously threatened by external factors stemming from increased consumer demands, new regulations, competitors entering the market and technological changes (Helfat, 2007) cited in (Ellström et al., 2022). To respond to these threats, an organisation must constantly renew and recreate its strategic capabilities to meet the needs of the changing environment (Teece, 1997) cited in (Ellström et al., 2022). Here the focus is on capabilities that secure and sustain an organisation's superior performance in the future by responding to the changing external environment. Organisations that fail either do not respond or are slow to react to external threats and opportunities (Teece, 1997) cited in (Ellström et al., 2022). Based on this view, Teece conceived the dynamic capability (Armstrong & Lee, 2021).

The later development of the dynamic capability theory has three overarching dynamic capabilities. Namely, the sensing capabilities to constantly search and explore new opportunities across markets and technologies, seizing capabilities to respond to external opportunities and threats and transformation capabilities to overhaul an organisation's processes and maintain relevance to consumers (Armstrong & Lee, 2021). This classification of dynamic capabilities is used widely in the literature (Fischer et al., 2010; Kindstrom et al., 2013; Warner and Wagner, 2019; Yeow et., 2018) cited in (Ellström et al., 2022). Summarised in figure 2-10 are the overarching capabilities.

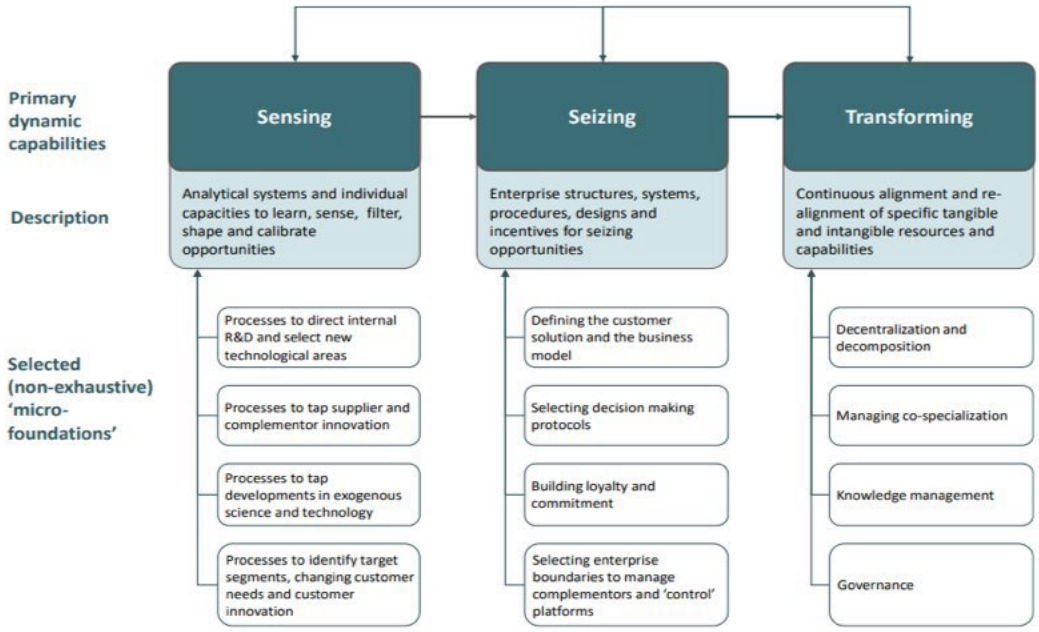

***Figure 2-10**: A framework for dynamic capabilities* **(Armstrong & Lee, 2021)**

The dynamic capability theory supports this study's propositions 1, 2 and 3. An organisation must constantly use its capabilities to search and explore new opportunities across markets and overhaul its organisation to remain relevant. Failure to which the organisation cannot survive or perform (Armstrong & Lee, 2021). Therefore, dynamic capabilities provide a consistent approach to studying digital transformation, considering the powerful impact digital technologies continuously have and will have on a business (Warner and Wagner, 2019) cited in (Ellström et al., 2022).

2.5.2 Conceptual Framework

This conceptual framework has been constructed based on the literature review and research propositions to answer the study's research questions. As depicted in figure 2-11, the conceptual framework shows the constructs addressed in the literature review and how they connect to answer the research objectives.

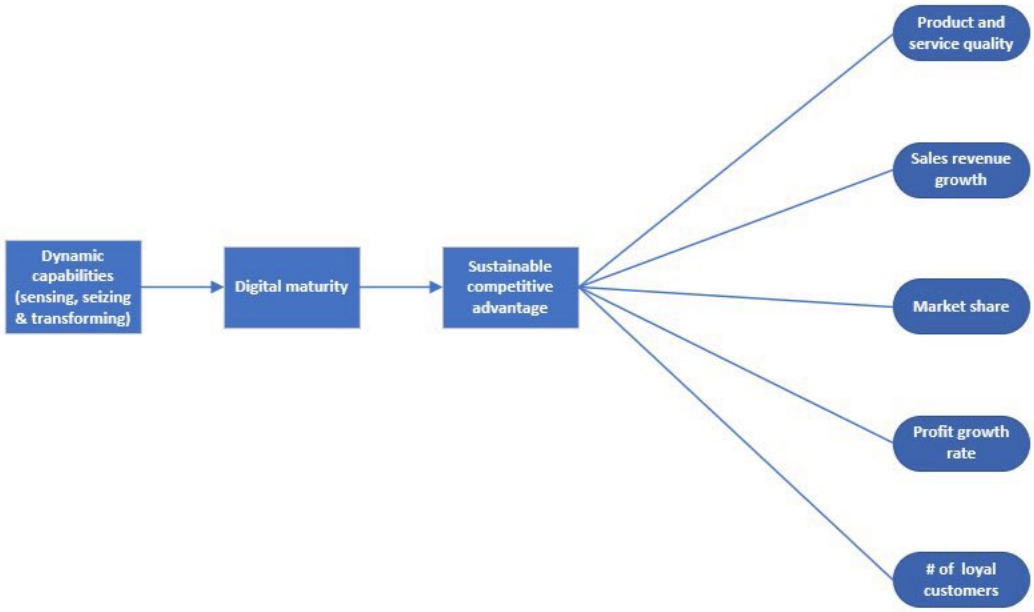

***Figure 2-11**: Conceptual framework illustrating digital maturity's effect on an organisation's sustainable competitive advantage.*

The following sections elaborate on the areas of the conceptual framework. The conceptual framework shows that dynamic capabilities influence digital maturity, and digital maturity affects sustainable competitive advantage.

According to Munroe (2018), revenue growth and profit margins are the business benefits derived from higher digital maturity, and different digital pivots enable these benefits. The biggest challenge for organisations is knowing the digital pivots that drive revenue, and when and how to implement them to respond to the digital world (Munroe, 2018). Gurumurthy et al. (2020) believe that organisations that execute digital pivots in a broader sense achieve higher digital maturity and resultant business benefits.

On the link between digital maturity and sustainable competitive advantage, several studies confirm that digital maturity is associated with a sustainable competitive advantage. One of the studies, the Deloitte survey, found a link between greater digital maturity and financial performance (Gurumurthy et al., 2020). Gurumurthy et al. (2020) further state that higher digital maturity companies have a three times higher chance than companies with lower maturity

to report revenue growth and net profit margins much higher than their industry average.

The research conducted on Baltic-listed companies on digital maturity by Eremina et al. (2019) also found some relationship between digital maturity and corporate performance. Munro's (2018) research supports the digital maturity link to the organisation's financial performance theory, which states that the higher an organisation's digital maturity, the greater the financial performance independent of the industry. Munroe demonstrated this by surveying 407 business leaders on 16 digital maturity pivots (Munroe, 2018). Four of the 16 characteristics had a high correlation with revenue growth, like clear vision and dedicated leadership, engaged intrinsically motivated employees, and the ability to leverage data for insights and digital interactions that are convenient and effortless.

In summary, dynamic capabilities influence digital maturity, and digital maturity affects an organisation's performance which is supported in the literature (Gurumurthy et al., 2020; Munroe, 2018 and Eremina et al., 2019).

2.6 Research objectives and propositions

The following propositions are based on the literature review to address the research objectives.

Research objective 1: To analyse the influence of sensing opportunities for sustainable competitive advantage.

Proposition 1: Scanning and exploring opportunities in the market leads to a sustainable competitive advantage.

Research objective 2: To analyse the influence of seizing opportunities for sustainable competitive advantage.

Proposition 2: Value generation from identified opportunities is a sustainable competitive advantage.

Research objective 3: To analyse the influence of organisation transformation for sustainable competitive advantage.

Proposition 3: Organisation renewal capability leads to sustainable competitive advantage.

2.7 Summary of Literature Review

The literature review focused on Digital transformation, digital maturity/models, sustainable competitive advantage and digital pivots to explore the effect of digital maturity on an organisation's sustainable competitive advantage.

Numerous research findings have substantiated the favourable impact of digital maturity on organizational performance and established a link with the attainment of sustainable competitive advantages. These studies have also highlighted various digital pivots that enhance digital maturity and the resultant business benefits. According to Gurumurthy et al. (2020), organisations should prioritize addressing all digital pivots rather than concentrating on a limited few. This is because organisations that implement digital pivots broadly across various business functions tend to attain greater digital maturity and, consequently, reap more substantial business benefits.

In summary, dynamic capabilities have a recognisable impact on digital maturity, and digital maturity, in turn, plays a significant role in shaping an organization's performance (Gurumurthy et al., 2020; Munroe, 2018 and Eremina et al., 2019). Given these findings, mining organisations are encouraged to make financial investments in digital transformation and strive to overcome the impediments to digital transformation in the mining sector to realise the benefits of digital transformation.

In this chapter, a comprehensive review of the dynamic capability theory was also conducted, employing it as an analytical framework to investigate the impact of digital maturity on the sustainable competitive advantage of an organisation. As per the insights derived from the literature review, it can be suggested that an organization's competitive edge is forged through the enhancement of its

sensing, seizing, and organizational renewal capabilities in line with the dynamic capability theory.

The next chapter contains the research methodology.

CHAPTER 3: RESEARCH METHODOLOGY

This section lays down the research methodology of the study. The discussion will start with the study approach, followed by the study design, data collection method, sample, sampling method, research instrument, and study limitations. The section will conclude by discussing the approach for the data analysis and ethical considerations of the study.

3.1 Research approach

This case study used a qualitative approach to answer the research questions. The selected research approach is suitable for this research because it answers the research questions based on the experience, meaning and perspective of the research participants (Hammarberg et al., 2016). Therefore, the research participants' experience, meaning, and perspective on the effect of digital maturity on the sustainable competitive advantage of an organisation using the dynamic capabilities (sensing, seizing and transforming) and the digital pivots with the most business benefits will provide answers to the topic under study.

3.2 Research design

This research was based on a qualitative research design approach to explore the effect of digital maturity on the sustainable competitive advantage of an organisation and identify digital pivots with the most business benefits. Data collection was through interviews with Digital transformation managers, Product portfolio managers and the Chief information officer of the organisation.

The exploratory case study was selected because it explores presumed causal links not managed with surveys or experiments and where no outcome is predetermined (Robert K. Yin, 2014). The exploratory case study is theory-building or affirming (Robert K. Yin, 2014). This research will contribute to building or affirming the theory of the impact of digital maturity on the sustainable competitive advantage of an organisation and identify digital pivots with the most

business benefits. The other advantages of using the case study method for this research include the following.

- It will help to explore a relationship between the phenomena, context and research participants and capture the context and lived reality of the participants.
- It supports data collection using different instruments. For this research, interviews will be used to collect primary data, and secondary data will be from a previously conducted digital maturity survey to determine the organisation's digital maturity level.
- It will help to deeply explore the effect of digital maturity on the sustainable competitive advantage of an organisation and identify digital pivots with the most benefits.
- The research participants are from different countries, and the case study will help conduct the research via teams.

The main disadvantage of this research method is that the participants can influence the study's outcome by providing inaccurate or incomplete answers to the questions. The mitigation is verifying the presented information to ensure its accuracy, which can take some time.

3.3 Data collection methods

One-on-one interviews with the research participants were this research's primary data collection method. Online interviews were conducted on the Microsoft teams platform because the participants are from different countries. Interview data was captured using a notepad and Microsoft teams recording and transcription. Secondary data analysis from a previous digital maturity survey and financial statements helped gauge the organisation's digital maturity level and financial performance. The secondary data was converged with the primary data collected from the interviews to understand the phenomena comprehensively. According to Patton (1999), cited in Carter et al. (2014), triangulation is a qualitative research strategy used for testing validity based on information from different sources.

Interviews as a data collection method in qualitative research have several pros and cons. Some of the pros are, that the participants are in different countries, and it was easier to conduct interviews virtually. Since the interviews were via Microsoft teams, recording them subject to the participant's consent was a backup tool. This data collection method guaranteed a reasonable response rate because the participants were keenly interested in the subject under study. Lastly, this method allowed the interviewer to be creative and ask further questions or seek clarity on the responses, enabled by a direct interchange with the participants. The downside of this data collection method is limited anonymity, and some participants might not be very free to respond truthfully to some questions. The other disadvantage of this method is that it is labour-intensive.

3.4 Population and sample

3.4.1 Population

According to Satishprakash Shukla (2020), a research population is a set of all the units having variable characteristics under study and for which the research findings can be generalised. This case study's population included all the senior managers within the organisation.

3.4.2 Sample

A sample represents a subgroup of a population selected for research purposes. While the selection is a subgroup, it is representative of the population and appropriate for the research (Sharma, 2017). The sample for this study included all five Digital Managers, eight Product portfolio managers and the Chief Information Officer in the organisation. The selection provided insights into the effect of digital maturity on the sustainable competitive advantage of an organisation and identified digital pivots with the most business benefits. Shetty (2018) recommends a sample size between twenty and thirty for qualitative research. However, a sample size of ten is acceptable, provided population integrity exists in the recruitment.

The research sample enabled a comprehensive understanding of the phenomena from which the theory will derive. The data collection and analysis started with the Digital managers generating the initial codes. Data collected later from the eight Product Portfolio Managers and the Chief Information Officer was analysed and compared with existing codes to see if new topics and themes emerged. No new topics and themes appeared from additional data, and no further data collection and analysis was required. Given (2016) and Urquhart (2013), cited in Saunders et al. (2018), are of the view that theoretical saturation in grounded theory occurs when no new themes emerge from additional data. Accordingly, the research reached saturation with the 5 Digital managers, 8 Product portfolio managers and the Chief information officer.

3.4.3 Sampling method

Leary (2004) defines sampling as, "the process of a sample of participants for a study from the population of interest. Sampling techniques are classified into probability and non-probability (Malhotra, 2004). For this case study, the selected sampling method is non-probability. This sampling technique includes quota, purposive, snowball, self-selection and convenience (Saunders et al., 2009).

The judgement sampling technique was used to select the research participants. This technique was preferred for this research because it enables the researcher to use his judgement/expertise when selecting elements for inclusion in the sample. According to Malhotra (2004), judgement sampling is a type of convenience sampling.

3.5 The research instrument

This research was conducted using virtual interview questions included in Appendix D because all the participants are from different countries. The interview questions were based on the research objectives and literature review. The interview data was captured using a notepad to write notes and Microsoft teams to record the interviews and produce an interview transcript.

3.6 Procedure for data collection

Data was collected using online interviews, and outlined below is the procedure followed:

i. The identified participants were formally requested through email to participate in the research interviews.
ii. Participants received a consent form once they agreed to participate in the research, which they duly signed.
iii. Meetings with research participants were scheduled in advance.
iv. The interview questions were shared with the participants well in advance to prepare.
v. The interviews took a maximum of an hour per interview.

The data collection was done during November and December 2022 for five weeks. In some cases, follow-up interviews were scheduled to get deeper participant insights.

3.7 Data analysis strategies and interpretation

Qualitative data analysis is one of the most critical steps of a qualitative research process. This data analysis enables researchers to make sense of the collected data (Leech & Onwuegbuzie, 2007).

This study used the thematic data analysis process to analyse the data as Braun & Clarke (2006) prescribed to identify patterns and themes in the qualitative data. This data analysis process allows the researcher to understand how the participants experienced the researched phenomenon (Braun & Clarke, 2006). Figure 3-1 below depicts the thematic analysis process.



Figure 3-1*: Diagrammatic representation of the thematic-analytic process adapted from* **(Braun & Clarke, 2006)**

3.7.1 Familiarisation with the data and generation of initial codes

The interviews were recorded and transcribed using Microsoft teams. Afterwards, the researcher read through the transcripts and listened to the recordings to get familiar with the data. The researcher generated over 300 initial codes from the data captured during participant interviews.

3.7.2 Identification of the initial themes

The identification of the initial themes was from the initial codes. Over 80 initial themes were identified from the initial codes.

3.7.3 Review and finalisation of themes

The initial themes were reviewed and used to develop the final themes from the research data. Reviewing the initial themes to develop the final themes acted as quality control. The themes are clearly defined, stating what each theme is about and how it differs from the others. The defining and naming of the themes are essential to avoid overlapping themes.

3.7.4 Report writing

The report delivery is the final phase which delivers a research report. However, it is essential to note that report writing in qualitative research starts during data analysis, unlike in quantitative research, where data and report writing are entirely separate (Braun & Clarke, 2006).

3.8 Quality Assurance

3.8.1 Transferability

Transferability is the degree to which the findings of the qualitative study can be generalised or transferred to other contexts or settings (M.K, 2020). For this study to meet this criterion, data collection was consistent and done in the same way for all the research participants through interviews using the same research instrument.

3.8.2 Credibility

Credibility is about creating confidence in the qualitative research findings, so they are believable from the perspective of the research participants (M.K, 2020). Two methods will be used to create confidence in the research results. The first method is the member check process. The trust will be achieved by asking all the Digital Managers to review the data collected from the interviews and the applied interpretation of the data. The research participants will appreciate the member check process because it allows them to verify their statements and provide additional input if necessary, creating trust (Devault, 2012). The second method to secure data credibility is prolonged engagement with the data through the thematic process.

3.8.3 Dependability

The extent to which the research replicates in similar conditions is called dependability (Stenfors et al., 2020). To ensure dependability, the data collected for this research will be analysed using the thematic analysis process to generate the initial codes and initial and final themes before delivering the final report. The thematic approach is proven, and future researchers who wish to recreate the study can use it.

3.9 Ethical considerations

In this research context, ethics refers to the researcher's impact on the rights of the people affected by the study (Saunders et al., 2009). Therefore, research ethics relates to the research questions, formulation of the research topic, the research design, gaining access to the research participants, collecting data, data processing ad storage, data analysis and writing up the research findings morally and responsibly (Saunders et al., 2009).

This study adhered to the following ethical considerations:

- As outlined in the data collection procedure, the study was explained thoroughly to the research participants to make an informed decision on whether to participate in the research or not.
- The study excludes any data that can personally link the participants and lead to their identification.
- The study followed the Wits University consent guidelines by ensuring the interview participants signed a consent form.

3.10 Conclusion

This chapter presents the research approach, design, data collection methods, research population and sample, research instrument and data collection, data analysis strategies and interpretations, quality assurance and ethical considerations. As the research is exploratory, seeking to explore the effect of digital maturity on the SCA of an organisation, a qualitative research approach

was followed. The next chapter presents the findings as guided by the research methodology.

CHAPTER 4: PRESENTATION OF FINDINGS

4.1 Introduction

The study aimed to explore the effect of digital maturity on the sustainable competitive advantage of a global engineering firm in the South African mining industry.

The study's objectives are threefold. The first and second objective is to analyse the influence of sensing and seizing opportunities for sustainable competitive advantage. The third objective is to analyse the influence of organisation transformation for sustainable competitive advantage.

This chapter presents the research findings through the dynamic capability theory framework. The results will be categorised into themes in line with the theoretical thematic analysis and interpreted according to the research questions. The organisation of the chapter is as follows: Section one provides the background information of the research participants. The second section presents the analysis of the research findings, and the final two sections summarise the results and the chapter.

4.2 Background Information

The background information gathered from the research participants includes the level of qualification, age range, position in the organisation and tenure (in years) in the organisation. The table below provides a high-level profile of each research participant.

Table 4-1: Research Participants' Background Information

Participants	Highest Qualification	Age Range	Tenure in the Organisation
Participant 1: Digital Manager	Postgraduate	40-50	3
Participant 2: Product Portfolio Manager	Postgraduate	40-50	15
Participant 3: Digital Manager	Undergraduate	30-40	9
Participant 4: Digital Manager	Postgraduate	50-60	20
Participant 5: Product Portfolio Manager	Undergraduate	30-40	6
Participant 6: Digital Manager	Postgraduate	40-50	12
Participant 7: Digital Manager	Undergraduate	20-30	3
Participant 8: Product Portfolio Manager	Undergraduate	50-60	8
Participant 9: Product Portfolio Manager	Undergraduate	40-50	13
Participant 10: Product Portfolio Manager	Honours Degree	30-40	6
Participant 11: Product Portfolio Manager	Postgraduate	30-40	7
Participant 12: Product Portfolio Manager	Undergraduate	40-50	6
Participant 13: Product Portfolio Manager	Postgraduate	30-40	7
Participant 14: Chief Information Officer	Postgraduate	50-60	11

According to table 4-1, the 14 research participants have a combined work experience of 129 years in the organisation. The participants have vast experience in their expertise to contribute positively to the study. The average age range of the participants is between 30 and 60 years.

Figure 4-1 below shows the distribution of the participant's roles in the organisation. 57% of the participants are Product portfolio managers, 36% are Digital managers, and 7% are Chief information officers.

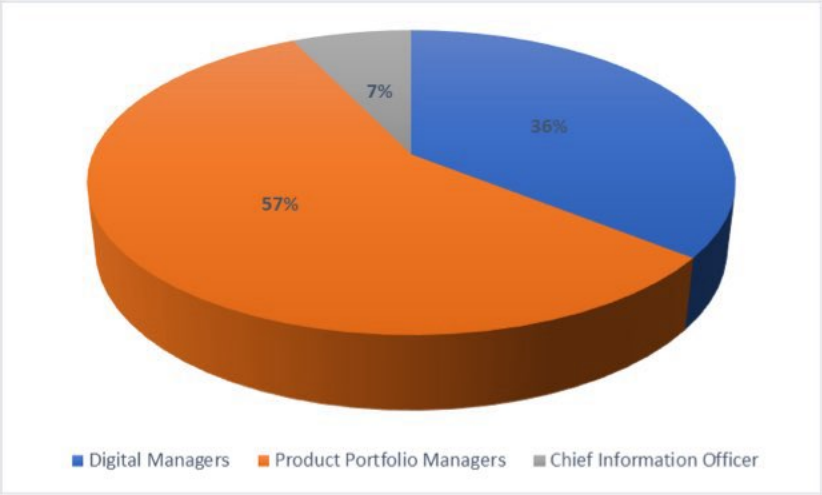

Figure 4-1: Distribution of participant's roles in the organisation

The graph below shows that 50% of the participants have a postgraduate degree, 43% have undergraduate degrees, and 7% have Honours degrees.

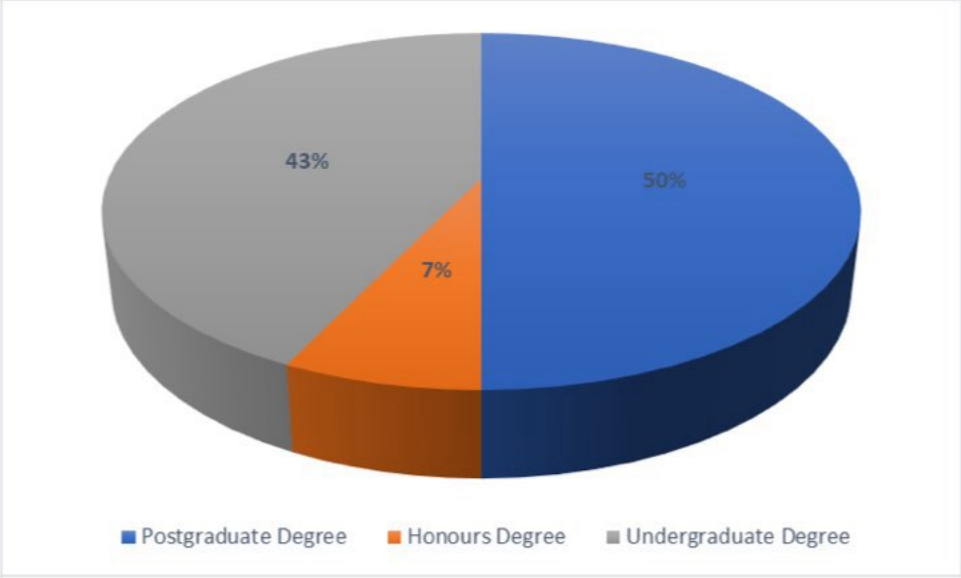

Figure 4-2: Distribution of the participant's level of education

The fourteen participants were selected for the study because they are subject matter experts with vast experience in the field that would enable them to contribute effectively.

4.3 Effect of digital maturity on SCA

In today's business environment, business sustainability and performance are continuously threatened by external factors stemming from increased consumer demands, new regulations, competitors entering the market and technological changes Helfat et., (1997) cited in (Ellström et al., 2022). To respond to these threats, an organisation must constantly renew and recreate its strategic capabilities to meet the needs of the changing environment (Teece et., (1997) cited in (Ellström et al., 2022). Here the focus is on capabilities that secure and sustain an organisation's superior performance in the future by responding to the changing external environment. Organisations that fail either do not respond or are slow to react to external threats and opportunities (Teece et., (1997) cited in(Ellström et al., 2022).

Therefore, this study explores the effect of digital maturity on the sustainable competitive advantage of a global engineering firm in the South African mining industry.

Data on the dimensions set out in the research sub-questions (Opportunity scanning and exploration, digital pivots, enablers for responding to opportunities and threats and organisation renewal and reconfiguration are mapped against the Dynamic capability theory dimensions as depicted in figure 4-4.

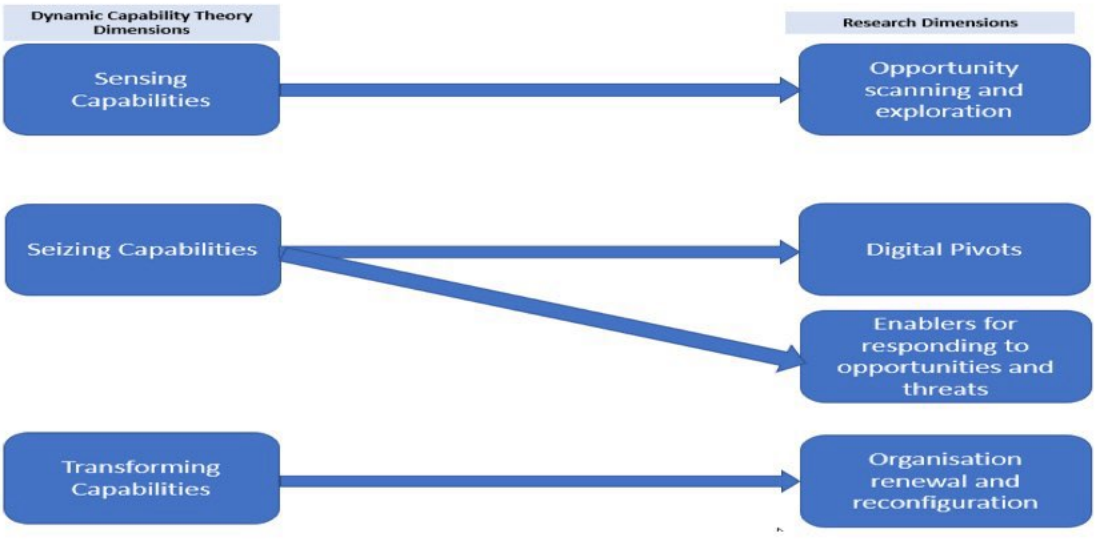

Figure 4-3: Mapping of the theory themes to research dimensions

The research findings are categorised into themes using the Dynamic capability theory framework. Each of the three dynamic capability theory components (sensing, seizing and transforming) is used as a lens to explore the research objectives.

4.4 Presentation of the findings

This section presents the results of the research findings based on the data collected from the interviews. The study's findings are categorised into themes using the dynamic capability theory framework. Each of the three dynamic capability theory components (sensing, seizing and transforming) is used as a lens to explore the effect of digital maturity on the sustainable competitive advantage of an organisation.

4.4.1 Sensing capabilities for digital transformation

The dynamic capability theory's sensing capabilities involve constantly scanning and exploring new opportunities across markets and technologies (Armstrong & Lee, 2021). An organisation that lacks sensing capabilities is marginalised in the market and eventually out of business (Armstrong & Lee, 2021). An example of a company that suffered this fate is Nokia which missed the smartphone revolution by failing to sense the evolving needs and opportunities in the market. Therefore, an organisation needs to build sensing capabilities to understand better and respond to unplanned developments in a changing business landscape and take actions to manage the change (Jacobi and Brenner, 2018; Warner and Wager, 2019) cited in (Ellström et al., 2022).

The four questions below were posed to the research participants to better understand the organisation's sensing capabilities.

4.4.1.1 Scanning and exploring market and technology opportunities

The participants highlighted how the organisation scans and explores opportunities across markets and technologies. Table 4-2 summarises the research findings and the final themes highlighting how the organisation monitors

and analyses opportunities across markets and technologies. The identified themes indicate that the organisation primarily scans and explores opportunities across markets and technologies through R&D, customer collaboration and mergers and acquisitions.

Table 4-2: Preliminary codes and themes and concluding themes

Sensing Capabilities: Opportunity scanning and exploration	**Preliminary Codes**	**Preliminary Themes**	**Concluding Themes**
How does our organisation scan and explore opportunities across markets and technologies?	• Research • Customer feedback • Customer interactions • Market trends analysis • Mergers and acquisitions • Mergers and acquisitions • Mergers and acquisitions • Research and development • Mergers and acquisitions • Research and design.	• Research and Development • Customer collaboration • Mergers and Acquisitions • Market trends	• Research and Development • Customer collaboration • Mergers and Acquisitions

4.4.1.1.1 Research and development (R&D)

Below are the direct quotes from the participants on how the organisation scans and explores market and technology opportunities through R&D.

'We scan the market and technology opportunities by researching the latest technology trends to incorporate into our product offering.'

'We have a strong R&D team that is proactive regarding new product development to respond to technological changes and customer demands.'

The research participants highlighted R&D as one of the strategies for scanning and exploring opportunities across markets and technologies. Through R&D, the

organisation examines market and technology opportunities to find the latest technology trends or new product offerings for investment. The company reports show that the solid organic growth posted by the company in recent years results from a robust, innovative product portfolio. The company has successfully launched several new products, such as battery electric trucks, cone crushers engineered for efficiency and lower costs and laser tagging of inserts with scannable data matrix codes for full traceability.

Research and development is central for an organisation to innovate and introduce new products and services in the market (Kenton, 2022). It enables an organisation to stay ahead of its competition and cannot survive without it (Kenton, 2022). Therefore, an organisation can use R&D to explore and identify market and technology opportunities and gain a competitive advantage.

4.4.1.1.2 Customer collaboration

Below are the direct quotes from the participants on how the organisation scans and explores market and technology opportunities through customer feedback.

'We rely on customer feedback for input on the available market and technology opportunities.'

'We run customer surveys to get customer feedback on our service levels and product performance. The feedback is a vital input into our opportunity funnel, and we respond by adjusting our service or product offering.'

The participants indicated that the organisation uses customer feedback to identify market and technology opportunities. Further, the participants indicated that most generated opportunities are from the sales organisation's interaction with customers. Input from customers provides first-hand information on customer needs and an opportunity for the organisation to respond with offerings that meet customer needs.

4.4.1.1.3 Mergers and acquisitions

Below are the direct quotes from the participants on how the organisation scans and explores market and technology opportunities through mergers and acquisitions.

'Mergers and acquisitions are critical for our business growth. We are constantly scanning the market for companies to acquire. Recently we have seen the acquisition of digital and data-driven companies because digital is very much on the organisation's agenda.'

Our strategy and M&A teams are constantly scanning the market, trying to understand what is happening, what can add value to our core business, and what product offerings to develop.'

'The M&A is an area where our organisation is super strong. We have been investing in automation and electrification through the battery by acquiring companies that can complement our current business or product offering. We can now argue that we are market leaders in the electric and automation space. The level of investment in this space also demonstrates this.'

'I do not know how the scanning of opportunities is done, but I think this is where the decentralised model of our organisation works well by enabling agility through delegated decision-making to the Sales Areas and divisions and complementing the central BA strategy function. The central BA strategy function is responsible for M&A and works with the divisions and Sales Areas to identify appropriate companies to acquire, considering the strategic objectives. The aim is to strengthen our market position or product offering or to introduce a new product offering.' An organisation's structure plays a vital role in the organisation's success. According to Steiner et al. (2014), the structure of an organisation strongly affects its performance and competitiveness. The literature stresses that the impact of organisational structure on organisation change and evolution to support new technologies and users' needs is the same as technological breakthroughs or market changes (DeCanio et al., 2000) cited in (Steiner et al., 2014). Given these conditions, the readiness to innovate given by the structural

organisation is essential for absorbing new knowledge and mastering new technologies (Sarrasin, Ramangalahy, 2007) cited in (Steiner et al., 2014).

Participants indicated that through M&A, the organisation identifies appropriate companies to acquire, considering the strategic objectives. Recent organisational acquisitions have brought on digital and data-driven companies because digital is very much on the organisation's strategic agenda. Therefore, M&A is vital to business growth.

Mergers and acquisitions (M&A) is a business strategy that consolidates companies or significant business assets facilitated by financial transactions between companies (Hayes, 2022). The type of M&A employed by the business is conglomerate. This type of M&A has enabled diversification through an expanded customer base, increased efficiencies, and introduced new product offerings.

4.4.1.2 Analytical systems for scanning and exploring opportunities across markets and technologies

The participants provided varied responses on the analytical systems and tools used in the organisation for scanning opportunities and threats across markets and technologies. However, no IT analytical systems per-say were mentioned. Table 4-3 shows the research findings and the final theme highlighting the organisation's approach to scanning and exploring opportunities across markets and technologies. The central theme identified is market intelligence.

Table 4-3: Preliminary codes and themes and concluding themes

Sensing Capabilities: Opportunity scanning and exploration	Preliminary Codes	Preliminary Themes	Concluding Themes
What analytical systems are available in the organisations for scanning and exploring opportunities across markets and technologies?	• Media scanning • Competitor analysis • Market Intelligence • Market trends • Surveys • Macro trends • Industry trends • Customer interactions • Mergers and acquisitions • Customer collaboration • Collaboration with external organisations • Market development	• Market Intelligence • Mergers and Acquisitions • Collaboration	• Market Intelligence

4.4.1.2.1 Market Intelligence

Below are the common expressions provided by the participants on the analytical systems and tools used in the organisation for scanning and exploring market and technology opportunities.

'*We work closely with our customers to understand their challenges. We use our customers' challenges as input into our opportunity funnel.'*

'The strategy team collaborates with organisations and companies that specialise in forward-looking, analysing market trends and predicting customer needs to access opportunity information from external sources.'

'We do a lot of competitor analysis by analysing and scanning media for news looking at the things that could be of strategic interest.'

'Our strategy team does all the market intelligence work looking at the macro trends, surveys done by consulting firms like Bang, McKenzie or EY looking at industry trends to get the expectations and direction the mining industry is taking.'

The participants highlighted several sources used to gather data for market intelligence. The participants highlighted customer collaboration, competitor analysis, macro trends and survey results. The organisation understands customer challenges through customer collaboration, which is input into the opportunity funnel. Competitor analysis and media scanning for news that could be of strategic interest were highlighted as other means to gather market intelligence data. Lastly, the participants stressed that the strategy team does a lot of market intelligence work by looking at the macro trends and surveys done by consulting firms like Bang, McKenzie or EY, looking to get expectations and directions the mining industry is taking.

Knowing about the market trends and its matrix before making major investment decisions can be the difference between avoiding losses arising from the investment and growing a profitable business (Akkannavar, 2023). With every industry becoming competitive, sustaining the same profitability margin is difficult. Therefore, by using market intelligence, the company can gather internal and external data about the business's market position, customer demands, challenges, and the market size for the products and services, which is critical when making funding decisions for new ventures or companies (Akkannavar, 2023).

4.4.1.3 Maturity of the analytical systems

Below are the statements quoted from the participants about the maturity level of the analytical systems to effectively sense opportunities in the markets and technologies.

'The organisation is mature in this area. It identifies value creation and targets entities that have large opportunities as opposed to entities that are necessarily delivering today on profits or other factors. The approach in this area is mature by buying not just lots of companies but targeted companies.'

'*Our organisation has a good enough maturity level regarding sensing opportunities in the market and technology. However, we can do more by implementing systems for this purpose.'*

'Ok, looking at the acquisitions that we have made in the recent past, we have mature systems for effective sensing of market and technology opportunities and responding accordingly.'

Most participants highlighted that the organisation has mature analytical systems and tools to effectively sense market opportunities and technologies. Maturity was the central theme identified from the research, as highlighted in Table 4-4.

Table 4-4: Preliminary codes and themes and concluding themes

Sensing Capabilities: Opportunity scanning and exploration	**Preliminary Codes**	**Preliminary Themes**	**Concluding Themes**
How mature are the analytical systems to effectively sense market and technology opportunities?	• Mature • Mature • Mature • Sensitivity analysis • Demographic data • Mature based on acquisitions made • Mature in backline organisations • Future prediction.	• Maturity	• Maturity

4.4.1.4 Implications for lacking opportunity sensing capability

Table 4-5 summarises the findings as they relate to the impact of an organisation's lack of sensing capacity for market and technology opportunities. Some highlighted consequences include loss of profitability, competitive advantage, market share and market leadership. The central theme identified from the research is business performance.

Table 4-5: Preliminary codes and themes and concluding themes

Sensing Capabilities: Opportunity scanning and exploration	Preliminary Codes	Preliminary Themes	Concluding Themes
What would you say are the consequences for our organisations if it cannot sense market and technology opportunities?	• Reduced competitiveness • Missed opportunities • Loss of market-leading position • Reduced profitability • Missed opportunities • Reduced competitive advantage • Lost market share.	• Business Performance	• Business Performance

4.4.1.4.1 Business performance

The following statements are quoted from the participant's responses as they relate to the business performance consequences of an organisation's lack of capability to sense opportunities from the market and technologies.

'The organisation would miss out on opportunities and become less competitive if it does not sense market opportunities.'

'The consequence of not sensing opportunities in the market is that we will always be second best in our industry and lose market share and impact profitability.'

'The organisation becomes myopic if it cannot scan the market and technology for opportunities.'

'The main risk is that we miss opportunities to get a competitive advantage and be at the forefront of our industry. The other risk is that we do not know what we are doing and start going in the wrong direction.'

The participants provided varied consequences resulting from an organisation's lack of capability to sense market and technology opportunities, resulting in low business performance. The highlighted effects include reduced competitiveness, missed opportunities, loss of market-leading position, reduced profitability, and loss of competitive business advantage and market share. A consequence is a loss of sustainable competitive advantage because some highlighted effects of not sensing market and technology opportunities are indicators of SCA.

In general terms, business performance is the company's ability to generate profit from its resources and achieve its objectives. Business performance refers to a company's achievements measured using several business metrics like profitability, productivity, profit, customer satisfaction rating, order delivery and market share (Terpilowski, 2022). Therefore, if a business does not perform due to a lack of capability to sense market and technology opportunities, it loses its competitive advantage. This view is supported by Newbert (2008), who views a positive link between a company's competitive advantage and financial performance.

4.4.2 Seizing capabilities for digital transformation

The seizing capabilities of the dynamic capability theory enable the firm to respond to identified opportunities and threats through, but not limited to, the introduction of new products and customer experiences, transforming cost structures and adopting new business models. Seizing capabilities involves selecting and implementing enterprise structures, procedures, designs and incentives to successfully enable the firm to exploit identified opportunities or threats (Armstrong & Lee, 2021). Often, organisations sense opportunities but fail to seize the value due to a lack of commitment, low-risk appetite, or lack of financial capacity (Teece, 2007) cited in (Ellström et al., 2022). The mitigation for highlighted shortcomings is to improve the rules and routines and strengthen organizational leadership and strategies to understand, capture and evaluate potential business opportunities (Teece, 2007) cited in (Ellström et al., 2022). Therefore, seizing capability is critical for organisations to realise value from new prospects and remain sustainable.

The five questions below were posed to the research participants to understand better the organisation's seizing capabilities and identify the digital pivots that deliver the most business benefits.

4.4.2.1 Organisation response to opportunities and threats

Table 4-6 summarises the research findings and final themes relating to how well the organisation responds to market and technology opportunities and threats. The themes identified from the research are Research and Development and Mergers and Acquisitions.

Research and Development enable the organisation to innovate and introduce new products and services (Kenton, 2022). Through Mergers and Acquisitions, an organisation consolidates companies or merges business assets facilitated by financial transactions between companies (Hayes, 2022).

Table 4-6: Preliminary codes and themes and concluding themes

Seizing Capabilities: Organisation enablers for responding to opportunities and threats	**Preliminary Codes**	**Preliminary Themes**	**Concluding Themes**
How well do our organisations respond to market and technology opportunities and threats?	• Good at responding to market opportunities and threats • Innovation leader • Respond very well • Market leader in the underground business • Research and innovation investment • Merges and acquisitions • Well-situated to act on opportunities • Financial muscle • Strong focus on R&D • Forward-looking • Innovative	• Research and Development • Innovation • Financial capacity • Mergers and Acquisitions	• Research and Development • Mergers and Acquisitions

4.4.2.1.1 Research and development

Below are the statements from the participants about how well the organisation responds to identified market and technology opportunities through research and development.

'My personal experience is that we have a strong focus on R&D. We are forward-looking and continuously evolve our offerings to our customers in terms of the underlying machines, exploring new requirements for bundling deals, including automation.'

'As part of our R&D, we continuously collaborate with our customers to develop new product offerings and enhance existing products. Having customer feedback in our R&D process ensures that we deliver products that are fit for purpose and meet customers' needs and expectations.'

Under the theme of Research and Development, the participants responded that the organisation has a firm focus on R&D. The organisation is forward-looking and continuously evolves its offerings to customers. In one way, the organisation's financial capacity enables it to act on opportunities when identified. The amount of investment in innovations demonstrates the business's growth ambitions.

According to Teece (2007), identified opportunities or possibilities need to be addressed either through new products, processes, services or a combination of these alternatives (Teece, 2007) cited in (Ellström et al., 2022).

4.4.2.1.2 Mergers and acquisitions

The quotes below show some direct thoughts from the participants on how well the organisation responds to market and technology opportunities and threats through mergers and acquisitions.

'We respond very well to market opportunities and threats through mergers and acquisitions. We aim to be number one in the market, especially in our core areas. We are number one in underground mining and want to remain number one. For surface mining, we are lagging, but the ambition is to get to the top spot.'

'The amount of investment in research, innovation and acquisitions to grow the business demonstrates the business's growth ambitions.'

Participants highlighted Mergers and acquisitions (M&A) as another strategy the organisation employs to respond to market and technology opportunities and threats. The organisation aims to be number one in the market, especially in the core areas. The organisation is already number one in underground mining. However surface mining is lagging, but the ambition is to get to the top of the surface mining business. The investment in mergers and acquisitions demonstrates the business's growth aspirations.

According to Hayes (2022), Mergers and Acquisitions refer to the consolidation of companies or significant business assets facilitated by financial transactions between companies. Given this, mergers and acquisitions are critical strategies for sustainable business growth.

4.4.2.2 Enablers for responding to identified opportunities and threats

Table 4-7 summarises the research findings and final themes related to the capabilities that enable the organisation to respond to identified prospects and threats. Some identified themes include competencies, Management support, and Strategy that directs focus areas and critical priorities.

The seizing capabilities allow the organisation to capture the value of potential business opportunities and decide whether changes are needed through the organisation to seize the value of the opportunities (Yeow et., 2018) cited in (Ellström et al., 2022).

Table 4-7: Preliminary codes and themes and concluding themes

Seizing Capabilities: enablers for responding to opportunities and threats	Preliminary Codes	Preliminary Themes	Concluding Themes
What capabilities exist in our organisation to enable the organisation to respond to identified opportunities and threats?	• Industry and market knowledge • Employee competence • Management support • Strategy • Customer collaboration • Customer interactions • Customer service • Data and Insights • Decentralised operation model. • Digital competence • Accountability • Mergers & Acquisitions • Financial muscle • Strategic direction • Research & Development.	• Competence • Management Support • Strategy • Collaboration • Mergers & Acquisitions • Trust • Financial Capacity • R&D • Business intelligence	• Competence • Management Support • Strategy

4.4.2.2.1 Competence

The quotes below show some direct thoughts from the participants on how the organisation leverages competence capability to respond to market and technology opportunities.

'We have an excellent understanding of our industry and the markets.'

' We also have competent employees that understand the business, especially the underground mining business where we are market leaders.'

The participants highlighted good industry knowledge and competent employees who understand the business as one of the capabilities that enable the organisation to respond to identified opportunities and threats. Another

highlighted competence capability is Internal digital competence from the digital subject matter experts.

4.4.2.2.2 Management support

The quotes below show some direct thoughts from the participants on how the organisation leverages management support to respond to market and technology opportunities.

"The biggest capability here is the decentralised operating mode, built on trusting the divisions to run the business on behalf of the owners. For example, if any Division President identifies an opportunity for growth and makes a case, they are supported and trusted to invest but are also held accountable. Therefore, having a decentralised model gives them the freedom to act and ultimate accountability to deliver success.'

'We have visible management support, supporting the business at different levels.'

The participants highlighted management support as another capability that enables the organisation to respond to identified opportunities and threats. The organisation has a decentralised operating model. With this setup, sales decision-making is delegated to the Sales Areas, enabling decision-making closer to the customers. Management has also entrusted the Divisions to run the business on behalf of the owners. If any Division President identifies an opportunity for growth and makes a case for it, they are supported and trusted by management to invest but also held accountable. Therefore, a decentralised model gives the Sales Areas and Divisions the freedom to act and ultimate accountability to deliver success with full management support.

According to Yeow et al. (2018), cited in Ellström et al. (2022), lack of management support is one of the main reasons businesses sense opportunities but fail to seize the total value. Therefore, management support is critical for organisations to seize value from identified opportunities.

4.4.2.2.3 Strategy

The quotes below are direct quotes from the participants on how strategy enables the organisation to respond to identified opportunities and threats.

'We have a strategy that directs our focus areas and key priorities. Through strategy, we know the focus areas and priorities in the mergers and acquisitions and R&D areas.'

"Strategy enables the organisation to invest in the right areas. Recent mergers, acquisitions, and innovations demonstrate how strategy directs where investments should be made.'

The participants highlighted a strategy that directs the organisation's focus areas and key priorities as a critical enabler for the organisation to respond to identified opportunities and threats. The growth strategy driven by M&A shows that the organisation has a solid financial capacity to invest in new opportunities. As highlighted by the participants, the organisation's strategic direction is digital, making it easy to approve the digital investment.

4.4.2.3 Enterprise structures, procedures, designs and incentives

Table 4-8 summarises the research findings and final themes relating to the enterprise structures, procedures, designs, and incentives that enable the organisation to exploit market opportunities and address threats successfully. The main themes highlighted in the research include business platform strategy and organisation structure.

Table 4-8: Preliminary codes and themes and concluding themes

Seizing Capabilities: Organisation enablers for responding to opportunities and threats	Preliminary Codes	Preliminary Themes	Concluding Themes
What enterprise structures, procedures, designs, and incentives enable our organisation to successfully exploit market opportunities or address threats?	• Decentralised organisation structure • Entrepreneurial culture • Decision-making is closer to the business • Value-based selling • Key account management • Market trends analysis • Customer needs focus • Platform strategy • Enterprise architecture • Design authorities • Financial muscle • Decentralised organisation setup • Mature digital culture	• Business model • Financial capacity • Digital Culture • Organisation structure • Enterprise Architecture • Platform strategy	• Business platform strategy • Organisation Structure

4.4.2.3.1 Platform strategy

The quotes below are direct quotes from the participants on how the business platform strategy enables the organisation to successfully exploit market opportunities or address threats.

'We have the business platform strategy, the division enterprise architecture and design authorities. These are new within our organisation, like 2 - 3 years old. However, there is much value in having these structures and processes to help

align end-to-end processes, common data elements and enterprise technologies across the organisation.'

'The platform strategy is expected to deliver business growth and generate customer value enabled by faster and more cost-effective change delivery with shorter lead times, better alignment of portfolios with strategic business direction, unified customer experience and seamless data flow to drive growth strategy.'

'Key account management structure and value-based selling are key in our organisation to exploiting market opportunities or addressing threats.'

'We leverage operation data captured from machines to deliver additional value to customers through actionable insights. This service is made available to customers who own our machines.'

The participants indicated that the organisation has a business platform strategy for supporting business growth ambitions and customer value creation through value-based selling. Despite being new to the organisation, participants see much value in having governance structures and processes to align decisions across all the business divisions. In the past, it has been a siloed approach where divisions can decide on their processes and applications. The alignment in this area is welcomed because it helps the organisation exploit market opportunities by enabling it to be more efficient and dynamic in reacting to things happening at a single customer or macro level. It has also enabled faster and more cost-effective change delivery with shorter lead times, better alignment of portfolios with strategic business direction, unified customer experience, and seamless flow of data to drive growth strategy.

The literature supports the above research findings. Recent studies on value-based business strategies suggest that a seller's successful leverage of customer value focuses on assisting the customer to drive value. In exchange produces more significant value for the seller. Hence superior customer value is considered a prerequisite for a company's realisation of above-normal value economic returns (Blois & Ramirez, 2006) and strategic benefits (Brandenburger & Stuart, 1996) cited in (Töytäri & Rajala, 2015). Because value-based thinking is becoming more common in the industrial exchange, selling is moving from the

individual to relationship-based activity towards customer value management (Keeney, 2009) cited in (Töytäri & Rajala, 2015).

4.4.2.3.2 Organisation structure

The quotes below are direct quotes from the participants on how the organisation setup enables it to successfully exploit market opportunities or address threats.

'Our decentralised organisation structure supports an entrepreneurial culture.'

'Decision-making is close to the business. These are some of the enablers for the organisation that aid the exploitation of market opportunities.'

In terms of structure, it is the way we are organised. We focus more and more on our key accounts to ensure they are served better and that we have a good focus on customers, a culture of serving them by understanding them better and putting their needs in focus.'

The participants indicated that the organisation has a decentralised structure which supports an entrepreneurial culture. An entrepreneur culture is supported by delegating decision-making closer to the customers. When Sales Areas or Divisions identify a local investment opportunity, management supports them in investing. The Sales Areas and divisions are also responsible for the profit and loss of their respective areas.

4.4.2.4 Organisation maturity in responding to opportunities and threats

The quotes below show some direct thoughts from the participants on how mature the organisation is at responding to market and technology opportunities.

'*The organisation is quite mature. We always respond to changes in the market. For example, when the market slows down or picks up, we re-organise accordingly to respond correctly*.'

'I rate the maturity of the organisation between six and ten. We are adaptable. We have shown during the COVID-19 pandemic in terms of how we responded as an organisation. The Russia and Ukraine conflict is another example of how we respond as an organisation to changes in the market. Many internal changes

within the organisation still take a long time. However, in the big macro things that happen, there is a top-down drive to respond quickly.'

'Responding to opportunities means you are reactive, which is a disadvantage, and this is the case for our organisation. Ideally, we should be leading in our industry. The organisation's maturity level is between levels five and six.'

Table 4-9 summarises the findings regarding how mature the organisation is at responding to market and technology opportunities and threats.

Table 4-9: Preliminary codes and themes and concluding themes

Seizing Capabilities: Organisation enablers for responding to opportunities and threats	**Preliminary Codes**	**Preliminary Themes**	**Concluding Themes**
How mature would you say our organisation is at responding to market and technology opportunities and threats?	• Mature • Good maturity • Very mature • Mature • Adaptability • Average maturity • Agility • Mergers and Acquisitions.	• Maturity	• Maturity

The general view from the participants is that the organisation is mature at responding to market and technology opportunities and threats. They all rated above five for the organisation's maturity in responding to market and technology opportunities and threats. The participants further commented that the organisation always responds to market changes. One participant explained that when the market slows down or picks up, the organisation re-organises to ensure it has the correct organisation set up to respond correctly. Another participant highlighted how well the organisation responded to the COVID-19 pandemic and the Russia and Ukraine conflict to ensure minimal impact on the business. However, one participant believes that the organisation should be the industry leader and not have to respond to market opportunities. Responding to market

opportunities is viewed as a reactive approach which disadvantages the organisation.

4.4.2.5 Digital pivots

According to Gurumurthy (2019), digital pivots refer to an array of assets and capabilities that enable an organisation to become digital if developed. Digital pivots have a more significant impact on the organisation when executed in concert rather than selectively, and the benefits are more for organisations that implement them widely (Gurumurthy et al., 2020). Some examples of digital pivots in the Unified Digital Maturity model include Vision and strategy, culture, organisation and governance, Digital ethics, New value streams and business models, Innovation and investment, Customer orientation and engagement, Digital product innovation, Workforce enablement and performance, Core process innovation & digitalisation, IT excellence and Results (Armstrong & Lee, 2021).

4.4.2.5.1 Digital pivots that increase business benefits

The statements below are quotes from the participants on the digital pivots they consider to have the most impact on business benefits.

'Having a clear digital strategy. Why are we going digital? What is the purpose and value we want to achieve?'

'Culture delivers the most business benefits. Getting used to the fact that digital is part of the organisation's DNA.'

'Having the right digital tools, training to ensure the employees are well vested to use the digital tools and having a digital culture in the organisation.

'I believe having a digital strategy supported by management is critical because management has to provide resources to execute the strategy.'

Table 4-10 summarises the findings of the research and the final themes identified relating to the digital pivots that increase business benefits. The study identified several themes: workforce enablement, vision and mission, digital

investment, culture, organisation and governance, innovation, and New value streams and business models. According to the research participants, several digital pivots increase business benefits, including having a clear digital vision and strategy, organisation culture, investing in digital innovation, management support and competence development.

Table 4-10: Preliminary codes and themes and concluding themes

Identify digital pivots in the organisation that require improvement to increase business benefits	Preliminary Themes	Concluding Themes
Which digital pivots would you say increase business benefits?	• Workforce enablement • Vision and Strategy • Digital Investment • Culture • Organisation and Governance • Innovation • New value streams and business models • Process innovation.	• Workforce enablement • Vision and Strategy • Digital Investment • Culture • Organisation and Governance • Innovation • New value streams and business models Process innovation.

Literature highlights different digital pivots from various researchers. However, the evidence about digital pivots that deliver the most benefits for an organisation is mixed (Gurumurthy et al., 2020). According to Munroe (2018), the biggest challenge for organisations is knowing digital pivots that drive revenue, and when and how to implement them to respond to the digital world. The conclusion by Gurumurthy et al. (2020) is that organisations should focus on all the digital pivots and not a selected few because organisations that execute digital pivots more broadly across business functions tend to achieve higher digital maturity and resultant business benefits.

4.4.3 Transforming capabilities for digital transformation

According to Kianto (2008), organisation renewal is a firm's ability to deliver learning and innovation outcomes. The outcomes include new products, processes and insights. The results enable the organisation to adapt to external

changes and create internal change. Organisations with high renewal capability outperform competitors with similar resources by developing, changing, modifying and reorganising resources, knowledge assets and routines (Kianto, 2008). Literature on renewal capabilities, as proposed by a theoretical model Kianto (2008), can be categorised into six key themes, strategic competence, leadership, exploiting time, connectivity, managing knowledge and learning orientation. However, changing business routines can be risky and costly (Teece, 2007) cited in (Ellström et al., 2022). The frequency of market condition changes must determine the size of the reconfiguration (Helfat et al., 2007) cited in (Ellström et al., 2022).

The four questions below were posed to the research participants to better understand the organisation's transforming capabilities.

4.4.3.1 Importance of continuous organisation renewal and transformation

Table 4-11 summarises the final themes identified on the significance of constant organisation renewal and reconfiguration. The theme identified in the research is Business sustainability.

Table 4-11: Preliminary codes and themes and concluding themes

Transforming Capabilities: Organisation renewal and reconfiguration	**Preliminary Codes**	**Preliminary Themes**	**Concluding Themes**
Why is continuous organisation renewal and transformation necessary for our organisation?	• Market relevance • Market response • Change • Organisation renewal • Strategic direction • Fit for purpose • New competence • Opportunity understanding • Growth • Efficiency	• Business performance • Efficiency • Competence • Business sustainability • Organisation renewal	• Business sustainability

4.4.3.1.1 Business sustainability

The statements below are quotes from the participants on the importance of continuous organisation renewal and reconfiguration for a sustainable business.

'The main consequence is loss of market leading position. A company cannot last in the business if it does not evolve as an organisation with all the macroeconomic changes. Suppose you look at the mining industry and the impact that electrification and automation have on the industry. Companies that do not come on board will cease to exist in the next ten years.'

'It is important to remain relevant in the market. The market dynamics are always changing with new technologies and competition entering the market.'

'Organisation renewal is a must for our organisation and all organisations. All businesses are undergoing a digital shift in one way or another, so whoever does it well will succeed and prevail.

'There are several reasons why an organisation needs to renew. Standing still is, in a way, going backwards. We reconfigure the organisation to ensure a structure fit for purpose.'

'Organisation renewal comes naturally for us because we make many acquisitions. We make many acquisitions because we continuously have to grow to meet the targets of the shareholders.'

The participants highlighted several reasons why organisation renewal is essential. One participant stated that it is vital for a business to stay relevant in the market because market dynamics are constantly changing with new technologies and competition entering the market. To achieve market relevance, the organisation must ensure the correct set-up to respond to changing market conditions. Another participant said that businesses are undergoing a digital shift in one way or another, and whoever does it well will succeed and, in the end, prevail. The participants also pointed out that renewal comes naturally for their organisation because they continuously have to grow the business to meet shareholder targets. If the organisation does not renew, it will become inefficient

and may not even understand how decisions on one end of the organisation impact the other end of the organisation.

The literature below supports the research findings on the importance of continuous organisation renewal and reconfiguration for business sustainability.

In a fast-paced and unpredictable changing environment, an organisation's ability to manage change offers a higher competitive advantage than intellectual or other capabilities (Kianto, 2008). Therefore, high organisation performance can only be sustained in a rapidly changing environment through continuous learning and innovation to maintain, adapt and recreate knowledge (Bansal & DesJardine, 2014).

Bansal & DesJardine (2014) define business sustainability as a firm’s ability to respond to short-term financial needs while securing its ability to meet future needs. What is critical from the definition of business sustainability by Bansal & DesJardine is that a firm must not focus on achieving short-term earnings targets at the expense of long-term value creation (Graham et al., 2005) cited in (Bansal & DesJardine, 2014). Therefore, balancing short- and long-term business decisions is essential to remain sustainable.

4.4.3.2 Organisation reconfiguration capabilities

Table 4-12 summarises the research findings and the final themes identified from the research on the organisation's capabilities that are key to transformation. The identified themes are Organisation strategy, Leadership and Human resource management.

Table 4-12: Preliminary codes and themes and concluding themes

Transforming Capabilities: Organisation renewal and reconfiguration	Preliminary Codes	Preliminary Themes	Concluding Themes
What reconfiguration capabilities exist in our organisation that are critical to transformation	• Good organisation structure • Organisation culture • Change Management • Strategy • Strong leadership • Good management • HR support • Employees • Business ownership of digital tools • Financial muscle • Global presence • Strong HR function • Enterprise Architecture support.	• Organisation culture • Organisation structure • Change Management • Leadership • Financial Capacity • Human Resource Management • Strategy	• Organisation strategy • Leadership • Human Resource Management

4.4.3.2.1 Organisation strategy

The statements below are quotes from the participants on their view on strategy as an organisation renewal and reconfiguration capability.

'We have a good organisation strategy which supports our transformation agenda. We have a digital shift strategy with six focus areas that provide guidance and direction to support our shift to digital. The focus areas are customer experience, seamless flow, AI & data, technology foundation, cyber security and competence and way of working.'

‘To transform the organisation, you need a strategy and an idea of where you want to go. The capability is critical because it focuses on the change.’

The participants identified organisation strategy as one of the reconfiguration capabilities cardinal to organisation transformation. The participants indicated that you need a strategy and an idea of where you want to go to transform the organisation. Further, the participants indicated that strategy is one of the most critical capabilities in focusing on the change.

Literature supports the above research findings on the importance of strategy to support continuous organisation renewal and reconfiguration. According to Armstrong & Lee (2021), an organisation's strategy is to deliver on the organisation's purpose. Providing the organisation's purpose involves understanding where the organisation wants to go and developing a plan to have that. Suppose the organisation operates in a competitive business environment. One of its goals could be to deliver a sustainable competitive advantage if it has to provide the organisation's purpose (Armstrong & Lee, 2021).

4.4.3.2.2 Leadership

The statements below are quotes from the participants on their view on leadership as an organisation renewal and reconfiguration capability.

‘To support the organisational change, you need good management and strong leadership.’

‘Our organisation leadership is good at promoting creativity and learning and managing structured and ordered innovation processes.’

‘Management promotes an entrepreneur culture. Employees are encouraged and rewarded for coming up with new business ideas.’

The participants identified strong Leadership as a capability that is central to organizational transformation. The two leadership capabilities highlighted by the participants that enhance continuous organizational learning and innovation are management skills in enhancing creativity and learning and managing structured and ordered innovation processes. However, if the organisation's top fully

controls knowledge and innovation, it can inhibit the process (Von Krogh, 1998) cited in (Kianto, 2008).

4.4.3.2.3 Human resource management

The statements below are quotes from the participants on their view on Human resource management as an organisation renewal and reconfiguration capability.

'I think we have a strong HR function, and they are well-represented everywhere.'

'Our HR function is adept at making changes when needed. Again, looking back at COVID-19 and how we adapted, we did not try to be one-size-fits-all. Some divisions of the organisation went to a four-day working week to reduce costs, while others remained on a five-day working week. The adaptive move was good; we had not seen it before, and it went well because no one lost their job. Under normal circumstances, the company would have just laid off several employees.'

'Because of the good business management during the COVID-19 pandemic, no jobs were lost despite business slowing down. When the market opened again, we had our full workforce, and we quickly picked up and supported our customers.'

The participants highlighted Human resource management as another critical capability contributing to organizational transformation. Change management was explicitly mentioned as an area well managed by Human Resources (HR), especially during organisation restructuring. A good corporate culture that embraces change compliments this.

The participants also highlighted that HR is adept at making changes when needed. An example given was how the organisation adapted during the COVID-19 pandemic. During the COVID-19 pandemic, business slowed down, and the organisation would have laid off some employees to reduce costs. Instead, some Divisions and countries went to a four-day working week to reduce costs. The adaptive move was new and a perfect one. It went well because no employee lost their job, and when the markets opened up again, the organisation had a complete workforce to support the customers.

4.4.3.3 Identification of capabilities for renewal and reconfiguration

Table 4-13 summarises the research findings relating to how the organisation identifies capabilities of renewal and reconfiguration. The final themes identified in the research are Strategy and Customer feedback.

Table 4-13: Preliminary codes and themes and concluding themes

Transforming Capabilities: Organisation renewal and reconfiguration	Preliminary Codes	Preliminary Themes	Concluding Themes
How does our organisation know which capabilities to transform?	• Organisation strategy • Continuous review of the organisation structure • Guided by the strategy • Strategy guides decision-making • Customer feedback • Customer feedback	• Strategy • Customer feedback • Organisation review	• Strategy • Customer feedback

4.4.3.3.1 Strategy

The statements below are quotes from the participants on how strategy supports identifying capabilities for transformation.

'I would say organisation strategy outlines the focus areas, the priorities, and goals to be achieved. The strategy also guides decision-making on the areas for transformation.'

'What we have is our strategy which is a guide on the key focus areas for the organisation. For example, the digital shift strategy supports our move to digital and provides the six focus areas.'

The participants identified the strategy as a guide for identifying organisation capabilities for transformation. One of the participants stated that the strategy outlines focus areas, priorities, and goals to be achieved. The digital shift focus areas were examples of how strategy guides the organisation's direction. To emphasise the importance of strategy in identifying capabilities to transform, one participant gave an example of the six moves to the digital shift, which provides guidance and direction on the areas to focus on and the cause of action.

4.4.3.3.2 Customer feedback

Below are some statements from the participants on how customer feedback supports identifying capabilities for transformation.

'We consider customer feedback when deciding and prioritising the areas for transformation. It could be introducing a new product or changing an existing product or service offering.'

'One of our company values is customer focus. We take our customers seriously, and customer value delivery is central to our product development and how we serve our customers. Therefore, customer feedback is a guiding resource for our organisation. It helps us to understand what we are doing well and areas for improvement, like customer service and adjusting our product or service to fit their needs.

Another critical guide highlighted for identifying capabilities for transformation is Customer feedback. Customer feedback is taken into consideration when deciding on areas to transform. It could be introducing new products or changes to existing products or service offerings. Also, customer needs must be fulfilled in the best way. Therefore, their viewpoint on how their needs must be solved is considered. In solving customer needs, gaps are identified, highlighting areas for transformation.

4.4.3.4 Organisation Digital Maturity

Below are some statements from the participants on how they rate the overall digital maturity of the organisation.

'I rate the maturity of the organisation between six and ten. We are adaptable. We have shown during the COVID-19 pandemic in terms of how we responded as an organisation. The Russia and Ukraine conflict is another example of how we respond as an organisation to changes in the market.'

'I would rate our organisation's maturity level between 7 and 8 maturity level. Our organisation is agile because of the decentralised nature of our business. Also, the focus on M & A has kept us at the forefront of technological change in our industry.'

'The maturity level of the organisation is good. I would give it a rating of 8 out of 10.'

Table 4-14 summarises the research findings relating to the organisation's digital maturity level.

Table 4-14: Preliminary codes and themes and concluding themes

Transforming Capabilities: Organisation renewal and reconfiguration	**Preliminary Codes**	**Preliminary Themes**	**Concluding Themes**
What do you think is the overall DM level of our organisation?	• Digital Maturity level five • Digital maturity level eight • Digital maturity level six • Digital maturity level seven • Digital maturity level six	• Maturity	• Maturity

All the participants gave the organisation a digital maturity rating of five and above out of ten. The overall view from the participants is that the organisation is on a good trajectory for digital transformation. However, despite giving a digital maturity rating of 5, one participant commented that the organisation has not fully leveraged the digital transformation changes due to slow adoption. However, the participant was optimistic and thought the organisation was making a reasonable effort. Change management was also mentioned as an area requiring attention if the organisation is to realise the full benefits of digital transformation. Emphasis was on post-implementation change management.

Literature offers different definitions of digital maturity. For this study, Gurumurthy et al. (2020) definition of digital maturity is adopted because it aligns with the topic under investigation. According to Gurumurthy et al. (2020), digital maturity measures business benefits derived from digital transformation. This definition of digital maturity means that the more benefits an organisation derive from digital transformation, the higher the digital maturity level.

4.5 Summary of Chapter

The chapter presented the research findings through the lens of the Dynamic capability theory. The results were categorised into themes in line with the theoretical thematic analysis. The interpretation of data was according to the research objectives.

4.5.1 Summary of findings concerning objective 1

The research concludes that the organisation has a sustainable competitive advantage through scanning and exploring opportunities and threats in the market and technologies. The recent significant acquisitions, product innovations and adopted new business models reflect the outcomes of the organisation's market and technology sensing capability. An organisation lacking the ability to scan and explore the market and technology suffers consequences such as loss of profitability, competitive advantage, market share and market leadership.

4.5.2 Summary of findings concerning objective 2

Recent organisational acquisitions have brought on digital and data-driven companies because digital is very much on the organisation's strategic agenda. Therefore, the high level of investment in innovations, mergers and acquisitions demonstrates the business's growth aspirations. The organisation is mature at responding to market and technology opportunities with an average maturity rating of above five out of ten. The organisation's digital maturity level is enabled by capabilities such as industry and business competence, management support and strategy that directs focus areas and critical priorities.

4.5.3 Summary of findings concerning objective 3

The research participants advanced several reasons to highlight the importance of continuous organisation renewal and re-organisation and pointed out business sustainability as a critical driver. An organisation must constantly renew and reconfigure to respond to the changing market dynamics impacting business sustainability due to new technologies and competition entering the market. The digital shift was another reason for continuous organisation renewal and reconfiguration. Most organisations are undergoing a digital shift, and companies that do well will succeed and prevail. The last reason advanced is that the organisation must renew and reconfigure to grow the business and meet shareholder targets. The highlighted capabilities that enable the organisation to renew and reconfigure include organisation strategy, leadership and human resource management. Lastly, the organisation's average digital maturity level was rated above five. The maturity level highlights why the organisation is good at renewal and reconfiguration to deliver learning and innovation outcomes.

CHAPTER 5: DISCUSSIONS, CONCLUSIONS & RECOMMENDATIONS

5.1 Introduction

This chapter analyses the findings presented in chapter four. The first section focuses on discussing the study's results. The second section provides the study's conclusions, the third section provides recommendations, and the last will evaluate the study.

Table 5-1: Summary of the findings, interpretations and supporting literature

Findings from the Previous Chapter	Interpretations	Supporting Literature
The organisation scans and explores market and technology opportunities mainly through R&D, mergers and acquisitions and customer feedback	Scanning and exploring opportunities in the market lead to a sustainable competitive advantage.	• (Gebauer, 2011) • Mousavi et al. (2018), cited in Khan et al. (2021 • (Armstrong & Lee, 2021) • (Ellstrom et al., 2021)
The organisation responds well to identified market and technology opportunities through R&D and mergers and acquisitions	Value generation from identified opportunities is a sustainable competitive advantage	• Mousavi et al. (2018), cited in Khan et al. (2021) • (Armstrong & Lee, 2021) • (Ellstrom et al., 2021)
Several reasons were advanced by the participants to highlight the importance of continuous organisation renewal and re-organisation and pointed out business sustainability as a critical driver	Organisation renewal capability leads to sustainable competitive advantage.	• Mousavi et al. (2018), cited in Khan et al. (2021) • (Kianto, 2008).

5.2 Discussions

This section discusses the study's findings provided in chapter 4 while reflecting on the aim and objectives of the study. The study's purpose was to explore the

effect of digital maturity on an organisation's sustainable competitive advantage using the lens of the dynamic capability theory. The findings provide a good foundation for theory affirmation and recommendations for further research. Specifically, the findings enable the formulation of three propositions. Below are the research objectives and how they were addressed:

5.2.1 Discussion on Research Objective 1

This section discusses the results of the first research objective: To analyse the influence of sensing opportunities for sustainable competitive advantage.

The research findings on research objective one indicate that the organisation scans and explores market and technology opportunities mainly through R&D, mergers and acquisitions and customer feedback. However, varied views were provided regarding the analytical systems and tools used to scan and explore market and technology opportunities and threats, but no specific IT systems were mentioned. The general view is that sensing market opportunities and threats is done through market intelligence based on data from different sources like customer collaboration, competitor analysis and media scanning, analysis of macro trends and survey results. The organisation's maturity level for scanning and exploring opportunities in the market and technologies is considered high by the research participants.

The research concluded that the organisation has a sustainable competitive advantage by scanning and exploring opportunities and threats in the market and technologies. The recent significant acquisitions, product innovations and adopted new business models reflect the outcomes of the organisation's market and technology sensing capability. An organisation lacking the ability to scan and explore the market and technology suffers consequences such as loss of profitability, competitive advantage, market share and market leadership.

Sensing the market opportunities and threats is vital for all organisations operating in changing markets to ensure business sustainability. It enables organisations to identify opportunities that can add value or identify competitors that might disrupt the business. Organisations that fail to scan and explore

business opportunities or threats lose their market position and eventually get out of business. Also, organisations with a high maturity level have the agility to scan and explore market and technology opportunities better than those with a low maturity level. Therefore, managers in the organisation need to understand how they can develop sensing capabilities for the organisation or leverage existing capabilities to scan and explore opportunities that can generate value for the organisation or identify and mitigate threats that can threaten business sustainability.

Literature supports the above findings. Due to rapid market changes (emerging technologies, changing customer needs, emerging and shrinking markets, and accelerated competition), deploying and understanding sensing dynamic capabilities is a critical managerial concern (Gebauer, 2011). Mousavi et al. (2018), cited in Khan et al. (2021), justified a positive link between a firm's sensing capabilities and sustainable innovation.

The sensing capability is vital for mining organisations, especially technology-related sensing because it presents opportunities and threats in the mining sector and is a critical competitive advantage. We have recently seen increased mine automation and the emergence of battery-operated mining machines. Most mining organisations are adopting these technologies to meet their financial goals (growth, profitability and market share) and sustainability goals (CO_2 emission reduction, reduction of injury frequency and increase of women in managerial positions). Some of the sustainability goals do not only provide a sustainable competitive advantage but are regulatory compliance requirements in most countries like South Africa. Failure to comply, the organisation would lose its operating license. Therefore, sensing opportunities in the mining sector leads to SCA and regulatory compliance.

5.2.2 Discussion on Research Objective 2

This section will analyse the results of the second research objective, which was to analyse the influence of seizing opportunities for sustainable competitive advantage.

The research findings on research objective two indicate that the organisation responds well to identified market and technology opportunities through R&D and mergers and acquisitions. Through R&D, the organisation is forward-looking with the continuous evolution of its customers' offerings. Mergers and acquisition is another strategy the organisation employs to respond to market and technology opportunities and threats. Through mergers and acquisitions, the organisation identifies appropriate companies to acquire, considering the strategic objectives.

Recent organisational acquisitions have brought on digital and data-driven companies because digital is very much on the organisation's strategic agenda. Therefore, the high level of investment in innovations, mergers and acquisitions demonstrates the business's growth aspirations. The organisation is mature at responding to market and technology opportunities with an average maturity rating of above five out of ten. The organisation's digital maturity level is enabled by capabilities such as industry and business competence, management support and strategy that directs focus areas and critical priorities.

An organisation needs to develop mechanisms and capabilities for responding to identified emerging opportunities and threats. Failure to do so the organisation would miss out on the opportunities or risk disruption by competitors or technology and lose the sustainability advantage. Therefore, it is no use to go through the process of identifying opportunities and threats in the market if it cannot seize value from the opportunities or respond to the threats. The organisation's managers are responsible for prioritising the opportunities and risks, developing appropriate capabilities, or leveraging existing capabilities to seize value from the opportunities or mitigate the risks. The policymakers in the mining sector can also support the endeavour by enabling mining firms to seize value from digital technologies and mitigate the disruption risks paused by digital transformation by putting policies that support and do not hinder the adoption of digital technologies and transformation.

Literature supports the above findings. Mousavi et al. (2018), cited in Khan et al. (2021), justified a positive link between a firm’s seizing capabilities and sustainable innovation. Teece (2007), cited in Khan et al. (2021), points out that a firm can identify opportunities but fail to seize the value due to the difference in

managerial skills required for sensing and seizing opportunities. According to Teece (2007), cited in Khan et al. (2021), effectively seizing opportunities requires taking good investment decisions, creating relevant business models, technological competence improvements and maintaining assets.

The seizing capability of identified technology opportunities and threats is vital for mining organisations. Failure to seize technology opportunities like mine automation and electrification would lead to missing out on the benefits of technologies and non-regulatory compliance. Mining organisations in this position would lose their sustainable competitive advantage and operating license in countries like South Africa. Therefore, generating value from identified opportunities in the mining sector is a sustainable competitive advantage and leads to regulatory compliance.

5.2.3 Discussion on Research Objective 3

This section will analyse the results of the third research objective, which was to analyse the influence of organisational transformation for sustainable competitive advantage.

The research participants advanced several reasons to highlight the importance of continuous organisation renewal and re-organisation and pointed out business sustainability as a critical driver. An organisation must constantly renew and reconfigure to respond to the changing market dynamics impacting business sustainability due to new technologies and competition entering the market. The digital shift was another reason for continuous organisation renewal and reconfiguration. Most organisations are undergoing a digital shift, and companies that do well will succeed and prevail. The last reason advanced is that the organisation must renew and reconfigure to grow the business and meet shareholder targets. The highlighted capabilities that enable the organisation to renew and reconfigure include organisation strategy, leadership and human resource management. Lastly, the organisation's average digital maturity level was rated above five. The maturity level highlights why the organisation is good at renewal and reconfiguration to deliver learning and innovation outcomes.

For an organisation to be sustainable in a changing market, it must renew and reconfigure its resources and structures unless it operates in a niche market. Failure to do so would cause it to lose its sustainability and be out of business. Organisations with a high digital maturity have a high renewal and reconfiguration rate. They are poised to successfully take advantage of the market and technology opportunities and respond to threats rather than organisations with low maturity. However, the organisation must identify the right capabilities to renew and reconfigure to gain the most value.

Literature supports the above findings. Mousavi et al. (2018), cited in Khan et al. (2021), justified a positive link between a firm's reconfiguring capabilities and sustainable innovation. It is worth noting that the firm's routines underpin the reconfiguration capabilities. These routines are responsible for renewing and orchestrating resources and competencies (Teece, 2007) cited in (Khan et al., 2021). To systematically adapt to the disruptive changes imposed by changing markets, technologies, and external shocks, firms are expected to develop digital strategies and achieve digital maturity (Kane et al., 2021) cited in (Forliano et al., 2023). The process entails changing how the organisation's workforce is organised and developed. It also includes nurturing digitally minded cultures, expanding the strategic horizon, expanding digital trials into whole organisation initiatives that positively impact the business, attracting talents and bringing on board leaders with a digital vision (Kane et al., 2021) cited in (Forliano et al., 2023). These principles are associated with organisations having a high digital maturity level.

The ability of an organisation to renew and transform itself is vital regardless of the industry in which it operates. Failure to which the organisations would not have the maturity to respond to market opportunities and threats. Organisation renewal and transformation are critical for organisations in the mining sector because some structural changes are regulatory to be granted an operating license. For example, having a particular percentage involvement of historically disadvantaged South Africans (HDSA) in the organisation is a regulatory requirement provided for in the mining charter. Failure to transform the organisation would impact the organisation's SCA and compliance with the

mining charter. Therefore, for organisations in the mining sector, the ability to transform the organisation structure leads to a sustainable competitive advantage and regulatory compliance.

5.3 Conclusion of the Discussions

The study explored the digital maturity of mining companies using the dynamic capabilities perspective revealing that sensing capabilities play a crucial role in achieving sustainable competitive advantage. Companies that have invested in sensing capabilities can detect emerging opportunities and threats in the market and be better equipped to respond proactively. These companies also better understand their customer's needs and preferences, which helps them develop customized solutions and products. Thus, sensing capabilities enable mining companies to stay ahead and maintain a sustainable competitive advantage.

The study also highlights the importance of seizing capabilities in achieving sustainable competitive advantage. Companies with solid seizing capabilities can quickly respond to new opportunities and take advantage of them before their competitors do. They can also adapt to changing market conditions and customer needs and develop new products and services to meet these needs. In the mining sector, seizing capabilities can help companies optimize their operations, reduce costs, and improve their environmental sustainability. Thus, seizing capabilities is critical for mining companies that want to maintain a sustainable competitive advantage.

Finally, the study reveals that transforming capabilities are essential for mining companies to achieve sustainable competitive advantage in the long run. Companies with solid transforming capabilities can continually reinvent themselves and adapt to new technologies, business models, and market conditions. They can also identify and develop new capabilities essential for long-term success. In the mining industry, transforming capabilities can help companies develop sustainable mining practices, implement digital technologies that improve safety and efficiency, and diversify their revenue streams. Thus, transforming capabilities are critical for mining companies that want to maintain

a sustainable competitive advantage in the face of rapid technological and market changes.

The organisation's overall digital maturity rating from the study was above average. The rating aligns with the digital shift maturity assessment survey conducted between 23rd August to 10th September 2022. As reported in the 2021 financial report, The organisation posted strong organic growth, which shows the strength of the organisation's innovative product portfolio. The organisation successfully launched several new products, such as the battery and electric trucks, wholly built around the battery and lower costs. This led to a 30% increase in organic order intake and 15% in revenues compared to the previous year. The overall growth totalled 18%, demonstrating a well-executed year in growth strategy both organically and through acquisitions.

5.4 Recommendations

This chapter provides the study's contributions and practical implications for practitioners, managers, policymakers and theory.

5.4.1 Contributions of the study

This study explored the effect of digital maturity on the sustainable competitive advantage of an organisation using the lens of the dynamic capability theory (sensing, seizing and transforming). By doing so, it opens the way for practical and theoretical implications.

5.4.1.1 Implications for practitioners & managers

The study findings have implications for practitioners and managers. It has become increasingly clear that a better understanding of digital transformation management is needed. The Westernman leading digital maturity model adopted for this study provides a framework that managers can use to prepare for digital transformation, benchmark their progress, and understand what is needed to reach a successive maturity stage or how to prioritise their efforts. The suggestion for managers is to consider the following actions:

The results can be used for benchmarking, especially for identifying a firm's capability gaps. Understanding the firm's functional areas that are efficient or deficient in digital capabilities is critical for digital maturity progression. Understanding the organisation's digital capability state is the first step to the next stage. Digital capabilities are complementary rather than mutually exclusive of one another. Digital transformation requires firms to develop these capabilities simultaneously, while capability development should be balanced. Failure to develop these capabilities and deploy the resources in the correct order and amount (e.g., under- or over-developing a capability in a given stage or under- or over-using an IT-enabled resource) leads to various predictable organisational problems and transformation 'pains'. Firms that have successfully managed digital transformation (Experts) understand the sequence, the right combination of IT-enabled resources and the interconnectedness of these five digital capabilities.

5.4.1.2 Implications for policymakers

The study's findings enable the mining industry's policymakers to gain insights into why it is essential to have mining policies that promote the adoption of digital technologies in the mining industry to safeguard employee health and safety and promote environmental sustainability, among many other benefits. Also, the results confirm Furr and Shipilov's (2019), cited in Hortovanyi et al. (2023) findings that digital transformation is as much about organisational change as technology. A Firm's success should be incentivised and supported to think beyond investment into technology and develop capabilities in all the digital maturity model dimensions.

5.4.1.3 Implications for theory

The study contributes to the literature on sustainable competitive advantage and dynamic capabilities by exploring digital maturity's effect. Several studies have found that an organisation's dynamic capabilities (sensing, seizing and transforming) are a sustainable competitive advantage (Mousavi et al., 2018), cited in (Khan et al., 2021; Ellström et al., 2022; and Armstrong & Lee, 2021).

This study reaffirms the past findings, provides recommendations and suggests the path for future studies.

5.5 Evaluation of the study

The main aim of this study was to explore the effect of digital maturity on the sustainable competitive advantage of a global engineering firm in the South African mining industry using the lens of the dynamic capability framework (sensing, seizing and transforming). Through the thematic theoretical analysis and deductive approach basis, the researcher's discussion centred around the effect of dynamic capabilities on digital maturity and digital maturity on an organisation's sustainable competitive advantage. The research findings revealed that sensing, seizing and transforming dynamic capabilities are a sustainable competitive advantage in a changing market environment and provided recommendations for future research.

5.6 Limitations of the study

This study had limitations arising primarily from the methodology used. The first limitation arose from the adopted research design. The study used the exploratory qualitative research design, and data was collected by interviewing fourteen research participants from within the organisation. By qualitative standards, the study is comprehensive. However, the data and sample size cannot generalise the study's findings.

The second constraint was time. Due to the study's adopted research design, significant time constraints applied to the research data collection, transcribing and analysis process. As a result of this limitation, the study could not have a bigger sample size.

The third limitation arose from the qualitative research method, which is not statistically representative, and the same applies to this study. The lack of mathematical analysis in research means the research is unique and will probably be challenging to replicate.

5.7 Suggestions for further research

The study's conclusions, recommendations and limitations inferred the recommendations for further research.

The first recommendation for future research is a detailed analysis of the effect of dynamic capabilities on sustainable competitive advantage. Research in this area would help ascertain the dimensions of dynamic capabilities that most impact an organisation's sustainable competitive advantage. The basis of the recommendation is that lower-level capabilities can mediate the effect of dynamic capabilities on organisation performance.

The second recommendation for further research is to analyse the conditions and mechanisms through which the positive effects of dynamic capabilities on performance are realised.

The third recommendation is to analyse the cost-benefit analysis of developing and leveraging dynamic capabilities in a relatively stable market environment. The basis of this recommendation is that dynamic capabilities are associated with high developing and sustaining costs, which might invalidate their benefits in a relatively stable market environment despite a positive contribution to organisation adaptability and performance.

The fourth recommendation for future research is the research design. The research design for this study was qualitative, with the highlighted limitations in generalising the findings. A quantitative research design is recommended for further research into this topic to provide additional insights into the findings and conclusions from the paper.

The final recommendation is on the impact of culture on business. Therefore, future research must focus in other turbulent sectors other than mining.

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APPENDIX B: The Participant Information sheet

Participants	Highest Qualification	Age Range	Position	# Years in the Organisation
Participant 1				
Participant 2				
Participant 3				
Participant 4				
Participant 5				
Participant 6				
Participant 7				
Participant 8				
Participant 9				
Participant 10				
Participant 11				
Participant 12				
Participant 13				
Participant 14				

APPENDIX C: Participant Agreement (Consent) Form

Title of project: Exploring the digital maturity of a global engineering firm in the South African mining industry

Name of Researcher: Benedict Chaila

I, ……., agree to participate in this research project. The research is explained to me, and I understand what my participation will involve. I agree to the following:

(Please circle the appropriate options below).

I agree that my participation will remain anonymous	YES	NO
I agree that the researcher may use anonymous quotes in their research report	YES	NO
I agree that the interview may be audio-recorded	YES	NO
I agree that other researchers may anonymously use my information after this project has ended for academic purposes, subject to their ethics clearance.	YES	NO

…… (signature)

…… (name of participant)

…… (date)

…… (signature)

…… (name of the person seeking consent)

…… (date)

APPENDIX D: Research Instrument

Introductory Questions

- I have set aside about 45 minutes for this interview. Is this still ok for you, or do you have a hard stop at the end of this time?
- According to your understanding, what is digital maturity?
- How digitally mature would you say your organisation is now?
- What are the benefits of being digitally mature for your organisation?

Research Question 1

- To explore the perceived effect of digital maturity on an organisation's financial performance.
    a. In your view, do you believe that DM has had any effect on the organisation? Can you please elaborate more?
    b. What would you say has been the effect of digital maturity on the organisation's financial performance?

Research Question 2

- What is your understanding of digital pivots?
- What are the digital pivots in use in the organisation?
- Which digital pivots would you say increase business benefits?
- Based on our discussion, is there anything else you want to share with me?

Research Question 3

Sensing:

- How does our organisation scan and explore opportunities across markets and technologies?
- What analytical systems are available in the organisations for scanning and exploring opportunities across markets and technologies?

- How mature are the analytical systems to effectively sense market and technology opportunities?
- What would you say are the consequences for our organisations if it cannot sense market and technology opportunities?

Seizing:

- How well do our organisations respond to market and technology opportunities and threats?
- What capabilities exist in our organisation to enable the organisation to respond to identified opportunities and threats?
- What enterprise structures, procedures, designs, and incentives enable our organisation to successfully exploit market opportunities or address threats?
- How mature would you say our organisation is at responding to market and technology opportunities and threats?

Transforming:

- Why is continuous organisation renewal and transformation necessary for our organisation?
- What reconfiguration capabilities exist in our organisation that are critical to transformation?
- How does our organisation know which capabilities to transform?
- What do you think is the overall DM level of our organisation?

APPENDIX E: Research Interview Invitation Letter

Dear Sir/Madam,

My name is Benedict Chaila, and I am a master's student in Digital Business at the University of the Witwatersrand, Johannesburg. As part of my studies, I have to undertake a research project. I am exploring the effect of Digital Maturity on the sustainable competitive advantage of an organisation under the supervision of Prof Nixon Ochara.

As part of this project, I would like to invite you to take part in an interview. This activity will involve you being asked several questions and will take around 45 minutes to an hour. I would also like to record the interview using a digital device with your permission.

You will not incur any costs if you take part in this project. There are no rewards either for participating in this project. Still, you will not be disadvantaged or penalised for not participating or withdrawing from the study. You can withdraw from the study anytime and choose not to answer questions. The interview will be completely confidential and anonymous, and the information you give me will be secure and not disclosed to anyone else. I will use a pseudonym to represent your participation in my final research report. If you experience any distress or discomfort during this process, we will stop the interview and resume another time.

If you have any questions during or after the research, please contact me at the details below. This study will be written as a research report and available on the university library website. It will be made available if you elect to receive a report summary. The University Human Research Ethics Committee (Non-Medical) can be contacted by telephone at +27 (0) 11 717 1408 or by email at hrec-medical.researchoffice@wits.ac.za for any concerns or complaints regarding the ethical procedures of this study.

Yours Sincerely

Benedict Chaila

Researcher

Benedict Chaila, 2475528@students.wits.ac.za

Supervisor

Prof Nixon Ochara, Nixon.ochara@wits.ac.za

APPENDIX F: Ethics Clearance Certificate

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

Wits Business School

Wits Business School Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number: WBS/DB2475528/332
This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

Project title	Exploring the digital maturity of a global engineering firm in the South African mining industry
Investigator / Researcher	Mr Benedict Chaila
Nature of Project	MM (Digital Business)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed confidentialty.
Issue Date of Certificate	2022-10-21
Expiry date	Date of submission of the project / research report
Chairperson	Prof Anthony Stacey ☎ +27 11 717 3587 +27 82 880 4531 anthony.stacey@wits.ac.za

Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Ethics Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

Signature

21/10/2022
Date: