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THE INFLUENCE OF DIGITALISATION ON STRATEGIC AGILITY OF A SOUTH AFRICAN MINING COMPANY

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Applied Research Project submitted in partial fulfilment of the requirements for the degree of Master of Business Administration

Faculty of Commerce, Law and Management, University of the Witwatersrand,

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ABSTRACT

A profound transformation in the way economic activities are perceived and controlled is currently unfolding. This transformation is primarily propelled by the advent of a flexible technological platform that serves as the foundation for the development of new business value chains and ecosystems. Digitalisation, which acts as the gateway to accessing this state-of-the-art infrastructure, carries profound implications for how organisations strategically evolve in response to changing environmental factors. Strategic agility has increasingly become a central factor in ensuring business survival within this context. While digitalization is an undeniable reality for businesses and plays a role in generating value, few studies have examined its impact on strategic agility and thus improving organisational performance in the mining sector. The role of digitalisation as a facilitator of strategic agility has sparked debates and discussions among scholars and industry professionals. Although some research indicates that digitalisation is the foundation of strategic agility, other perspectives dispute this assertion. Recognizing this disparity, the primary aim of this research was to investigate the relationship between digitalisation and strategic agility. In order to draw conclusions regarding this observed relationship, primary data was collected from individuals at the management level within a South African company, which was then meticulously prepared and analysed. The analysis was conducted using quantitative data analysis.

The study found that digitalisation empowers organisations with the tools, insights, and capabilities to enhance their strategic agility. By leveraging digital technologies, organisations can sense and respond to changes rapidly, make data-driven decisions, streamline operations, innovate, and deliver superior customer experiences. Embracing digitalisation has become essential for organisations to thrive in today's fast-paced and highly competitive landscape. After conducting an extensive examination, this research establishes that digitalization is positively associated with strategic agility and that collectively the variables are important predictors of organisational performance. The study concludes that organizations should adopt an iterative approach to digitalization, with clarity of purpose, strategically in order to efficiently attain control over their intended impact on strategic agility.

KEYWORDS

Digitalisation, Strategic Agility, Strategy, Organisational Performance

DECLARATION

I, Nthabiseng Mosena, affirm that this research report is entirely my own work, with the exception of the credited references and acknowledgements. This report is being submitted as part of the fulfilment for the degree of Master of Business Administration at the University of the Witwatersrand, Johannesburg. I confirm that this report has not been previously submitted for any other degree or examination in this university or any other institution.



_____

Nthabiseng Mosena

Signed at Kyalami Johannesburg

On the 29th day of June 2023

DEDICATION

It is my greatest honour to dedicate this research work to the Lord Almighty whose divine support and guidance have carried me through this process of this work. Every step of the way, I have felt the presence of God's grace, which has not only enhanced my intellect during challenging times but also provided me with the strength to persevere.

Furthermore, this dissertation is dedicated to my Grandmother who believed in me, encouraged me, and contributed to my academic journey. Your unwavering support has been instrumental in helping me reach this milestone. Thank you for being a part of this meaningful endeavour.

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I would like to dedicate this dissertation to the unwavering support of my family. You have been my pillar of strength throughout this challenging journey, offering encouragement and understanding every step of the way.

My dearest Mother, who values education, and hard work and who enormously believes in me, thank you for your loving support and motivation for me to pursue education.

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LIST OF ABBREVIATIONS

DBS	Digital Business Strategy
DCF	Dynamic Capabilities Framework
IoT	Internet of Things
IT	Information Technology
KPI	Key Performance Indicator
SA	Strategic Agility
SPSS	Statistical Package for the Social Sciences

CHAPTER ONE: INTRODUCTION

1.1 Purpose of the Study

The purpose of the research is to explore the relationship between digitalisation and strategic agility in the context of a South African mining company. Particularly the influence that the former has over the latter against the background that, increasingly, the industrial world is becoming digital as stated by (Parviainen, Tihinen, Kääriäinen, & Teppola, 2017). Throughout the past seven years, the subject matter of digitalisation has been extensively researched from a managerial perspective. This impact of the digital revolution is not likely to end soon. Digitalisation can be viewed as a business model driven by adoptions that occur when digital technology is applied in all areas of human life (Stolterman and Fors, 2004, p. 689).

Kraus et al. (2017) describe digitalisation as a technological enabler that has now become a necessity for the world's growing population to manage their needs and expectations. As a result of these changes, many organisations have seen both internal and external transformations, with Digitalisation introducing new processes and methods that have the potential to change how a business operates.

According to (Hess, Benlian, Matt, and Wiesböck, 2016), Digitalisation has the primary aim of improving productivity and efficiency, while asserting that businesses that fail to develop and apply Digitalisation strategies will likely not keep pace with the new digital reality and will likely lose out to their competitors.

1.2 Background of the Study

In the mining industry, digital technologies have the potential to transform operations by improving efficiency and productivity, and many companies are investing in digital initiatives to enhance their competitive advantage (PwC, 2018). However, it is not yet clear how these digital initiatives impact strategic agility in the mining industry.

The researcher identified a South African mining company to further investigate the influence of the two constructs on one another and how they fundamentally impact the organisation's performance. The researcher opted to evaluate this specific company based on its commitment to conducting high-quality operations and its strategic emphasis on promoting safety, sustainability, competitiveness, and profitability in a manner that positively impacts the South African economy, communities, and individuals. Furthermore, the company offers comprehensive resource-to-market services, supplying a diverse range of mined and recycled products to a global customer network. The company's strong focus on its workforce and its utilization of innovative practices and cutting-edge technologies in resource exploration, mining, processing, transportation, and marketing further motivated the researcher's choice.

The company has embraced digital technology, and its changes and incorporated future smart mining practices. Technological advancements are leading to a significant shift in the manner in which organisations carry out their operations. Recognizing the significance of strategic agility in the digital era, it is essential to explore how digitalisation influences this aspect within the mining industry. Examining the impact of digitalisation on strategic agility in the mining sector provides valuable insights into how organisations can effectively leverage digital technologies to enhance their ability to respond to changing market conditions and maintain a competitive advantage.
This research will be valuable not only for mining companies in South Africa but also for organisations in other industries looking to enhance their strategic agility through digitalisation.

1.3 Context of the Study

The rapid pace of technological advancements is changing the way organisations operate and interact with their stakeholders, and many companies are turning to digital technologies to enhance their capacity to adjust and align with rapidly changing economic environments (PwC, 2018). Strategic agility, or the ability of an organisation to quickly and effectively respond to changing market conditions, has become a key factor in maintaining competitiveness in the digital age (McKinsey & Company, n.d.). The integration of digital technology into every element of an organisation, including the use of digital tools, data, and analytics to increase efficiency and productivity, is referred to as digitalisation (McKinsey & Company, n.d.). Digitalisation has grown more significant for mining businesses, notably those in South Africa, in recent years (PwC, 2018). One way that digitalisation might improve a mining company's strategic agility is by allowing it to make quicker, more informed choices (McKinsey & Company, n.d.). A mining business may obtain a better knowledge of its operations and find areas for development by employing digital technologies to collect and analyse data (PwC, 2018). For example, a corporation may utilize sensors to gather data on the operation of its equipment, which could then be used to improve maintenance schedules and decrease downtime (McKinsey & Company, n.d.).

Digitalisation may also increase the supply chain efficiency of a mining firm (PwC, 2018). A corporation may cut the time and expense of moving products and equipment by utilizing digital tools to handle logistics (McKinsey & Company, n.d.). This is especially advantageous for a South African mining firm since the nation has a huge and complicated supply chain owing to its vast territory and a broad variety of minerals (PwC, 2018).

Furthermore, digitalisation may assist a mining firm in better managing its stakeholder relationships, such as workers, customers, and regulators (PwC, 2018). A corporation may more effectively react to the demands and concerns of various stakeholders by utilizing digital technologies to communicate and interact (McKinsey & Company, n.d.). A corporation, for example, may utilize a digital platform to monitor and react to client feedback, or to provide staff access to training and development opportunities (PwC, 2018).

It is crucial to emphasize, however, that digitalisation presents challenges, such as the need to invest in new technology and the possible disruption of established business models (PwC, 2018). To successfully utilize the advantages of digitalisation while limiting any negative repercussions, a South African mining firm must carefully analyse these difficulties and develop a strategy (McKinsey & Company, n.d.).

Overall, digitalisation has a substantial impact on a South African mining company's strategic agility (PwC, 2018). Digitalisation may help a mining firm adapt more effectively to changing market circumstances and preserve a competitive edge by allowing quicker, more informed decision-making, boosting supply chain efficiency, and strengthening stakeholder connections (McKinsey & Company, n.d.).

Recent research demonstrates that implementing change in organisations can be challenging (Deline, 2018), approximately 70% of large organisational changes fail (Barrett & Stephens, 2017; Burke, 2011). As well, companies are known to be slow to adapt to change (Wright, Van Der Heijden, Bradfield, Burt, & Cairns, 2004), which means they are less likely to adopt Digitalisation and implement Digitalisation strategies. Further, Kane, Palmer, Phillips, Kiron, and Buckley, 2015 and Carr (2003) argue that digitalisation is not a technology-driven process, but one driven by strategy. New value chains and ecosystems for business are being built upon a general-purpose technology platform that is causing a paradigm shift. As a consequence of this new age infrastructure, digitalisation plays a significant role in how organisations respond to environmental stimuli when developing their strategic direction in response. Academic studies have argued that Digitalisation is the foundation of strategic agility, while others criticize this claim. Digitalisation has gained both defenders and critics in both academia and business (Sebastian, Ross, Beath, Mocker, Moloney & Fonstad, 2017; Matt et al., 2015).

In order to effectively manage the desired influence on their strategic adaptability in a cost-efficient way, organizations must adopt an incremental approach to digitalization, leveraging the variations in the relative contributions of its various elements.

The changing complexities of business environments have reshaped the economic landscape in which enterprises operate, influencing the adaptation of corporate strategies by organisations to survive (Pagani, 2013). Scholars argue that this strategy evolution is directly linked to the progression of digital technology, shifting its role from a mere topic within the information technology department to a crucial consideration for strategic decision-makers (Bharadwaj, el Sawy, Pavlou & Venkatraman, 2013). In the past two decades, digital technology has expanded beyond its initial role in information technology and emerged as a source of competitive advantage in the global business community (Matt, Hess & Benlian, 2015; WEF, 2017).

However, in recent years, the field of strategy has experienced a shift in thinking due to the increased accessibility and reduced cost of technology. This shift acknowledges the distinction between the flexibility brought about by digital technology and the core competence of adaptability, which is crucial for strategic agility (Teece, Peteraf & Leih, 2016). Various researchers have proposed contrasting aspects of digitalisation and its impact on organisations, with varying levels of detail (Sebastian, Ross, Beath, Mocker, Moloney & Fonstad, 2017; Matt et al., 2015). Sebastian et al. (2017) and Matt et al. (2015) primarily focus on the influence of digitalisation on aspects such as value proposition, value capture, and organisational structure. However, Fitzgerald, Kruschwitz, Bonnet, and Welch (2014) argued a contrasting view, suggesting that the measurable benefits of digitalisation have yet to be adequately determined.

In the past to decades, digital technology has transitioned from its previous status to become strategically significant, challenging existing notions (Bharadwaj et al., 2013). This intersection of digitalisation and strategy has given rise to the concept of digital business strategy (DBS) that emphasizes formulating and executing strategies by leveraging digital resources. It suggests that strategy and digital technology are inseparable in the digital era (Bharadwaj et al., 2013). However, Kane, Palmer, Phillips, Kiron, and Buckley (2015) offer a contrasting viewpoint, suggesting that strategy should be independently considered, with technology incorporated only when necessary to support strategic objectives. The existence of digitalisation despite these divergent perspectives necessitates an impartial and critical examination. To summarise, the background covered in this section, as well as Section 2, underscores

the significance of strategic agility as a vital capability for organisations to maintain their competitive edge and long-term viability. While some literature credits the achievement of agility to digitalisation, others challenge this notion, asserting that the strategic impact of digitalisation remains difficult to quantify (Saunders & Lewis, 2018). Given the existing debates and their implications in business and academia, a critical analysis of the real impact of digitalisation on strategic agility is justified given the current state of the link between the two constructs.

1.4 Problem Statement

While digital technologies have the potential to enable faster, more informed decision-making, improve supply chain efficiency, and enhance stakeholder relationships (PwC, 2018; McKinsey & Company, n.d.), it is unclear how much these benefits contribute to an organisation's overall strategic agility. Some research suggests that digitalisation can lead to improved strategic agility by enabling organisations to respond more quickly to changes in the market (Aubert et al., 2017).

Questions remain, however, as to the extent of the influence of digitalization on the strategic agility of firms. It is the purpose of this research to investigate the relationship between these two constructs.

1.5 Research Objectives

The goal of this research is to look at the relationship between digitalisation and strategic agility in the setting of a mining firm in South Africa. The objectives of the study are as follows:
Assessing the influence of digitalization on strategic agility by exploring the extent to which the adoption of digital technologies affects the organization's ability to adapt, respond, and thrive in a rapidly changing business environment.

Secondly, the research’s objective is to investigate the contribution of digitalization to organizational performance: The study seeks to understand how the integration of digitalization practices can enhance overall organizational performance.

Thirdly, the research aims to determine if implementing digitalisation in a company influences its strategic performance, ultimately improving organisational performance.

1.6 Research Questions

1. Does the introduction of digitalisation influence and improve the strategic agility of a company?
2. Does the introduction of digitalisation enhance organisational performance?
3. Does the implementation of Digitalisation, particularly in a company with a legacy of success, reflect the significance of the influence of digitalisation on strategic agility?

1.7 Significance of the Study

This study is noteworthy for many reasons. First, the mining sector is experiencing a digital transition, with many firms investing in digital technology to increase efficiency and production (PwC, 2018). Understanding the influence of digitalisation on strategic agility in the mining sector may give significant insights for businesses trying to employ digital technology to gain a competitive edge. Mining businesses may better position themselves to adapt to changing market circumstances and preserve a competitive edge by finding best practices for incorporating digital technology into operations and decision-making processes.

Second, the study's findings may have larger ramifications for businesses in other sectors. Strategic agility has become critical to staying competitive in the digital era, and many businesses are turning to digital technology to improve their capacity to adapt to changing market circumstances (McKinsey & Company, n.d.). Useful insights may be obtained into the potential advantages and problems of digital technology for companies in other sectors by analysing how digitalisation affects strategic agility in the mining industry.

Third, the study's results have the potential to influence the formulation of policies and strategies to encourage the use and integration of digital technologies in the mining sector. Given the mining industry's complex and frequently demanding operating

environment, it is critical to establish solutions for efficiently using digital technology to improve strategic agility. This study may give significant information to governments and industry leaders wanting to help the mining sector's digital transformation.

Finally, this study is important because it adds to the body of literature on whether there is a link between digitalisation and strategic agility. While some research has investigated this presumed link in broad strokes (Aubert et al., 2017; Bughin et al., 2018), there is a scarcity of empirical studies that look at it in the context of individual sectors. This research seeks to address this gap by investigating the influence of digitalisation on strategic agility in the mining sector. It also provides a greater understanding of the complicated and subtle interaction between these two variables. Overall, the importance of this research stems from its capacity to give significant insights for mining businesses, governments, and organisations in other sectors wanting to harness digital technology to improve strategic agility and competitiveness in the digital age. We can discover best practices for efficiently integrating digital technology into operations and decision-making processes and better position ourselves to adapt to changing market circumstances by studying the influence of digitalisation on strategic agility in the mining sector.

1.8 Limitations and Delimitations

This research has various limitations that should be considered when evaluating the findings.

First, the scope of this research is confined to a single South African mining business. While the conclusions of this research may be relevant to other mining businesses in South Africa, they may not be applicable to mining companies in other nations or industries.

Second, since the research is based on a single case study, the findings may not be reflective of the larger community. While case studies allow for a deep investigation of a given situation, they are not as generalizable as larger, quantitative studies.

Third, the research is based on self-reported data from corporate personnel, which may be biased. Employees' experiences with digitalisation and strategic agility may not be correctly remembered or reported.

Finally, this research exclusively looks at the link between digitalisation and strategic agility in the mining business. The link between these two conceptions probably varies by industry. It is crucial to stress that these limitations do not decrease the importance of this research, but rather emphasise the need to exercise care when interpreting the findings.

In addition to these constraints, it is critical to define the scope of this investigation. This research focuses on the link between digitalisation and strategic agility in the setting of a mining corporation in South Africa. It excludes other elements that may influence strategic agility, such as corporate culture, leadership, or market circumstances. Furthermore, this research examines the overall influence of digitalisation on the construct rather than the impact of individual digital technologies on strategic agility.

1.9 Assumptions

This research is predicated on numerous assumptions:
Digitalisation has the potential to influence the mining industry's strategic agility. This premise is founded on the concept that digital technologies may allow quicker, more informed decision-making, increase supply chain efficiency, and strengthen stakeholder connections, all of which can contribute to strategic agility (PwC, 2018; McKinsey & Company, n.d.).

The link between digitalisation and strategic agility is complicated, with various elements influencing it. This assumption is based on past research, which indicates that the link between these two dimensions is complex and may vary depending on factors such as industry, organisational culture, and the sort of digital technology utilised (Bughin et al., 2018).

The case study technique is a good way to investigate the link between digitalisation and strategic agility in the mining sector. This assumption is based on the concept that the case study technique allows for a more in-depth analysis of a given setting and may reveal insights that would not be visible in broader and more generalisable research.

The information gathered in this research is authentic and trustworthy. This assumption is founded on the premise that data gathered via surveys and interviews with corporate personnel accurately reflects their experiences and perspectives.

It should be noted that these assumptions are not necessarily confirmed, but rather serve as the study's basis. If these assumptions are not satisfied, the validity and reliability of the study's results may suffer.

1.10 Chapter Organisation

The research project is broken up into five chapters, the first of which is an introduction to the overall study. It covers the background of the study, a description of the problem, research objectives and research questions, the relevance of the investigation, as well as limits and delimitations of the study.

In the second chapter, the research provides an analysis and synthesis of the relevant literature that pertains to the goals of the research. An extensive literary account clarifies the concepts while also providing a firm basis for this study provided by a number of authors who have conducted research and presented on information technology and internal audit and their impacts.

The third chapter discusses the methodological procedures that were followed in carrying out the study. This chapter also offers further information on the case study organisation and its population, as well as the research methodology, the sample strategies that were employed, and an explanation regarding the validity and reliability of the data that was acquired. Additionally, it describes the manner in which the gathered data will be presented and evaluated in the subsequent chapter.

Chapter 4 presents the findings of the surveys and interviews, along with a discussion of those results. The researcher offers likely explanations for the data obtained, referring to the literature review in Chapter 2 for more context. In the fifth and final chapter, the study, its findings, and its implications for future research are summarized. The conclusion primarily focuses on the research findings and their connection to the theoretical analysis in Chapter 2. Suggestions are formulated based on the data presented in Chapter 4, and the study's findings also point to potential areas for further investigation.

1.11 Conclusion

This chapter recaps the motivations for conducting the study through the introduction, problem statement and the significance of the study. The research objectives and questions are also stipulated in order to provide a guiding framework for the study. Other sections discussed included the assumptions, limitations, delimitations and the chapter organisation of the study. The next chapter will analyse literature related to the study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The purpose of this section in the study is to introduce the literature by providing insight into different aspects examined in the investigation of the influence of digitalisation on strategic agility. The purpose of this research is to provide an overview of digitalisation using literature reviews, including numerous definitions and discussions about the interaction of the subject with business. In order for the researcher to answer their research questions, the literature review comprises key variables of the study which are illustrated in the table below. The researcher will be expanding on the variables individually and then tie them up to address the research purpose. The study aims to provide an overview of digitalisation using literature reviews, including various definitions and discussions. The concept of strategy will be further explored to clarify its foundation and the relevance of strategy to business. Furthermore, an analysis will be conducted to expand the definition of strategic agility to include its implications on organisations.

The researcher has analysed the most recent published literature for this study, with 70% of the literature published in the last 4 years and 30% in the last 10 years. The study also considered the seminal work of the concepts that were developed many years ago in order to refer to evolutionary processes. The concept of strategy is explored in order to clarify its foundation, its relevance, and the relevance of strategy to business. The purpose of this concept is to provide an understanding of the decisions that have long-term effects on strategy by differentiating between strategic decisions and those that are not strategic in nature. In addition, an analysis to expand the definition of strategic agility will be conducted to include its internal and external ramifications on organisations.

2.2 Digitalisation

Across many industries, managers are leveraging digital technologies such as analytics, mobility, social media, and smart embedded systems, in addition to

improving their use of traditional technologies, to redefine customer relationships, internal processes, and value propositions.

Digitalisation refers to organisations shifting from traditional methods of providing goods and services to big data, analytics, cloud computing, mobile communications, and social media platforms (Bresciani et al., 2021b, Nwankpa and Roumani, 2016). Furthermore, Nasiri et al. (2020) characterised digital transformation as a tool for changing business processes, cultures, and organisational aspects in response to changes in market requirements. There are three elements to digital transformation: (1) revisiting and redefining firm boundaries; (2) allowing community input into products and services; (3) minimising property rights; and (4) reshaping product and organisational identities (Parmentier and Mangematin, 2014).

True digitalisation is referred to as ‘digital transformation’, aptly defined by consulting firm i-SCOOP, as “the pro-found transformation of business and organizational activities, processes, competencies and models to fully leverage the changes and opportunities of a mix of digital technologies and their accelerating impact across society in a strategic and prioritized way.”(MaryAnne M. Gobble, 2018).

Digitalisation can be defined simply as the use of digital technologies to create value for a company (Sommarberg & Makinen, ¨ 2019). Its benefits are numerous and include automating and optimising processes to improve productivity, save costs, streamline production, substantially reduce human error, and foster a culture of innovation (Parida et al., 2019; Scott et al., 2019).

Digitalising the workplace means using digital technologies and data (digitised and natively digital) to enhance revenue, business processes, and profitability (rather than making them digital). The digitalisation of the workplace includes new methods of communication and collaboration. In addition, it creates an environment that encourages digital business (Schwarzmueller, Brosi, Duman, and Welpe, 2018).

McGrath and Maiye, 2010, Vial, 2019) refer to this process as digital transformation, since digital technology integrates into all aspects and functions of the organisation,

reflecting its organisational structure and value delivered to customers (McGrath and Maiye, 2010). Some researchers have argued that digitalisation goes beyond the conventional business model and is capable of radically altering business products, processes, and tasks. (Bouncken, Kraus, & Roig-Tierno, 2021 and Vial, 2019).

Irrespective of the type of organisation or its size, all business processes must be adapted or redesigned (Horváth & Szabó, 2019) in a manner that might not be comfortable to the organisation (Benjamin & Potts, 2018). Digital transformation demands a change in leadership, strategies, mindsets, and ways of working as well as new technologies, ambiguity acceptance, and embracing constant change. (Kane et al. (2015)

2.3 Digitalisation at South African mining company

As part of its efforts to create a more sustainable company - for shareholders, employees and stakeholders across society - South African mining company relies on technology and innovation to achieve this. The business is constantly trying to improve its sustainability and deliver enduring value to all its stakeholders, from mineral exploration to the delivery of products to its customers.

Mining operations at the South African Mining Company have been updated with new technologies. A new trajectory for mining was described by the South African Mining Company in its technical and innovation update. As part of this programme, the company will focus on operational excellence, digital transformation, Future Smart Mining and a multifaceted pathway to carbon neutrality through its VOXEL digital transformation platform.

As part of the Sustainable Mining Plan ambitions, Future Smart Mining will integrate technology and digitalisation, including water and energy targets and the path to carbon neutrality by 2040. By combining these approaches, the South African mining company is able to transform its operating and financial performance to the next level.

2.4 Organisational Performance

"In the broader business context, organizations' management compares their intended objectives with the actual outcomes achieved. Consequently, assessing organizational performance has gained unanimous recognition among researchers as a crucial managerial concept (Rehman, S. 2019., Wang, T. 2020). Organisational performance refers to the effective and efficient utilisation of available resources to accomplish planned goals (Muthuveloo, R. 2017). Zhou et al. (2019) further regarded it as a system for measuring and analysing work outputs, allowing stakeholders to address shortcomings (Zhou, S.S, 2019). The metrics employed to evaluate organisational performance vary across academic and practical domains.

They encompass market performance, return on investment (Mehralian, G., 2018), effectiveness, and efficiency (Chakraborty, D, 2020) financial indicators like sales return, investment return, and equity return, as well as non-financial indicators such as customer satisfaction (Pang, K, 2018). In this study, organisational performance was measured as a dependent variable.

2.5 Strategy

In Johan Hough's book "Crafting and Executing Strategy," he provides a definition of strategy as the operational plan devised by management to effectively run a business and carry out its activities. This plan reflects a manager's commitment to adopt a specific set of actions aimed at business growth, customer attraction and satisfaction, successful competition, efficient operations, and enhanced financial and market performance (Hough et al., 2008).

Hough et al. (2008) further argue that strategy encompasses the approaches management intends to employ in growing the business, including the "how," "what," and "why" aspects. This involves strategies for building a loyal customer base, outperforming competitors, optimising each functional aspect of the business, and improving overall performance. Companies may choose different strategies, and even similar companies may opt for different approaches depending on their pursued business models.

According to (Shivakumar, 2014), the value of the strategy is found in the capacity to extract a long-term corporate vision from a sea of information and endless choices. The organisation may then be led toward the realisation of the desired vision by deciphering this vision into a set of operational plans and objectives.

Strategy is often considered a statement of the operating environment of an organisation, but a competing view says it is more of a reflection of its internal mechanisms. The strategy of a business is defined by the interplay of its functional activities that enable it to provide unique value to its targeted clients. Porter (1996) argued that a company's strategy is an expression of the interplay between its functional activities.

Considering the views expressed on this topic, it can be determined that strategy is comprised of three elements. Strategy begins with a diagnosis of the external environment and related trends. An organisation's desired condition or vision, which is then translated into clear policies that serve as guidance to align the enterprise with its external environment, is the second implied element. An articulate set of decisions and actions, as a final element of the strategy, guide the organisation from its viewed current state toward its envisioned state.

2.6 Strategic agility

Adaptability is crucial to thriving in an increasingly competitive business world. Modern businesses must be ready to respond rapidly and adapt to the changing environment no matter where the disruption comes from. The term for this is strategic agility. An organisation's strategic agility consists of its rapid and appropriate response to change while retaining flexibility and focus. Maintaining strong strategic agility is a demanding practice that requires significant effort and constant control. To maintain organisational effectiveness, it is important that organisational leaders and managers deliberately design and construct an organisational structure that can facilitate the smooth flow of information throughout the company. It is equally important for communication to flow smoothly at all levels of the organisation in order to adapt quickly. Furthermore, it

entails training all employees to think strategically, balancing focused attention on today's tasks with an eye on tomorrow.

A company's agility is its ability to efficiently and effectively deploy, redirect, or capture higher-yield resources as internal and external circumstances warrant. Teece et al. (2016) define agility as "the ability to redeploy, redirect, or capture resources in order to create or retain greater value". It is clear from this that agile capacity is a limitless resource. According to Harraf et al. (2015), strategic agility can be achieved through the implementation of several components. An organisation that constantly seeks out ways to improve the service it provides to clients is the first component of an innovative culture. A company that embraces an innovation culture reacts to indicators of changes in its operating environment by adjusting its internal policies in a manner that supports strategic alignment.

Secondly, there is a need for ambiguity tolerance in order to achieve strategic agility (Harraf et al., 2015). It serves as an artifact of the organisation's culture, much like innovation. Managing uncertainty is a key attribute of agile companies in the modern economy, where digitalisation is accelerating the rate of global change. (Harraf et al., 2015) stress the importance of change management in the discussion of Strategic Agility. This is another component of strategic agility. According to (Williams, Worley, and Lawler, 2013), organisations must possess the capability to effectively handle change that occurs beyond their direct influence due to the dynamic and intricate nature of the contemporary business landscape. This suggests that change will continue to occur.

2.7 Digitalisation and strategy

As a functional element, information technology was also subordinate to business strategy (Bharadwaj et al., 2013). A growing number of traditional business strategies are being reshaped by digital technology (Sebastian et al., 2017; Mithas, Tafti & Mitchel, 2013; Bharadwaj et al., 2013). In adopting digital technologies, companies depart from their traditional strategies and transcend all operational strategies (Matt et al., 2015). A digital business strategy is what Bharadwaj et al. (2013) define as "an

organisational strategy that leverages digital resources to drive differentiation". A path to the desired state of Digital Business Strategy (DBS) is identified through a digitally inclined transformation by Bharadwaj et al. (2013) in the discussion on its derivation. Bharadwaj et al. (2013) outline three themes of a desired state of DBS feasible through digitally inclined transformation, starting from the debate on the DBS's derivation. There are scope, scale, and speed. Digitalisation will affect scope based on the specific business elements and products; scale refers to how many of those elements will be digitally transformed; and speed indicates how rapidly Digitalisation will be implemented and its impact on the organization.

2.8 Dynamic Capabilities Framework

The Dynamic Capabilities Framework (DCF) is a theoretical framework that suggests that organisations can maintain a competitive advantage by developing the ability to constantly learn and adapt to changing market conditions (Teece et al., 1997). This framework is based on the idea that organisations must be able to identify and exploit new opportunities, and must be able to continuously renew and enhance their resources and capabilities in order to stay competitive (Teece et al., 1997).

In the context of this study, which aims to explore the relationship between digitalisation and strategic agility within a South African mining company, the DCF framework can be used to understand how digitalization can enable organisations to constantly learn and adapt to changing market conditions.

Digitalisation, or the integration of digital technologies into operations and decision-making processes, has the potential to transform the way organisations operate and interact with their stakeholders (PwC, 2018). Digital technologies can enable organisations to access and analyse large amounts of data in real-time, which can help them respond more quickly to changes in the market (PwC, 2018). In the mining industry, digital technologies have the potential to improve efficiency and productivity, and many companies are investing in digital initiatives to enhance their competitive advantage (PwC, 2018).

According to the DCF, organisations can develop dynamic capabilities in several ways (Teece et al., 1997). One way is through learning and knowledge management, which involves acquiring and sharing knowledge about new technologies, markets, and customer needs. Digitalisation can be seen as a key enabler of learning and knowledge management, as it allows organizations to access and analyse large amounts of data and to share knowledge more effectively through the use of digital platforms (McKinsey & Company, n.d.).

Another way organisations can develop dynamic capabilities is through innovation and experimentation, which involves testing and implementing new ideas and technologies. Digitalisation can facilitate innovation and experimentation by providing organizations with the tools and platforms to quickly prototype and test new ideas (McKinsey & Company, n.d.).

Finally, organisations can develop dynamic capabilities through collaboration and coordination, which involves building relationships and networks with external partners and stakeholders. Digitalisation can enable organizations to more effectively collaborate and coordinate with their stakeholders through the use of digital platforms and tools (McKinsey & Company, n.d.).

Overall, the dynamic capabilities framework provides a useful framework for understanding the relationship between digitalization and strategic agility in the context of a South African mining company. By studying how digital technologies can enable organizations to constantly learn and adapt to changing market conditions, we can gain a deeper understanding of how organizations can effectively leverage digital technologies to enhance their strategic agility and maintain a competitive advantage.

2.9 Conclusion

The literature surveyed above has provided background insights into several aspects of digitalization and strategic agility. For this study, we have chosen to use the DCF framework as the basis for our theoretical framework. This framework is particularly

relevant for our study as it focuses on the ability of organisations to adapt and respond to changing market conditions, which is a key aspect of strategic agility.

Overall, the framework provides a useful framework for understanding the relationship between digitalisation and strategic agility in the context of a South African mining company. By studying how digital technologies can enable organizations to continuously learn and adapt to changing market conditions, we can gain a deeper understanding of how organisations can effectively leverage digital technologies to enhance their strategic agility and maintain a competitive advantage.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the methodology that was used to carry out the research and gives an overview of the data-gathering and analysis processes employed in this research endeavour. The methodology refers to the method used to find or answer the research problem (Flick, 2015). The researcher sought out numerous research methodologies relevant and key to achieving the study objectives specified in the first chapter. The literature review was another aspect that influenced the study methodology used by the researcher since it allowed the researcher to address research gaps that were not being addressed at the time. The research design, sampling methods, research instrument, data collection, and analysis are all well-discussed. These are followed by a discussion on the limitations as well as the validity and reliability of this study. Population and sample size are also discussed.

3.1.1 Quantitative Research

This research used a quantitative methodology in order to successfully analyse and develop an understanding of the nature of the relationship between digitalisation and strategic agility. The purpose of the quantitative research was to find solutions to a research problem by collecting and analysing numerical data. The quantitative research methodology focused on generating objective and statistically valid information to answer specific research questions. The research questions were answered and the necessary deductions and recommendations were made.

3.2 Research Approach

The study is aimed at gaining a better understanding of the relationship between digitalisation and strategic agility, and its influence thereof, in a mining business environment. There has been considerable debate about both constructs in academic circles for a considerable amount of time. Having access to this background, as well as studying one independent variable (digitalisation), one mediating variable (strategic

agility) and one dependent variable (organisational performance), the researcher selected the deductive approach because:

1. From the investigations the researcher has done, there's existing theoretical background. The researcher has noticed that both digitalisation and strategic agility have generated diametrically opposed and controversial academic perspectives for a considerable period.
2. The researcher is not developing a new theory due to the pre-existing theory base.

Moreover, the research was conducted within a specified time frame that aligned with the utilization of an existing theoretical framework, rather than the creation of a new theory, which is typically associated with an inductive study.

3.3 Research Instrument

The measurement instrument used in the research paper was adapted from existing studies and authors discussed in Section 2, aligning with the deductive approach employed in the research. Blocks of questions were compiled from different sources to create a single online self-administered questionnaire. The chosen questions were obtained from thoroughly validated instruments for data collection, guaranteeing the intended purpose of data collection. Developing a new tool from scratch was deemed impractical given the time and effort required, thus supporting the use of an adapted instrument. The chosen measurement instrument offered flexibility in completion time and location for participants. However, potential drawbacks included the possibility of low response rates if recipients ignored the questionnaire link and the risk of participants misinterpreting or skipping questions.

3.4 Research Design

The research design refers to the plan or blueprint for conducting research that guides the collection, measurement, and analysis of data (Creswell, 2014). It is the set of procedures and methods used to collect and analyse data (Trochim, 2006). It was

important for the researcher to carefully consider the research design and methods in order to increase the validity and reliability of the findings.

The quantitative design approach is well-suited for this study as it allowed the researcher to examine the relationship between digitalisation and strategic agility in a systematic and objective manner, and to draw conclusions based on statistical analyses of the data.

The study conducted a survey research design, in which a standardised questionnaire was administered to a sample of employees at a South African mining company. The questionnaire included questions related to the level of digitalisation at the company, strategic agility as well as measures of organisational performance.

3.5 Target Population and Sample

The South African mining company's junior, middle, and senior management were the targeted participants in this study. To deliver value to clients and customers, this characteristic population must adopt and/or use various forms of digital technology. Moreover, they must be involved in the strategic matters of the company when performing their duties. Thus, the target population was expected to consist of those involved in transforming their organisations from conventional to digitally-based strategies (Park et al., 2017).

First, was is expected that this population will have exposure to and involvement with digital technologies. As the company seeks to transform its operations and strategies from traditional to digital-based approaches, it is likely that junior, middle, and senior management will be responsible for implementing and using various forms of digital technology to deliver value to customers.

Second, it was expected that this population will be involved in strategic matters at the company, and will have a good understanding of the organization's overall goals. This is important as strategic agility involves the ability to align with changing market conditions and respond to new opportunities and challenges. By focusing on junior,

middle, and senior management, the researcher captured the perspective of those who are responsible for setting and implementing strategic direction at the company. Finally, it was anticipated that focusing on these levels of management resulted in a more homogeneous population, which resulted in more consistent data quality. This is because these levels of management are likely to have similar levels of experience and exposure to digital technologies and strategic matters.

3.6 Sampling Techniques

Purposive sampling, also known as judgmental or selective sampling, is a type of non-probability sampling in which the researcher selects the sample based on specific characteristics or criteria that are relevant to the research question (Saunders et al., 2009). This type of sampling is often used when the researcher is interested in studying a specific group or phenomenon in depth, and when the sample is intended to be representative of the broader population (Neuman, 2014).

In the context of this study, purposive sampling was used to select the sample of junior, middle, and senior management at a South African mining company. Due to the study's focus on capturing individual viewpoints and opinions regarding the relationship between digitalisation and strategic agility in the South African context, it was crucial to ensure a diverse representation of relevant individuals in the mining company. Therefore, the selection of participants who matched the desired profile was made using purposive sampling, which involved exercising judgement (Saunders & Lewis, 2018) to achieve the broadest possible representation. By selecting the sample based on specific criteria such as job role and level of management, the researcher ensured that the sample is relevant to the research question and that it is representative of the population of interest.

A compilation of individuals who possessed the necessary characteristics was created, which included their email addresses. The identification of these individuals was conducted using the researcher's internal digital global address book from the subsidiary company where the researcher is employed. This approach provided the researcher with a direct network of the participants. The list of participants

encompassed various business units within a South African mining company, such as Projects & Environments, Corporate Affairs, Human Resources, Digital Transformation, Marketing, Finance, Operations & Technical, Asset Reliability, and Safety And Health. The aim of involving representatives from various business units was to achieve a broad scope encompassing all sectors, thereby facilitating a more comprehensive understanding of the relationship between the constructs. Consequently, the assembled list was used to issue the questionnaire to potential participants.

3.7 Sample Size

The online survey questionnaire was distributed to a target population of 150 individuals. The researcher obtained the email addresses from the company's digital global address book to fulfil the sample requirement. The target for the sample size was determined to be a minimum of 40 responses to achieve statistical significance. With an estimated response rate of 25%, the survey was distributed to 150 participants who met the required respondent profile.

3.8 Questionnaire Design

The questionnaire comprised four sections. Participants were initially presented with a concise introduction and overview of the research they were about to take part in. To ensure clarity and understanding of the constructs being investigated, brief explanations of the fundamental meanings of the terminology used in the study were provided.

The initial section of the data collection tool consisted of demographic and qualifying questions designed to obtain crucial profiling information about the respondents. This included their job title, length of employment, and hierarchical position. This information was utilised to assess the respondents' suitability based on the desired profile criteria.

The subsequent sections of the questionnaire incorporated questions aimed at capturing participants' perspectives on the study variables specifically, digitalisation and strategic agility. The third section contained the questions specifically crafted to extract insights on the research variables from the participating respondents. These questions utilised the Likert Scale to gauge the participants' opinions and insights. This section focused on the independent and mediating variables relevant to the study.

Lastly, the fourth section of the questionnaire was dedicated to queries pertaining to the measurement of the dependent variable, which is organisational performance.
The completion time of the questionnaire was envisaged to take an estimated 10 minutes taking into consideration the number of questions pertaining to the study.
To capture the participants' opinions and beliefs on the constructs, a measuring tool employed a Likert scale with five points. The scale ranged from "strongly agree" (1) to "strongly disagree" (5). This standardized scale, consistent with previous studies (Chen et al., 2014; Lu & Ramamurthy, 2011; Saunders & Lewis, 2018; Lavrakas, 2008), was consistently used in the third section of the questionnaire. This approach aimed to ensure consistency and minimize the potential for human error in response selection by participants.

3.9 Data Collection

An online self-administered questionnaire was used as part of a survey research technique in keeping with the study's intended explanatory character. The adoption of a standardized data collection tool, commonly utilized in surveys (Brannen, 2005), ensured consistent data collection conditions and structure across the sampled population, making it the most suitable approach for this study (Saunders & Lewis, 2018). This decision was expected to enhance the objectivity of the study's findings and increase the possibility of reaching a larger pool of potential participants to attain a statistically significant sample size.

The survey was conducted via a secure platform known as SurveyMonkey, and it was disseminated to the employees of the organisation to guarantee that the sample accurately reflects the broader employee population within the company. A survey link

was generated within the platform and sent by electronic communication (email) to the intended participants along with instructions for completing the questionnaire online. By utilizing this survey tool, potential obstacles such as geographical and logistical constraints were overcome. This approach eliminated the need for physical copies of the questionnaire, thereby facilitating a more efficient distribution process (Saunders & Lewis, 2018; Zikmund et al., 2009). The platform was configured to ensure that the survey is accessible only to the sample of participants and that the data is collected and stored in a confidential and secure manner. Additionally, participants were informed about the consent requirements before proceeding with the survey.

3.9.1 Data Collection Approach

To ensure optimal response and completion rates, the data collection process followed the steps outlined by Saunders and Lewis (2018):

i. A purposively selected list of individuals meeting the target population criteria was compiled. A cover letter was sent to them via email, providing an explanation of the study's purpose and highlighting the potential contribution they could make by participating. This cover letter was presented as an introduction to the data collection tool and was sent before sharing the actual survey link, allowing the recipients to be prepared for the survey.

ii. The introductory cover letter presented the research and author, underscoring a strong dedication to confidentiality and the protection of respondent anonymity. Participants were assured that only anonymized aggregated response data would be collected. The letter explicitly stated that participation in the survey was entirely voluntary.

iii. The initial step involved sending the cover letter to the individuals, informing them that a second communication would follow containing the research questionnaire link. They were requested to complete the survey within a specified period. Subsequent emails were sent at intervals of one week to express appreciation to those who had already participated in the survey, while also serving as reminders and encouragement for those who had not yet completed it.

Overall, this data collection approach yielded 40 responses out of the intended target population of 150 individuals within a three-month timeframe. Although Deutskens et al. (2004) identified a typical response rate of 25%, the accumulated response total was considered sufficient to proceed with the study. The collected data was deemed statistically significant based on the required condition.

3.10 Research Validity

The amount to which a research study measures what it is meant to assess and the extent to which the study's findings are supported by the data is referred to as validity (Saunders et al., 2009). Internal validity, external validity, and construct validity are all forms of validity that must be examined in the context of this research.

The amount to which the research is devoid of bias and confounding factors, as well as the extent to which the observed link between the variables of interest can be ascribed to the study design and intervention, is referred to as internal validity (Saunders et al., 2009). Internal validity will be improved in this research by employing a large and representative sample, adjusting for any confounding factors, and analysing the results statistically.

The degree to which the study's findings may be extrapolated to other groups or circumstances is referred to as external validity (Saunders et al., 2009). External validity may be reduced in this research since the sample comprises personnel from a single South African mining firm and may not be typical of other companies or industries. However, using a broad and varied sample, as well as including a variety of factors linked to digitalization and strategic agility, may assist to boost the study's external validity.

The degree to which the research assesses the ideas or constructions of interest in a valid and reliable way is referred to as construct validity (Saunders et al., 2009). Construct validity will be improved in this research by employing validated measures of digitalization and strategic agility, as well as pilot testing the survey to verify that the questions are clear and simple to comprehend.

To maintain the study's credibility and ensure the validity of its results, it was determined that the inclusion of individuals who were not engaged in the discussion or implementation of the strategy would compromise the integrity of the research (Lu & Ramamurthy, 2011).

3.11 Data Analysis

Data analysis is an important phase in the research process since it includes collecting, summarising, and interpreting the acquired data to answer research questions and evaluate study hypotheses (Saunders et al., 2009).

To classify the collected data obtained through a Likert scale as numeric and quantitative, its statistical nature was determined. Since the assigned digits in the Likert scale responses did not correspond to actual numbers, the data were categorized as having discrete interval characteristics (Wegner, 2016).

To analyse the data collected from an online questionnaire, it was conveniently downloaded and imported into the statistical software package SPSS. The statistical implications of the gathered data on the variables were then investigated using SPSS. Thereafter, the information was thoroughly analysed using the instrument tool to ensure reliability and conduct descriptive analysis. For each variable in the research, descriptive statistics such as means, medians, and standard deviations were computed.

Data visualization tools such as graphs and charts are illustrated in the study to graphically portray the data as well as discover trends and patterns. These visualizations are used to aid in the interpretation of statistical analyses and to convey the study's results in a comprehensible way.

In summary, the use of SPSS in this research allowed the researcher to efficiently evaluate the data acquired via the online survey and establish the association between digitalisation and strategic agility in a South African mining company.

3.12 Limitations and Challenges

The data collection process was influenced by a number of limitations and challenges. Firstly, it was anticipated that some bias would be present in the results because the respondents' views and beliefs were recorded utilising an online questionnaire.

Secondly, the online distribution of the questionnaire limited participation to individuals with internet access and the necessary technology. However, even among those who had access, not all completed the survey, resulting in lower response rates.

Thirdly, the use of non-probability sampling methods prevented the findings from being generalised to a larger population. Thus, inferential statistics cannot be applied to the sample data.

Fourthly, due to the specific focus on the mining industry within a single company, the study limited its participant selection to a narrow range of respondents within organizations. Consequently, obtaining an adequate number of questionnaire responses posed a challenge due to this selectivity. Furthermore, this study only collected data from one country.

Fifthly, the standardised nature of the data collection tool restricted respondents from providing nuanced information in their own words. Participants had limited opportunity to clarify elements of the questionnaire via electronic channels because it was distributed via electronic channels. Additionally, the measurement tool did not allow for follow-up questions.

Sixthly, without the researcher's presence, there was no opportunity to address queries or provide clarification, potentially leading to unanswered questions and impacting the completion rate.

Seventhly, the researcher's absence during the completion of the electronic questionnaire could have potentially led to a response rate lower than the original target.

Lastly, concerns around cyber-crime and phishing scams affected the trustworthiness of electronic communications containing links. A few individuals reached out to the researcher to authenticate the source of the emails and questionnaire. To address their concerns about clicking on hyperlinks that could potentially lead to phishing scams, the researcher opted to send the survey invitation through email using a recognizable email address, thus alleviating any apprehensions. Ideally, the use of an official professional email address since the researcher has access to the organization’s global digital address book.

A clear and formal introduction of the researcher, affiliation, and purpose of the research was provided in the email. In order to establish credibility, the researcher included a brief explanation of the study, shared supervisor details, researcher contact details, and university details and expressed emphasis on the anonymity of the research findings.

3.13 Conclusion

The purpose of the study was to look at the link between digitalisation and strategic agility in a South African mining company. To accomplish this goal, a quantitative research approach was used, with an online survey used to gather data from a sample of the company's junior, middle, and senior management. The poll included digitalisation and strategic agility metrics, as well as a variety of control factors. Data analysis was carried out using statistical software such as SPSS, which included the computation of descriptive statistics, the use of t-tests to compare mean scores, and regression analyses to investigate the link between the variables. To preserve the participants' rights and welfare, ethical concerns like informed consent, confidentiality and anonymity, and the use of incentives were addressed. Validity was assessed to verify that the research measured what it was supposed to measure and that the results supported the findings.

CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION OF RESULTS

4.1 Introduction

The chapter discusses the data analysis and presentation of results generated from the collected data. Furthermore, the chapter is divided into four main sections which are the demographics of the study, implementation of digitalisation, outcomes from digitalisation and regression analysis model. The chapter will be concluded with a chapter summary which highlights the important and key findings from the study. The next section shall be the demographics of the study.

4.2 Demographics of the study

This section discusses the demographics of the study and is divided into four subsections which are employment tenure, management designation level, department and department size. These are discussed in the following sub-sections below.

4.2.1 Employment tenure



Figure 1: Employment tenure

The results indicated that most of the participants had 6 – 10 years of employment tenure within the organisation and this accounted for 28.67% of participants as shown in Figure 1 above. However, this was closely followed by those who had more than 5 years or less and 11 – 15 years of employment tenure within the organisation. These accounted for 26.00% and 24.00% of the participants respectively. Nevertheless, 21.33% of the participants had more than 15 years of employment tenure within the organisation. The results suggest that the participant's employment tenure was roughly balanced to include those relatively new to the organisation and therefore had short-term experience within the organisation, those who had middle-term experience and those who had a long-term experience within the organisation. This is likely to bring reduce bias that may be amongst any of these groups.

4.2.2 Management designation level

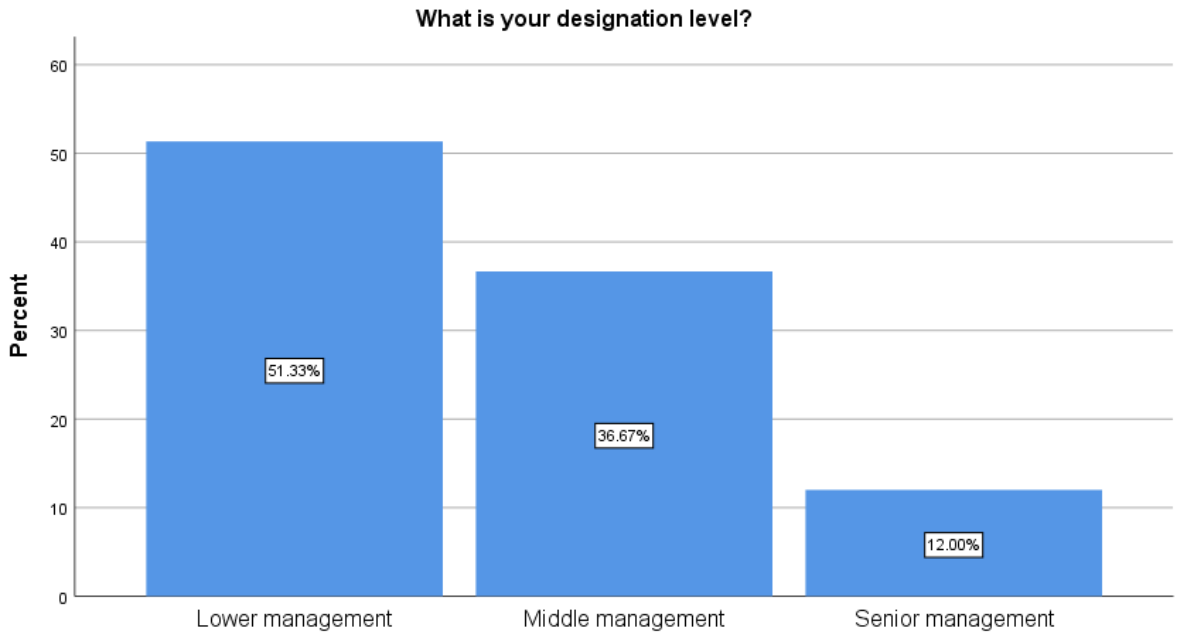


Figure 2: Management designation level

The majority of the participants had a lower management designation level and these accounted for 51.33% of the participants as shown in Figure 2 above. However, the rest of the participants were in middle and senior management levels which accounted for 36.67% and 12.00% of participants respectively. The researcher argues that senior and middle management is much more difficult to access due to their busy schedule relative to lower management. This may explain why more participants at lower management levels were able to participate in this study.

4.2.3 Department

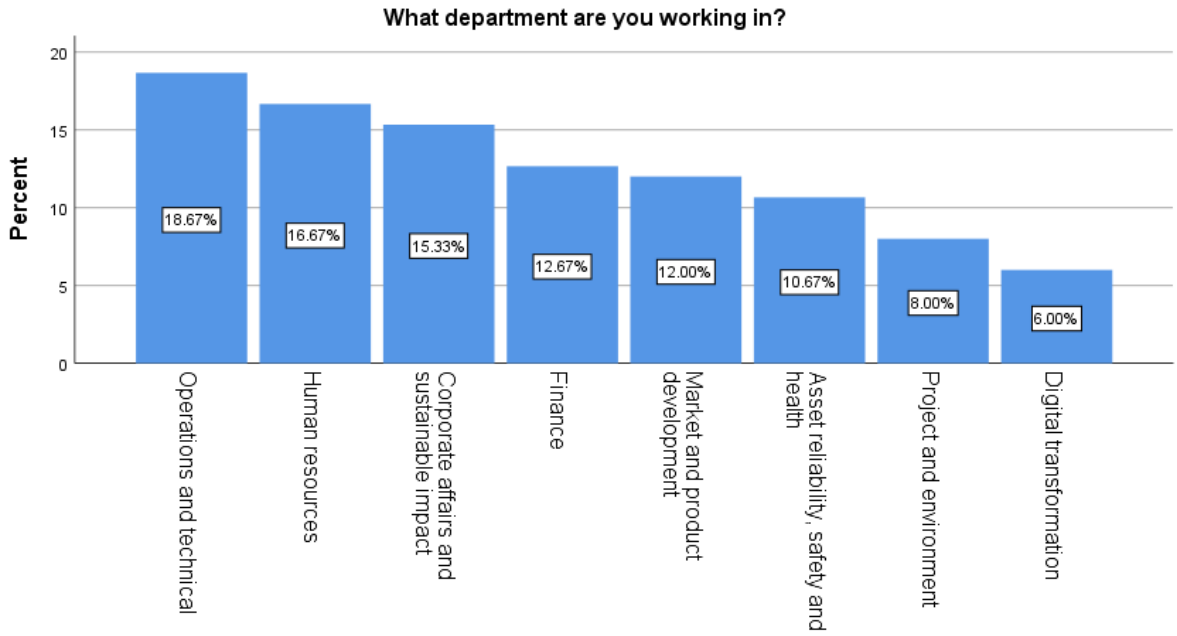


Figure 3: Department

Most of the participants were from the Operations & Technical Department and these accounted for 18.67% of the participants as shown in Figure 3 above. However, the least number of participants were from the Digital Transformation Department which accounted for only 6.00% of the participants. The rest of the participants were from the Human Resources Department, Corporate Affairs & Sustainable Impact Department, Finance Department, Market & Product Development Department and Asset Reliability, Safety & Health Department and Project & Environment Department. These accounted for 16.67%, 15.33%, 12.67%, 12.00%, 10.67% and 8.00% respectively as shown in Figure 3 above. Nevertheless, each of the participants were relatively fairly represented in the study if we consider each departmental size. However, it should be noted that the Operations & Technical Department is the largest in the organisation followed by the Human Resources Department and then Corporate Affairs & Sustainable Impact Department, whilst the Digital Transformation Department is the smallest. This could explain the distribution of participants shown in Figure 3 above.

4.2.4 Department size

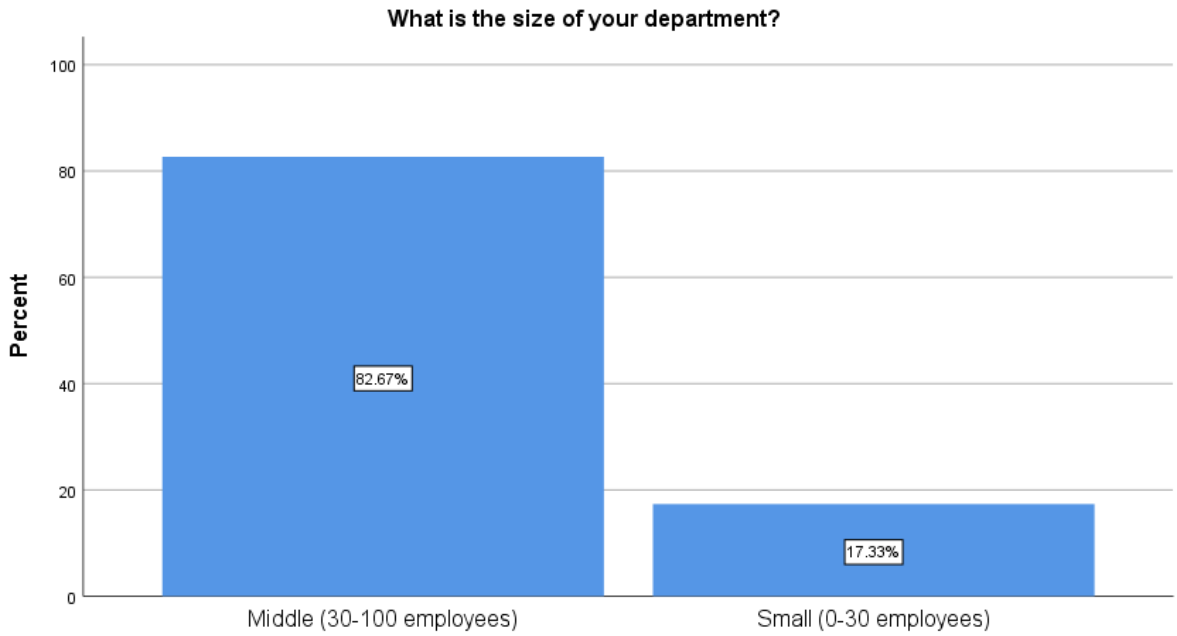


Figure 4: Department size

The majority of the participants indicated that their department size was middle size with 30 -100 employees and these accounted for 82.67% of the participants as shown in Figure 4 above. On the other hand, the rest of the participants indicated that their department was small size with up to 30 employees. This is fairly consistent with the current departmental sizes within the organisation which has the Digital Transformation Department and the Project & Environment Department as the smaller departments as they are specialised departments.

4.3 Implementation of digitalisation

This section discusses the implementation of digitalisation within the organisation and related issues such as challenges, benefits and reasons for adopting digitalisation. It is divided into eleven subsections which shall cover most of the various issues related to the digitalisation of the organisation. The next subsection shall discuss the digitalisation at departmental level.

4.3.1 Digitalisation at departmental level

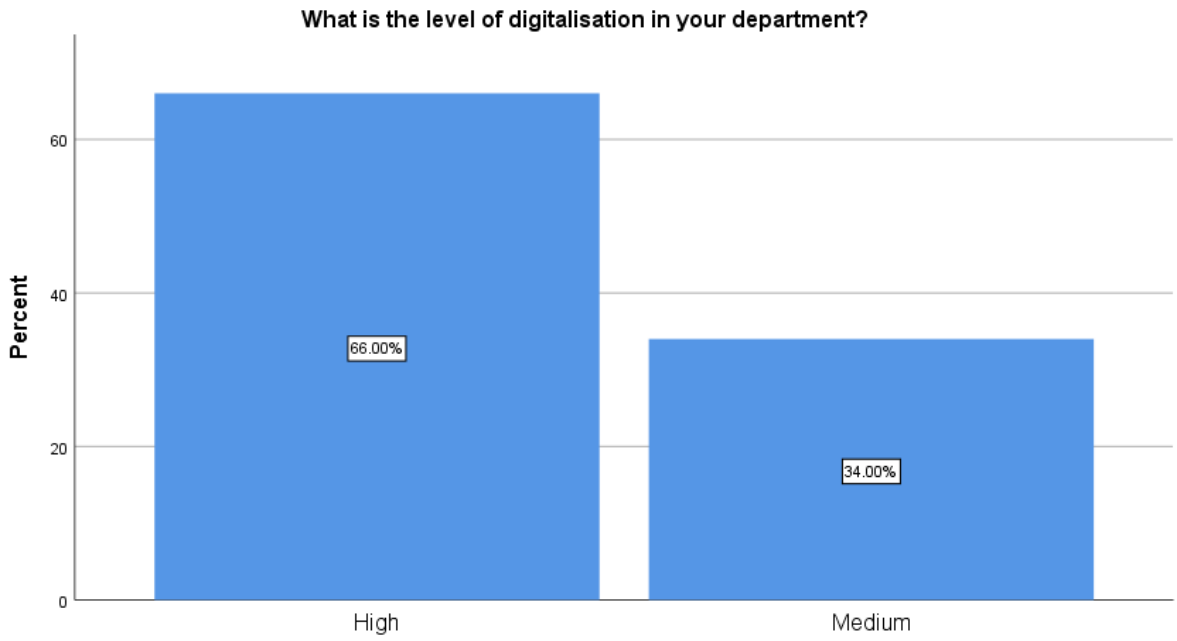


Figure 5: Digitalisation at department level

The results in Figure 5 indicate that digitalisation within the organisation at departmental level ranges from medium to high. However, the majority of participants stated that the level of digitalisation at departmental level is high and this is reflected by 66.00% of the participants. Nevertheless, 34.00% of the participants indicated that digitalisation at departmental level is medium. Besides, it should be noted that the organisation has rolled out the same level of digitalisation in the form of innovation across all departments as part of its strategic initiative. Moreover, it is worth pointing out that each participant responded to this question from perspective of their

understanding of what level of digitalisation they are experiencing within their job environment, and on the basis of what they generally see in their day-to-day activities. As such, the level of digitalisation may not necessarily be the same across all departments and within specific work areas in those departments. In light of this, the results suggest a medium to high digitalisation at departmental level and this could be reflecting these different perceptions from the participants.

4.3.2 Frequency of making strategic decisions at current role

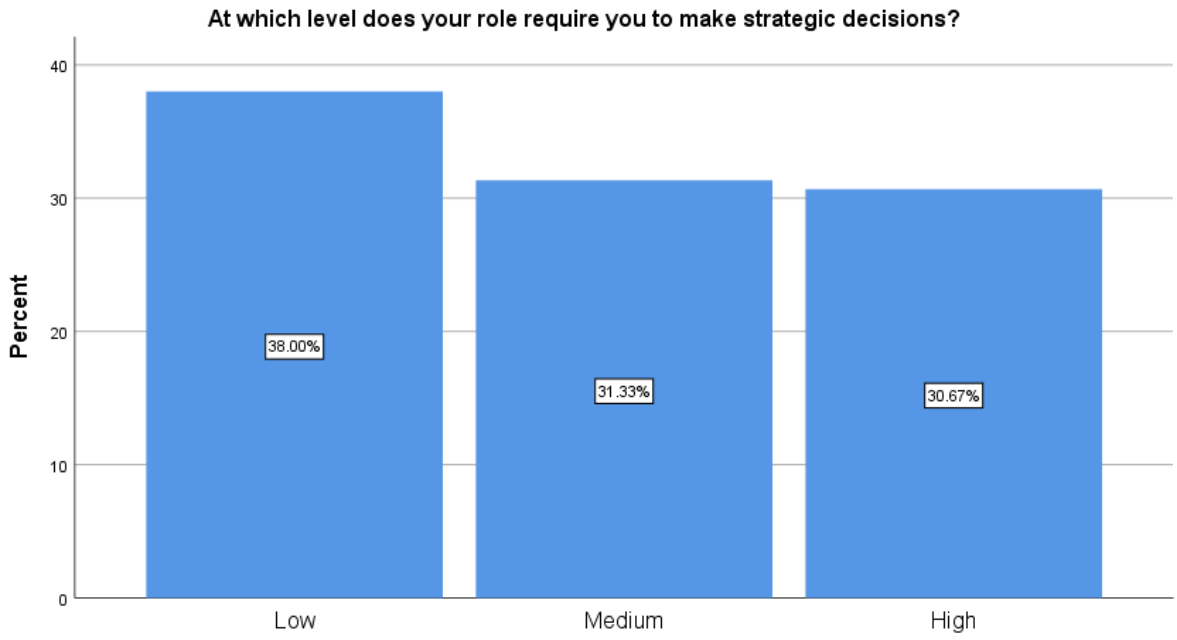


Figure 6: Frequency of making strategic decisions at current role

Most of the participants indicated that they have a low frequency of making strategic decisions in their current role and this account for 38.00% of the participants as shown in Figure 6 above. This is consistent with the fact that the majority of the participants were at lower management designation levels as shown in Figure 2 in the previous subsection. Nevertheless, the rest of the participants indicated that their frequency of making strategic decisions in their current role was medium and high which accounted for 31.33% and 30.67% of the participants respectively. The results suggest that most of the participants have a medium to high frequency of making strategic decisions and this could have a bearing on the impact they have in implementing the recommendations of the study.

4.3.3 Evidence of the impact of digitalisation

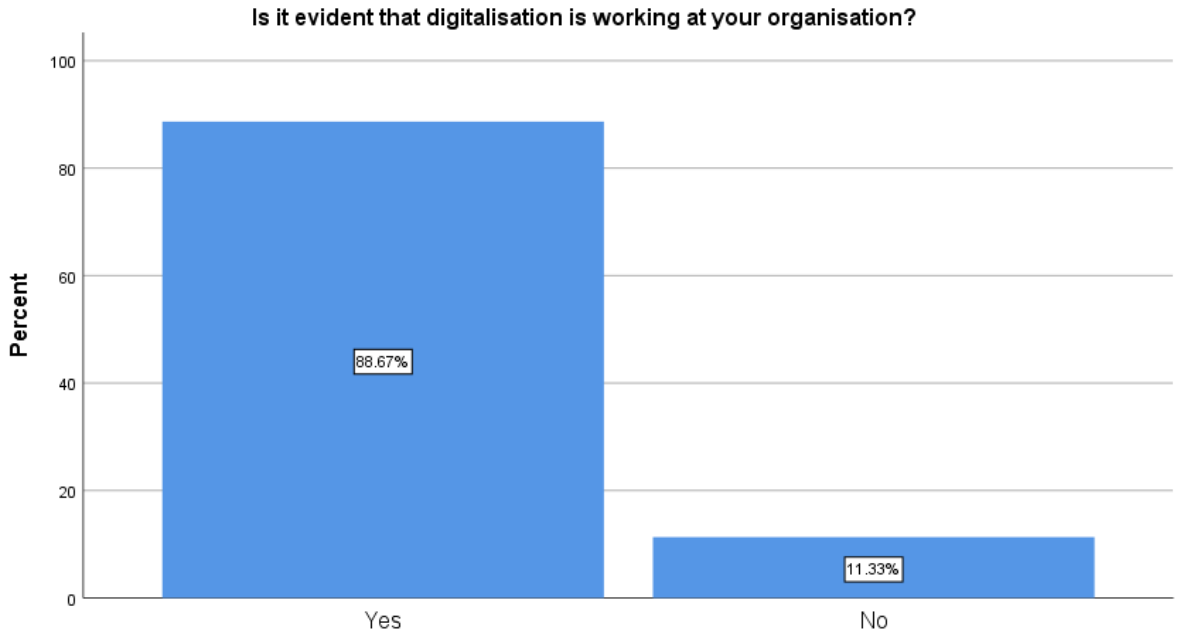


Figure 7: Evidence of impact of digitalisation

The majority of the participants indicated that there is evidence of the impact of digitalisation within the organisation and this accounted for 88.67% of the participants as shown in Figure 7 above. however, only 11.33% of the participants indicated that they did not see any evidence of the impact of digitalisation. This could be because their current job environment has yet to benefit from digitalisation given that it may have activities that can be digitalised effectively at least from the currently available technologies. Also, it should be noted that some of the participants do not necessary like the changes that are brought by digitalisation and may resist the change. This in many instances may cause technostress in some of the employees who may not be in a position to cope with new digital technologies. This could explain why some of the participants did not see a positive impact of digitalisation.

4.3.4 The need for digital transformation for current role

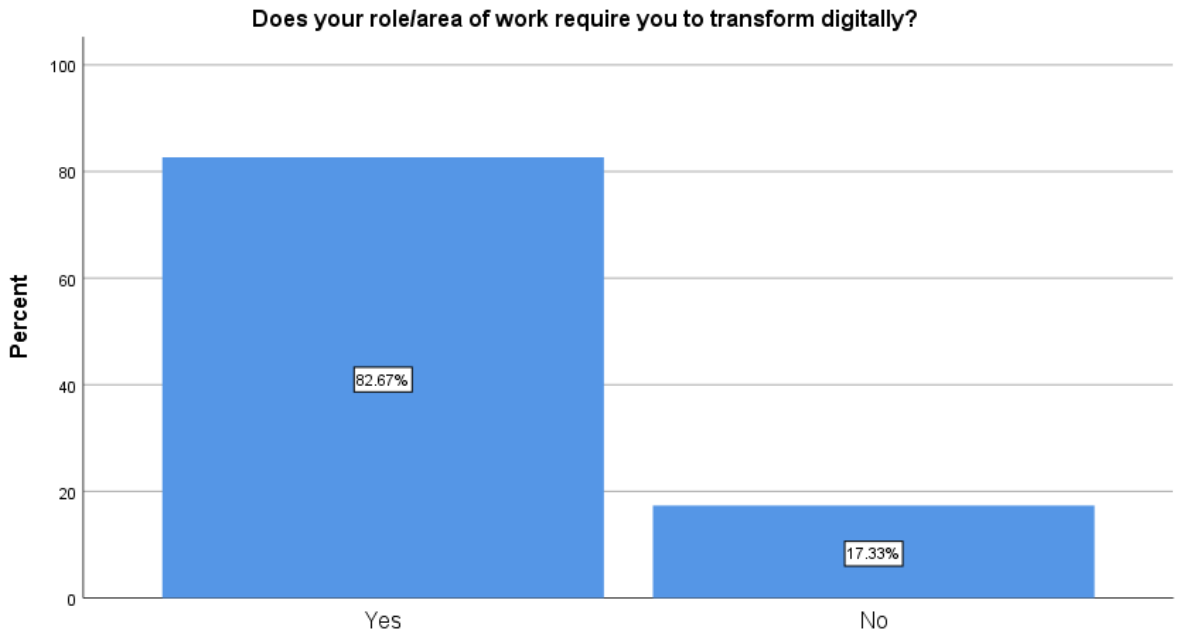


Figure 8: The need for digital transformation for current role

The majority of the participants indicated that their current role was in need of digital transformation and this accounted for 82.67% of the participants as shown in Figure 8 above. Nonetheless, only 17.33% did not see any need for digital transformation in their current role. This could be a reflection of those employees who are not coping with the new changes that the digital transformation has brought to their work environment. In view of this, these employees may feel that there was no need to make any changes to the way they traditionally performed their job roles.

4.3.5 Effect of digitalisation on the organisation

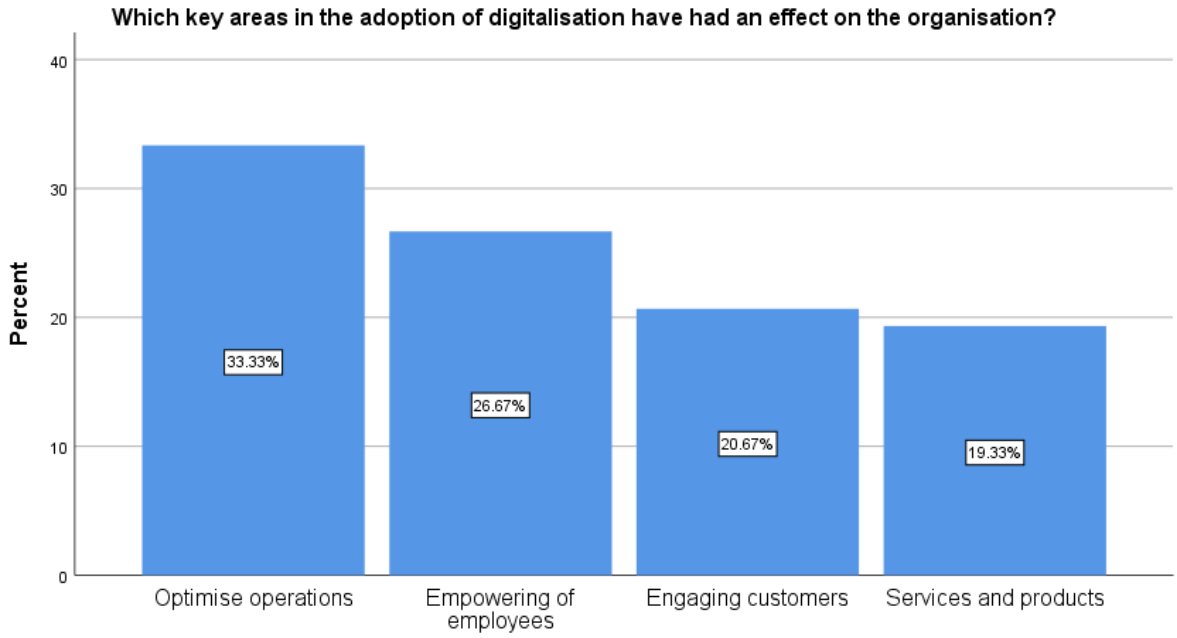


Figure 9: Effect of digitalisation on the organisation

The results indicate that digitalisation had various effects on the organisation which have been reflected in optimisation of operations, empowerment of employees, engagement of customers and improvement of services and products as shown in Figure 9 above. However, most of the participants observed that digitalisation helped to optimise operations within their work environment and this accounted for 33.33% of the participants. On the other hand, 26.67% of the participants stated that digitalisation empowered employees within the organisation more than they would have done without digitalisation. Yet still, 20.67% of participants indicated that digitalisation helped to engage with customers on a deeper level than previously realised as digitalisation expanded ways in which the customers were able to interact with the organisation. Lastly, 19.33% of the participants reported that digitalisation helps to improve services and products.

4.3.6 Reasons for adopting digitalisations

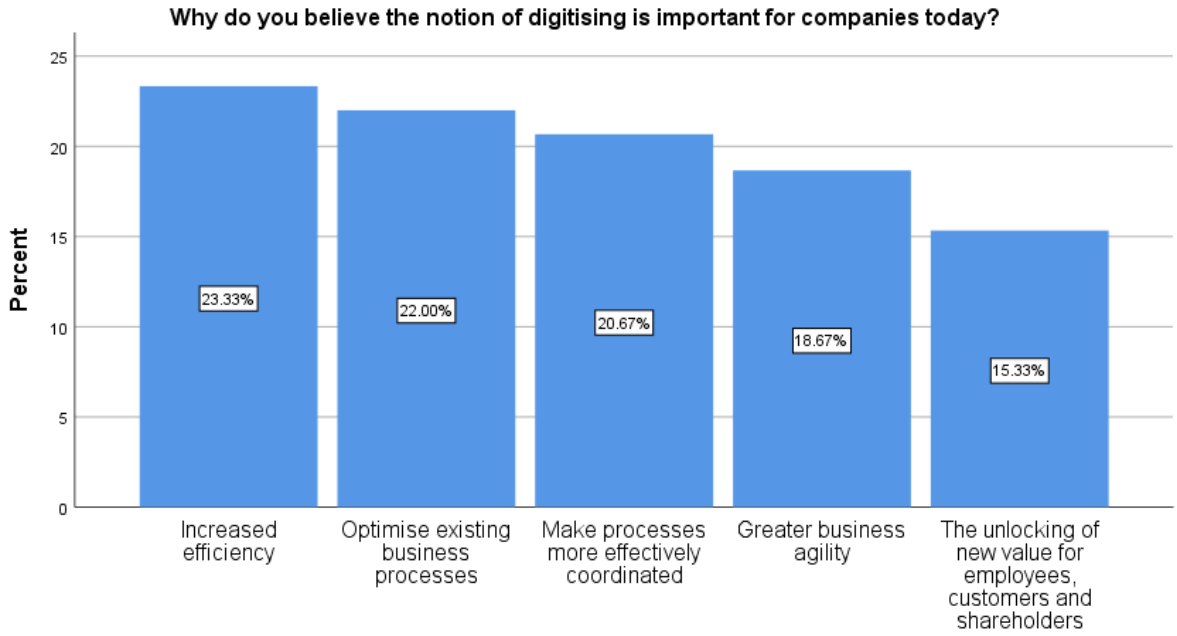


Figure 10: Reasons for adopting digitalisations

The participants were asked why organisations undergo digitalisation and most of them stated that increasing efficiency within the organisation was their main reason. This accounted for 23.33% of the participants as shown in Figure 10 above. However, the rest of the participants also indicated other reasons which are to optimise existing business processes, making processes more effectively coordinated, greater business agility and unlocking new value for employees, customers and shareholders which accounted for 22.00%, 20.67%, 18.67% and 15.33% of the participants respectively. Nonetheless, the reasons highlighted above have roughly the same representation from the participants suggesting that all of them could be viable reasons why organisations may decide to digitalise. In view of this, each of the reasons may receive a different weight depending on the circumstances of the organisation and its value chain dynamics.

4.3.7 Association between digitalisation and disruption

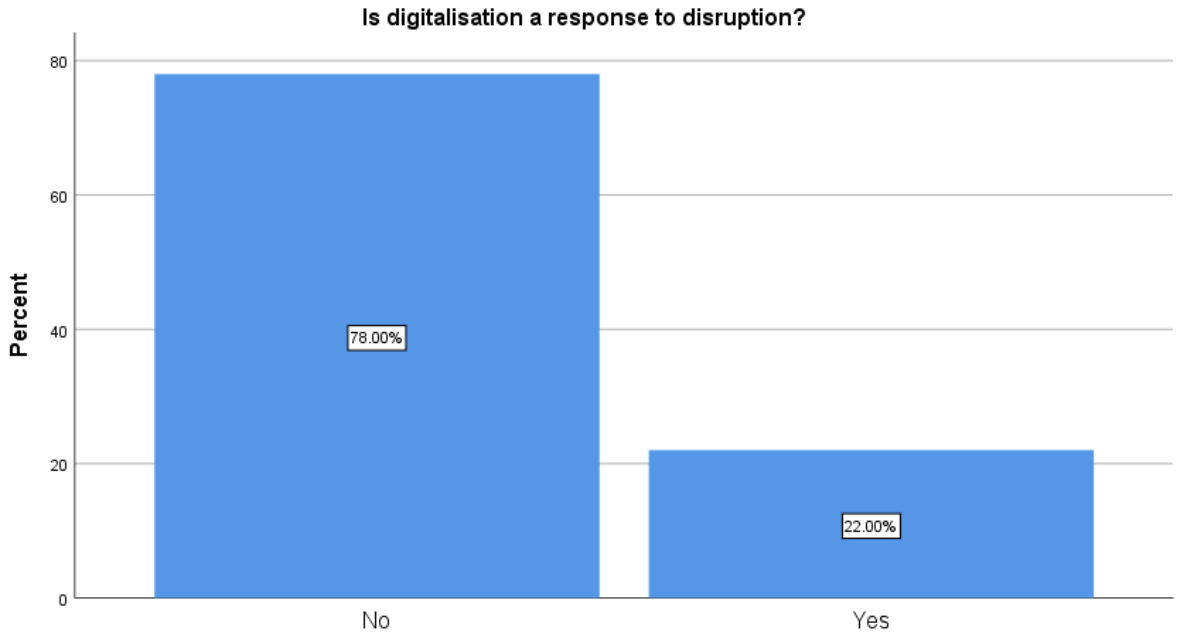


Figure 11: Association between digitalisation and disruption

The majority of the participants indicated that there was no association between the organisation adopting digitalisation and disruption. This was supported by 78.00% of the participants as shown in Figure 11 above. On the other hand, 22.00% indicated that there were of the opinion that there was an association between the digitalisation of the organisation and disruption. Besides, it should be pointed out that digitalisation can be a response to disruption such as in response to the emergence of new competitors, changing customer expectations and disruptive technologies but it is not the only reason why companies embark on this journey. Also, digitalisation could happen solely due to the need to improve business operations, enhance employee and customer experiences and increase the competitive edge of the organisation within the industry. In view of this, it seems the organisation embarked on digitalisation as part of its proactive strategic imperative rather than a reactive response to disruption.

4.3.8 Most significant benefit brought by digitalisation

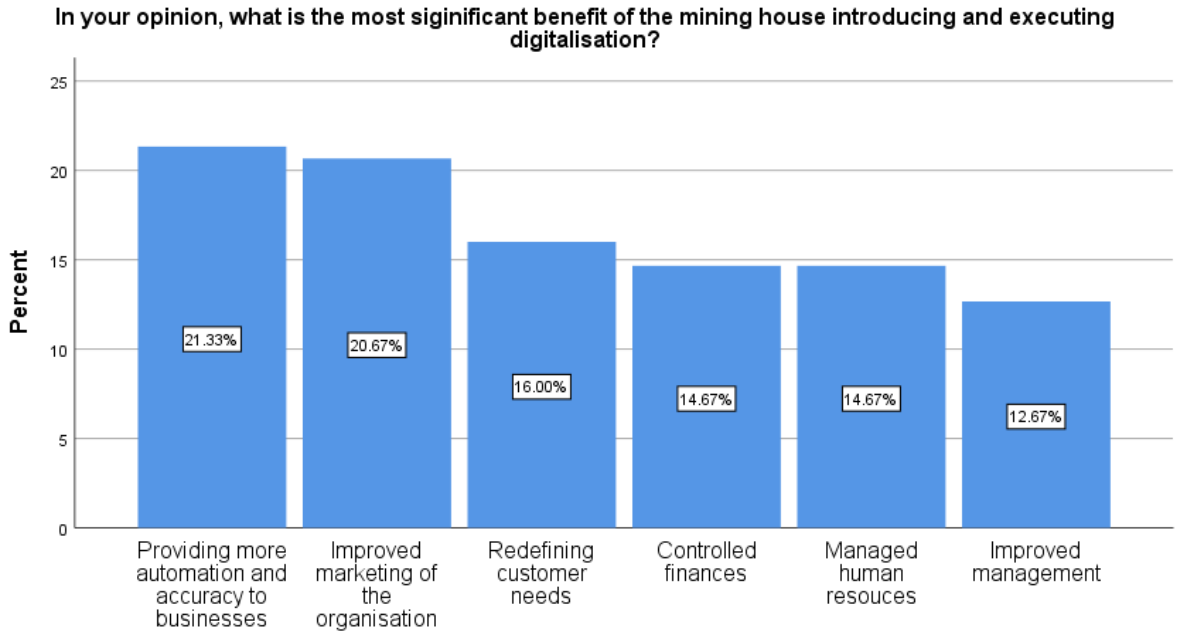
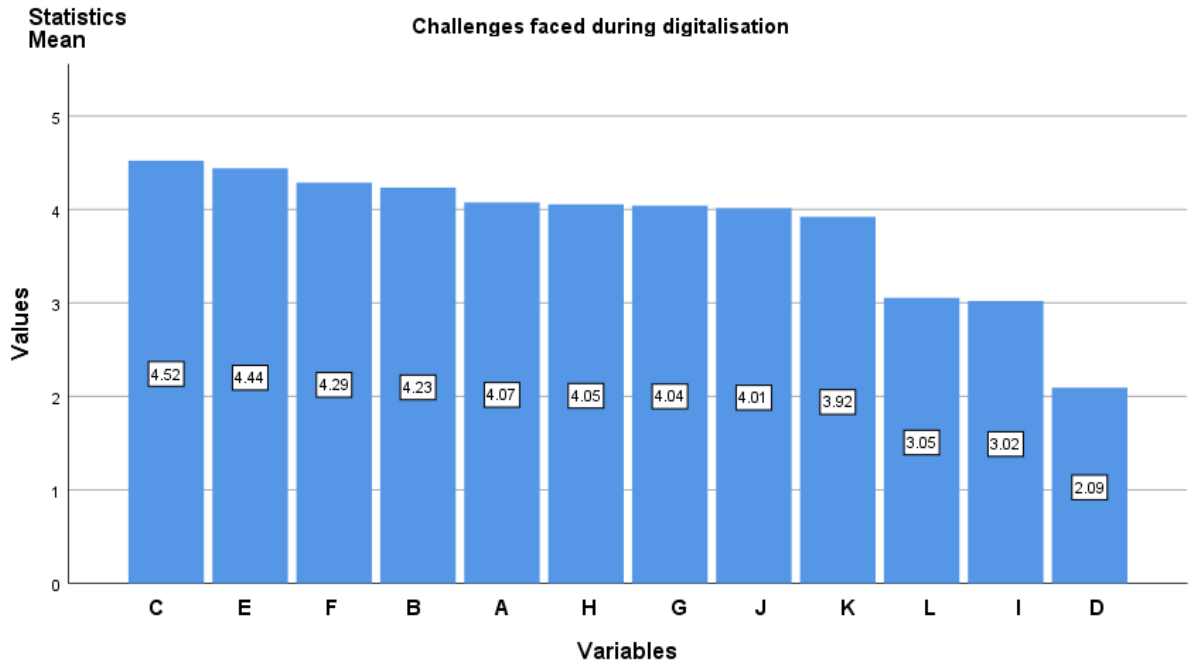


Figure 12: Most significant benefit brought by digitalisation

The two most significant benefits brought by digitalisation as reported by most of the participants were providing more automaton ad accuracy to businesses and improved marketing of the organisation. These accounted for 21.33% and 20.67% of the participants respectively as shown in Figure 12 above. The rest of the participants indicated that redefining customer needs, controlled finances, managing human resources and improving management were the most significant benefits brought by digitalisation and these account for 16.00%, 14.67%, 14.67% and 12.67% respectively. But it should be noted that the most significant benefit of digitalisation may differ from department to department depending on the items impacted by the digitalisation process. It should be noted that the digitalisation of the organisation has led to the improvement of safety, productivity and asset management. This could explain why there is no clearly outstanding benefit as these three aspects can arguably be used to realise all the benefits shown in Figure 12 above.

4.3.9 Challenges faced during digitalisation



KEY:

A Process digitisation is one of the challenges exist when undergoing digitalisation.
B Risk-averse organisational culture is one of the challenges exist when undergoing digitalisation.
C Employee pushback is one of the challenges exist when undergoing digitalisation.
D Insufficient budget for technological change is one of the challenges exist when undergoing digitalisation.
E Looming digital skill/talent gap is one of the challenges exist when undergoing digitalisation.
F Shortage of technological resources is one of the challenges exist when undergoing digitalisation.
G Increased security risks is one of the challenges exist when undergoing digitalisation.
H Business model evolution/Structural changes to the organisation's business model is one of the challenges exist when undergoing digitalisation.
I The large amount of digital data generated is one of the challenges exist when undergoing digitalisation.
J Lack of developing a relevant digitalisation strategy is one of the challenges exist when undergoing digitalisation.
K Lack of understanding its impact on the business (that can be leveraged) is one of the challenges exist when undergoing digitalisation.
L Change management: organisations facing resistance to adapt new technologies in different departments is one of the challenges exist when undergoing digitalisation.

Figure 13: Challenges faced during digitalisation

Challenges such as employee pushback (C), digital skill/talent gap (E), shortage of technological sources (F), risk-averse organisational culture (B), process digitalisation (A), business model evolution or structural changes (H), increased security risks (G) and lack of development of a relevant digitalisation strategy (J) received an average score above 4 on a scale of 1 to 5 with 1 being ‘strongly disagree’ and 5 being ‘strongly agree’. In view of this, the results suggest that these eight challenges were experienced by the majority of the participants. However, challenges such as lack of understanding of the impact of digitalisation (K), change management to managed

resistance in the adoption of new technologies (L) and management of big data generated from digitalisation (I) were relatively experienced by most of the participants but not to the extent of the previous eight. On the other hand, insufficient budget for technological change (D) was not regarded as a challenge that negatively affected the digitalisation process within the organisation as the majority of the participants were in disagreement with this being a challenge for the organisation.

4.3.10 Most significant source of value creation brought by digitalisation

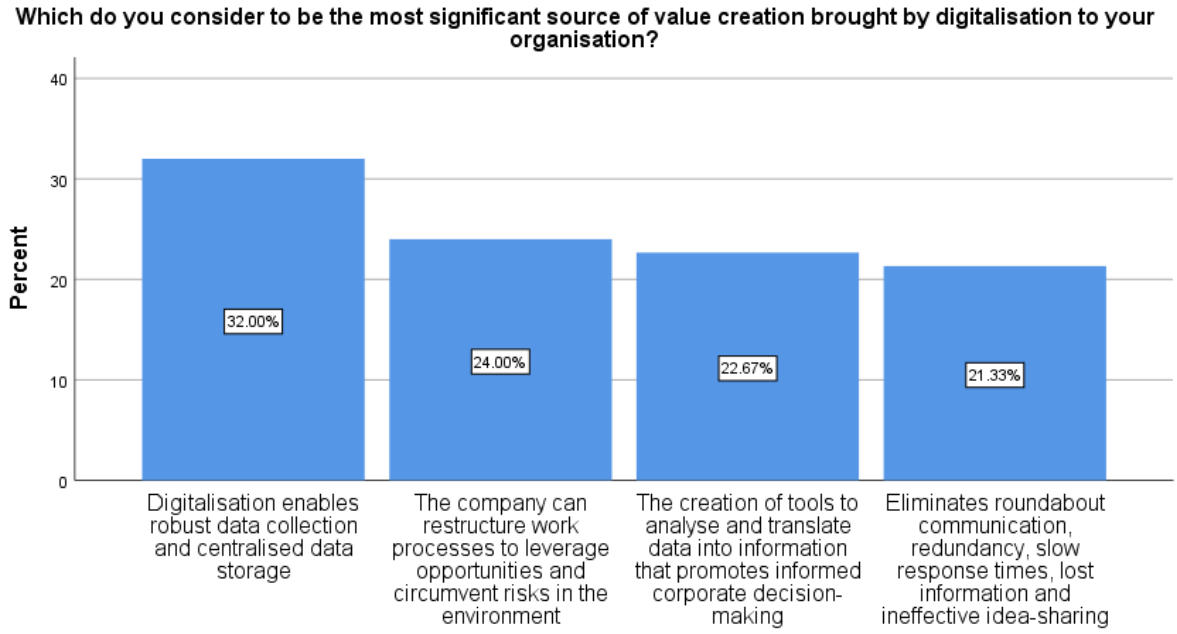


Figure 14: Most significant source of value creation brought by digitalisation

The study results suggest mixed feelings with regard to the most significant source of value creation brought by digitalisation as all the sources are relatively represented as shown in Figure 14 above. However, most of the participants noted that digitalisation enables robust data collection and centralised data storage and these accounted for 32.00% of the participants. This was closely followed by those participants who observed that value creation from digitalisation could also be realised through restructuring work processes to leverage opportunities and circumvent risks in the environment, creation of tools to analyse and translate data into information that promotes informed corporate decision-making and elimination of roundabout communication, redundancy, slow response times, lost information and ineffective idea-sharing. These accounted for 24.00%, 22.67% and 21.33% of the participants respectively as shown in Figure 14 above. Besides it should be noted that increased efficiency, enhance safety, improved decision making and cost savings are some of the sources of value creation that have been outlined by the organisation. As such, it is understandable that the participants cited each of the four sources of value creation

shown in Figure 14 with relatively equal weighting since all these are products of increased efficiency, enhanced safety, as well as improved decision-making and cost savings. In view of this, the participants could have mentioned the most significant source of value creation brought by digitalisation from the perspective of their department and job environment leading to different sources of value creation being cited.

4.3.11 Benefits of undergoing digitalisation

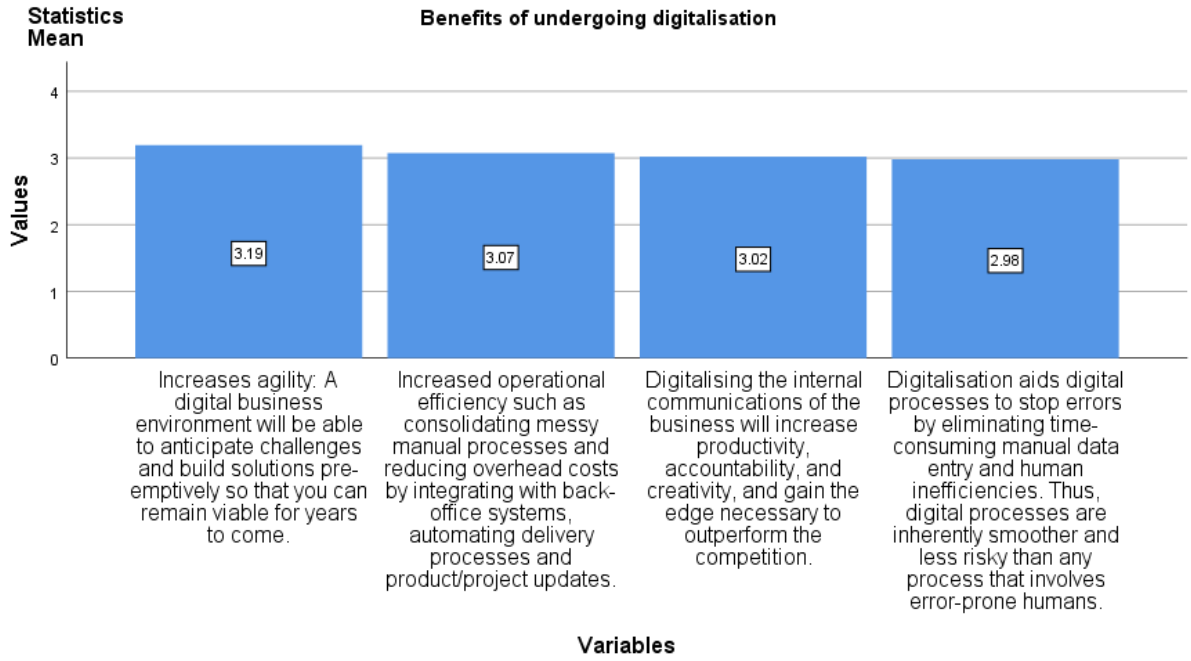


Figure 15: Benefits of undergoing digitalisation

Participants were asked to express their opinions on the benefits of undergoing digitalisation within the organisation with a specific focus on agility, operational efficiency, productivity and elimination of time-consuming manual tasks. In light of this, the result indicates a mean score of 3.19 on digitalisation increasing agility, 3.07 on digitalisation increasing operational efficiency, 3.02 on digitalisation increasing productivity and 2.98 on digitalisation eliminating time-consuming tasks. The results suggest that there were mixed opinions as to the benefits of undergoing digitalisation as the mean scores are roughly close to the value of 3 which corresponds to a neutral viewpoint. This suggests that there is a mixture of both positive and negative effects of undergoing digitalisation. Furthermore, it should be pointed out that the benefits seem to slightly overwhelm the disadvantages as the majority of the results are above the mean score of 3. Nonetheless, the researcher argues that the benefits would increase as more and more employees within the organisation become more competent in their use of digital technologies, which may lead to further improvement in performance and productivity. However, given that the implementation of digitalisation is still relatively new within the organisation, employee adoption of the new business model and many processes are still being synchronised with each other.

4.4 Outcomes from digitalisation

4.4.1 Proactivity in digitalisation

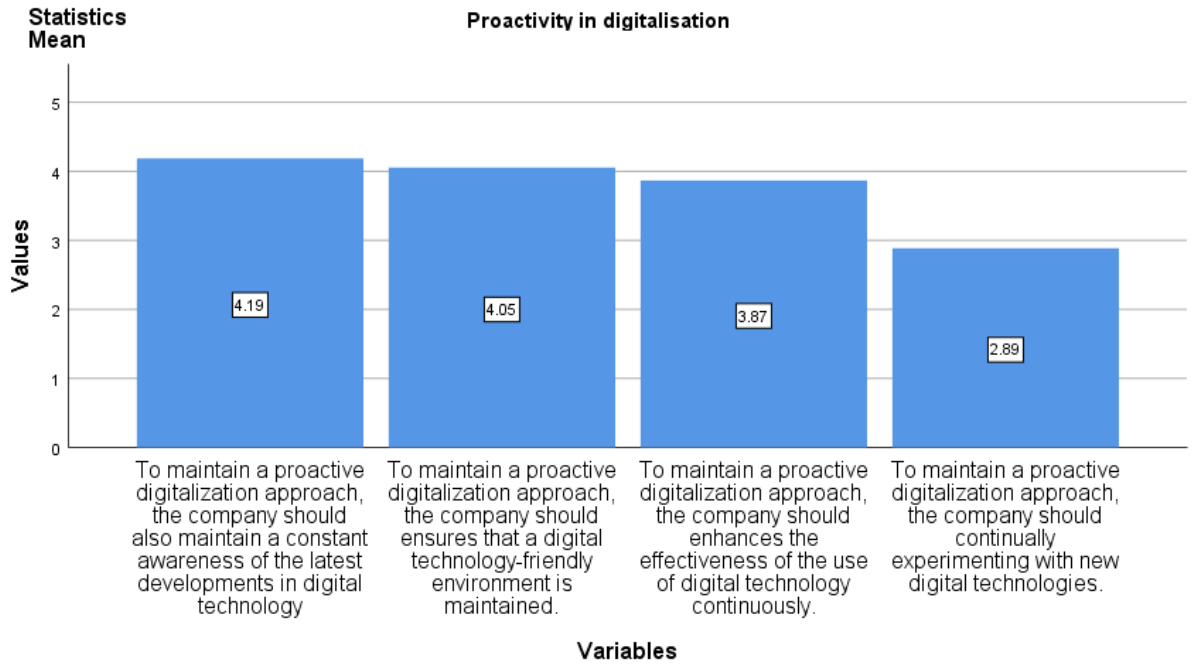


Figure 16: Proactivity in digitalisation

The participants agreed that the organisation should maintain a constant awareness of the latest developments in digital technology, should ensure that a digital technology-friendly environment is maintained and should enhance the effectiveness of the use of digital technology on a continual basis in order for the organisation to remain proactive in the digitalisation process. These are supported by the mean scores of 4.19, 4.05 and 3.87 respectively as shown in Figure 16 above. However, the participants were in disagreement that the organisation should continually experiment with new digital technologies in order to remain proactive in the digitalisation process as reflected by a mean score of 2.89. This could be because continuous experimenting with new digital technologies could potentially disrupt the stability of organisational processes as opposed to adopting tried and tested technologies once they have matured.

4.4.2 Outcomes of digitalisation within the organisation

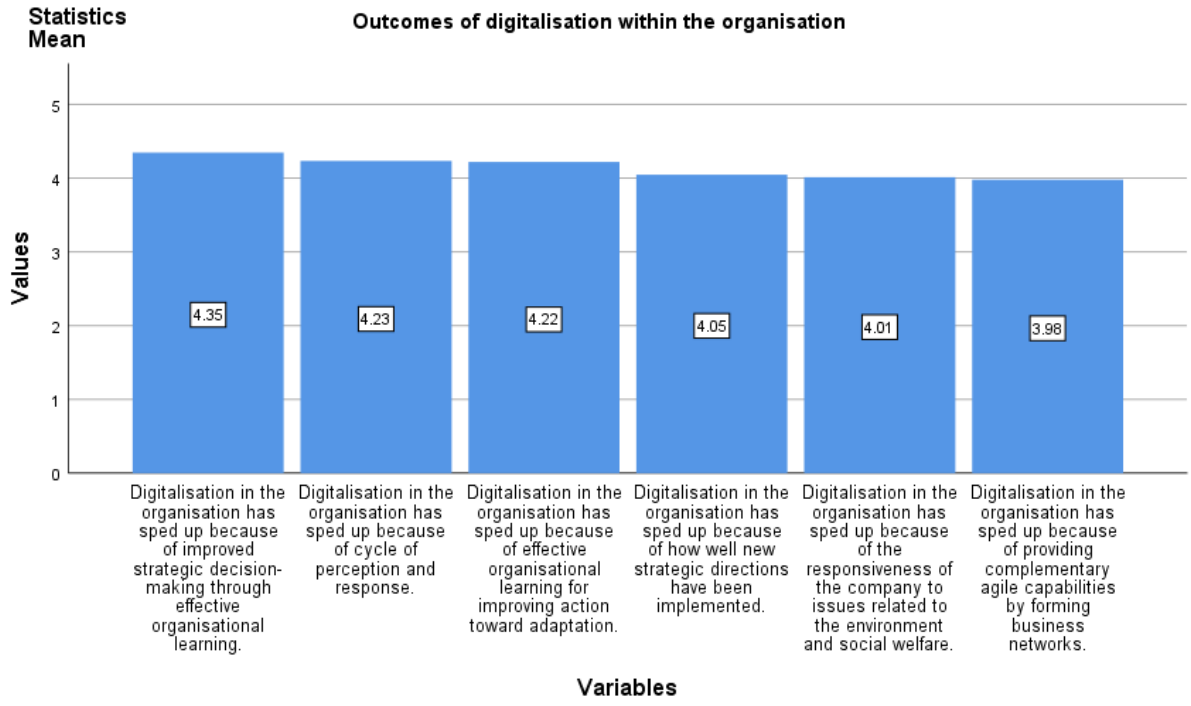


Figure 17: Outcomes of digitalisation within the organisation

The participants generally agreed that digitalisation has sped up because of: i) improved strategic decision-making through effective organisational learning, ii) the cycle of perception and response, iii) effective organisational learning for improving action toward adaptation, iv) how well new strategic directions have been implemented, iv) the responsiveness of the company to issues related to the environment and social welfare and v) providing complementary agile capabilities by forming business networks. This is supported by the mean scores of 4.35, 4.23, 4.22, 4.05, 4.01 and 3.98 respectively.

4.4.3 Organisational capacity development

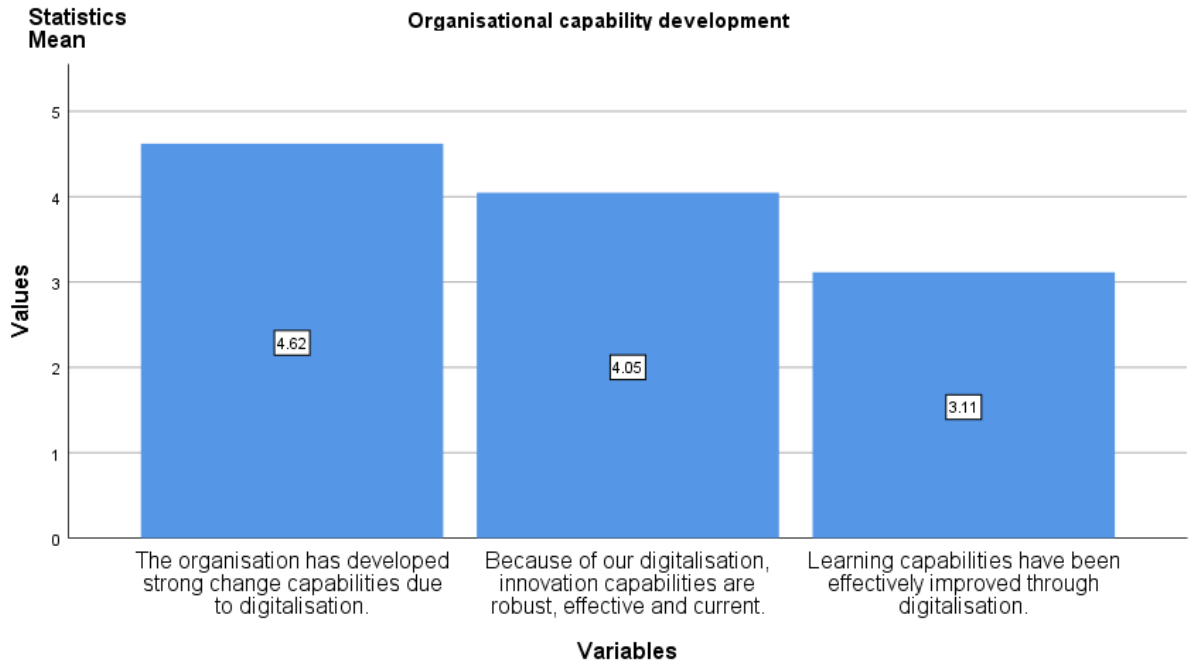


Figure 18: Organisational capacity development

The participants generally agreed that the organisation has developed a strong change in its capabilities due to digitalisation. Moreover, digitalisation has caused its innovative capabilities to be robust, effective and current. This is supported by the mean scores of 4.62 and 4.05 respectively as shown in Figure 18 above. However, there was a somewhat neutral viewpoint on whether digitalisation has effectively improved the organisation's learning capabilities which was reflected in the mean score of 3.11 as shown in Figure 18 above. Furthermore, it should be noted that this is consistent with the sustainable mining plan that has been developed by the organisation to foster innovation and deliver step-change results across the entire mining value chain. This helps in the development of strong change capability in the organisation. Yet still, it should be noted that the organisation has purchased software systems and has the propensity to invest more and deepen its relationship with digital and information technology service providers such as Hetzner, Akamai and Amazon Web Services to enhance competitiveness and fend off threats from disruptive forces whilst complying with internal mandates to improve enterprise efficiency. These reasons could explain why the development of strong change capabilities and improvement innovation capabilities received higher mean scores from the participants.

4.4.4 Impact of digitalisation management capabilities

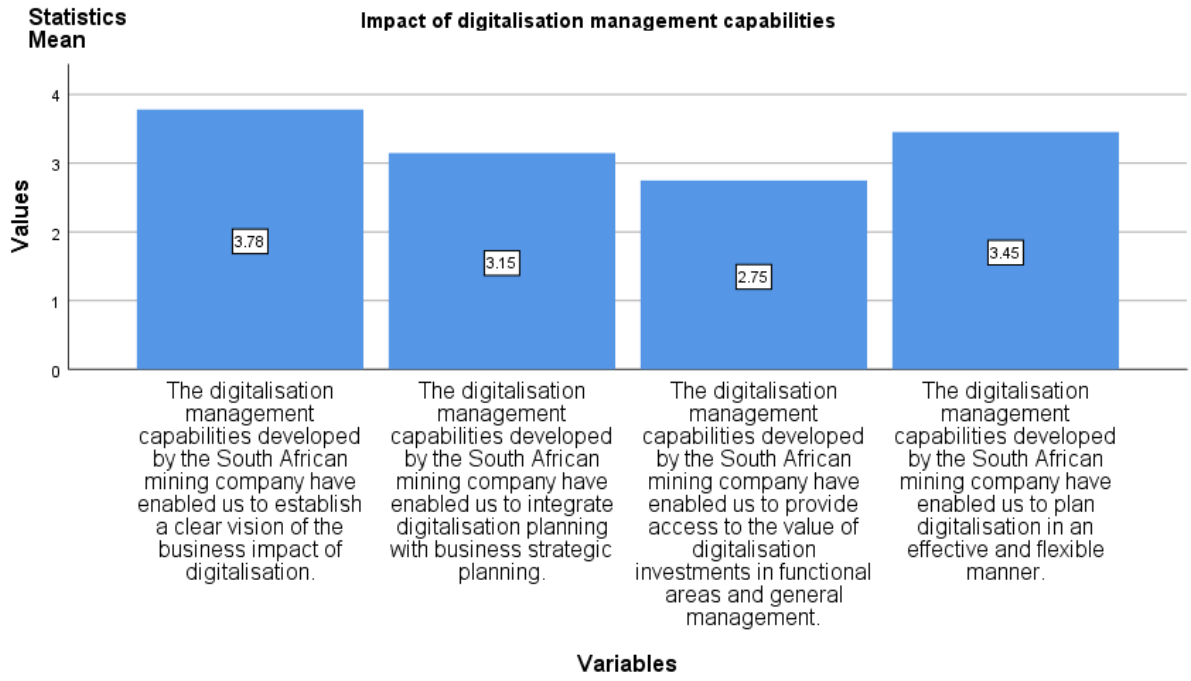


Figure 19: Impact of digitalisation management capabilities

The participants somewhat agreed that the digitalisation management capabilities enabled the organisation to establish a clear vision of the business. It has also enabled the organisation to plan digitalisation in an effective and flexible manner, in addition to enabling it to integrate digitalisation planning with business strategic planning. This is reflected in the mean score of 3.78, 3.45 and 3.15 respectively as shown in Figure 19 above. However, the participants did not agree that digitalisation management capabilities have enabled the organisation to provide access to the value of digitalisation investments in functional areas and general management. This is reflected in the mean score of 2.75 as shown in Figure 19 above and this low mean score could be because the synchronisation of processes has not yet reached a level where this could be realised.

4.4.5 Impact of digitalisation on organisational strategy

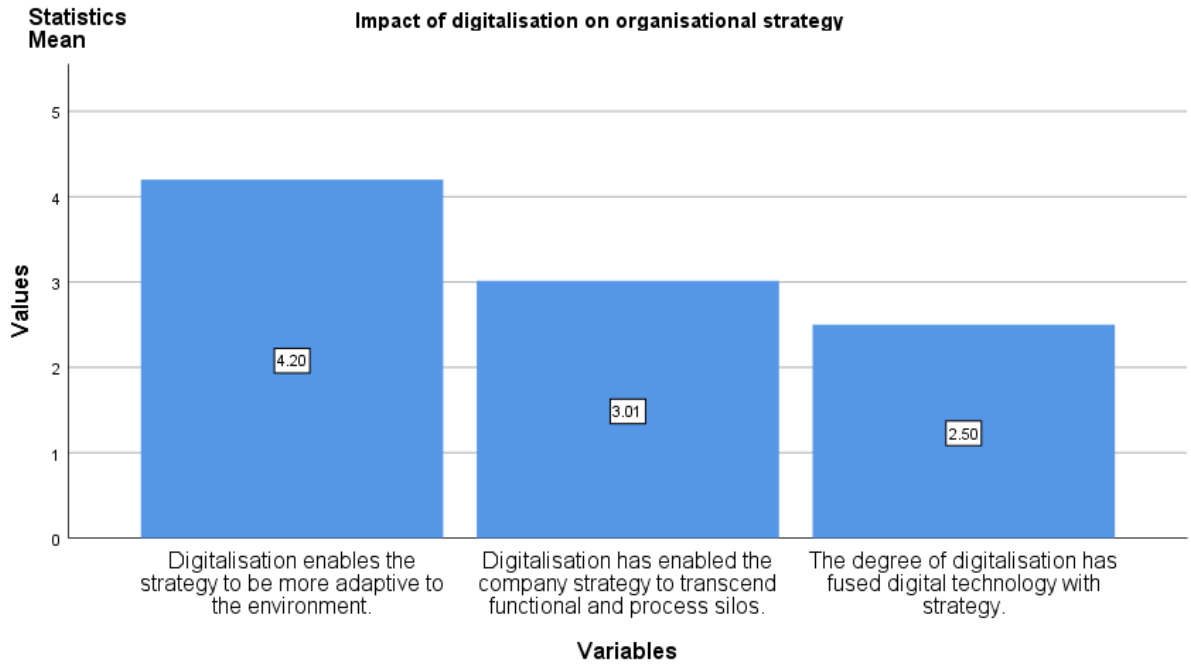


Figure 20: Impact of digitalisation on organisational strategy

The participants agreed that digitalisation enables the organisational strategy to be more adaptive to the environment and this was reflected in the mean score of 4.20 as shown in Figure 20 above. However, the participants had somewhat a neutral viewpoint on whether digitalisation has enabled the company strategy to transcend functional and process silos. This was reflected in the mean score of 3.02 which is shown in Figure 20 above. Also, the participants indicated that they did not agree that the degree of digitalisation has fused digital technology with strategy and this was reflected in a mean score of 2.50 as shown in Figure 20 above. The findings imply that digitalization had a notable influence on enhancing the adaptability of the strategy to the environment. However, it did not appear to have a significant impact on enabling the organisational strategy to transcend functional and process barriers as well as fusing digital technology with strategy.

4.4.6 Impact of digitalisation on strategic agility

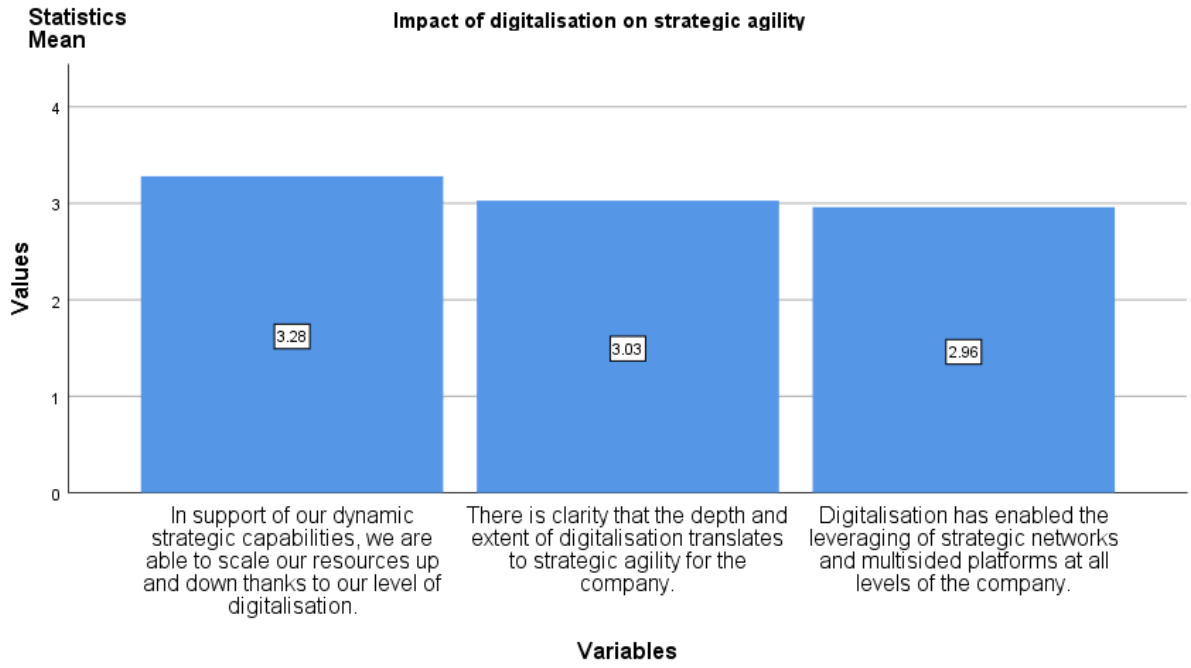


Figure 21: Impact of digitalisation on strategic agility

The participants somewhat agreed that in support of their dynamic strategic capabilities, they are able to scale their organisational resources up and down in as a result of digitalisation and this is supported by a mean score of 3.28 as shown in Figure 21 above. Nevertheless, the participants expressed a somewhat impartial perspective regarding their understanding of the extent and profound impact of digitalisation in terms of strategic agility for the organisation. They also acknowledged that digitalisation has facilitated the utilization of strategic networks and multi-sided platforms throughout all levels of the company. This is reflected in the mean scores of 3.03 and 2.97 respectively as shown in Figure 21 above.

4.4.7 Impact of digitalisation on productivity

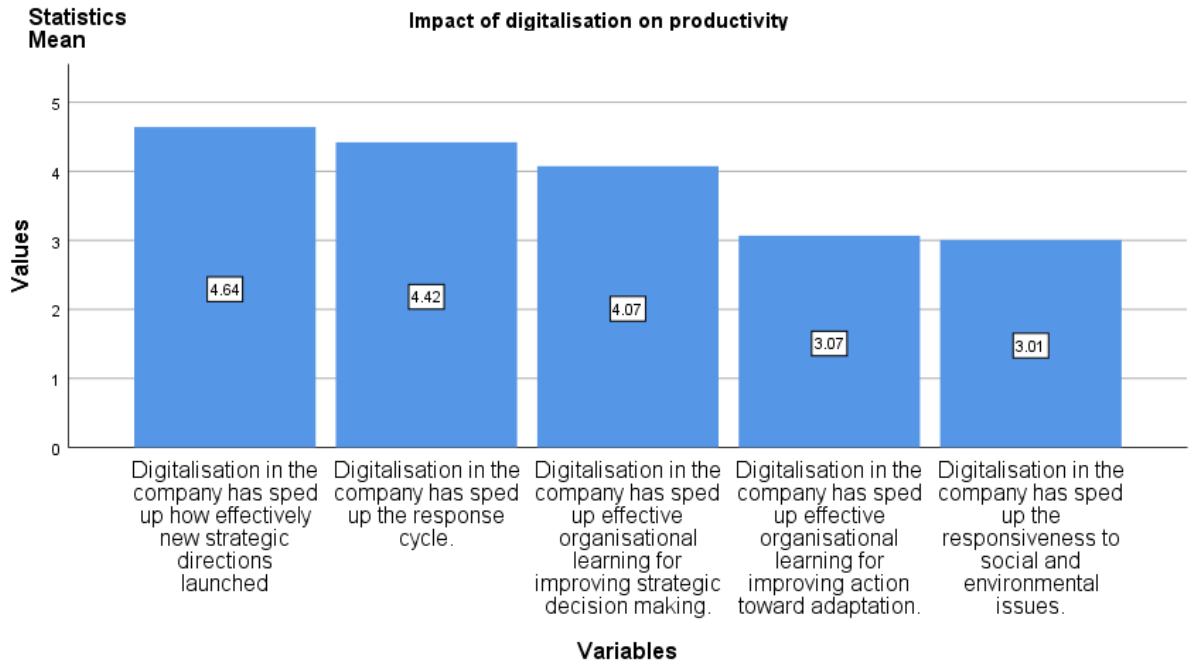


Figure 22: Impact of digitalisation on productivity

The participants reached a consensus that digitalisation has accelerated the effectiveness of launching new strategic directions, shortened response cycles, and enhanced organisational learning, thereby improving strategic decision-making processes. This is reflected in the mean score of 4.64, 4.42 and 4.07 respectively. However, the participants had a somewhat neutral viewpoint on digitalisation speeding up organisational learning for improving action toward adaptation and speeding up the responsiveness to social and environmental issues. This is reflected in the mean score of 3.07 and 3.01 respectively as shown in Figure 22 above. The neutral viewpoint on these two items may suggest that the digitalisation of the organisation has not yet made meaningful strides in the areas of organisational learning and responsiveness to social and environmental issues. Nevertheless, the results suggest that digitalisation has an overall positive impact on the productivity of the organisation and it is likely to improve in the future even more than what is currently being experienced as digitalisation has become more synchronised and entrenched in various organisational processes.

4.4.8 Impact of digitalisation of change management capabilities

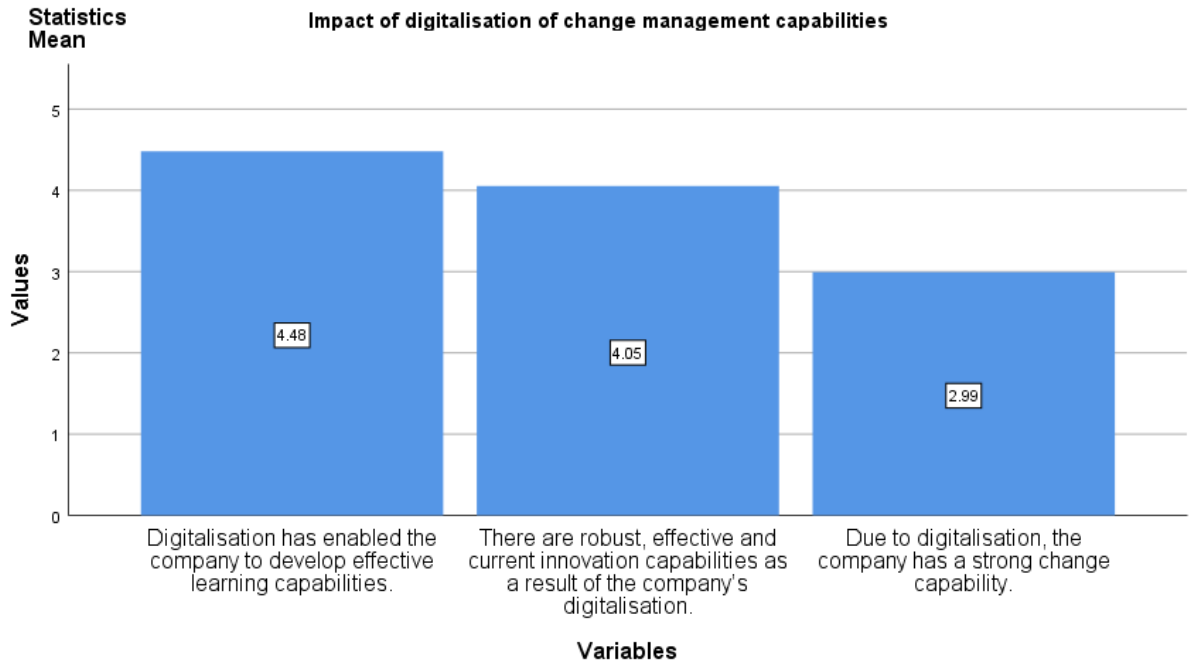


Figure 23: Impact of digitalisation of change management capabilities

The participants concurred that digitalisation has empowered the organisation to cultivate proficient learning abilities and establish strong and effective innovative capabilities. This is supported by mean scores of 4.48 and 4.05 respectively as shown in Figure 23 above. On the other hand, the participants had a somewhat neutral viewpoint on the impact of digitalisation on the organisation having a strong change capacity. This was reflected in the mean score of 2.99 as shown in Figure 23 above. The results suggest digitalisation has positively impacted the change management capabilities within the organisation, although there is still room for improvement.

4.4.9 Impact of digitalisation on competitive advantage

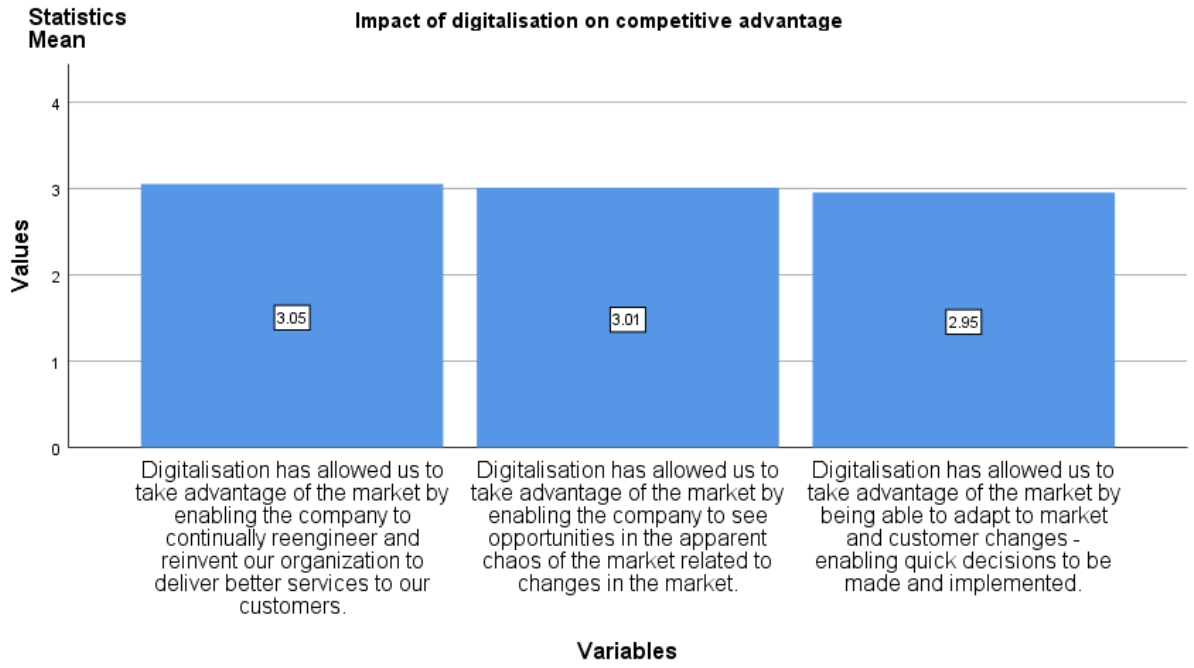


Figure 24: Impact of digitalisation on competitive advantage

The participants indicated somewhat a neutral viewpoint on the impact of digitalisation on their ability to take advantage of the market by enabling the organisation to continually reengineer and reinvent itself to deliver better services, to see opportunities in the apparent chaos of the market related to changes in the market and to adapt to market and customer changes that enables quick decisions to be made and implemented. This is reflected in the mean score of 3.05, 3.01 and 2.95 respectively as shown in Figure 24 above. The results suggest that digitalisation is yet to make a significant impact on the competitive advantage of the organisation and there is still room for improvement in this regard.

4.5 Regression analysis

The regression analysis was done to take the relationship between the independent variables (digitalisation strategy, leadership and corporate culture, strategic agility and technology investment) and the dependent variable (organisational performance). Nevertheless, the descriptive statistics of each of the variables shall be discussed first in the following subsections below before going into the regression analysis model.

4.5.1 Digitalisation strategy

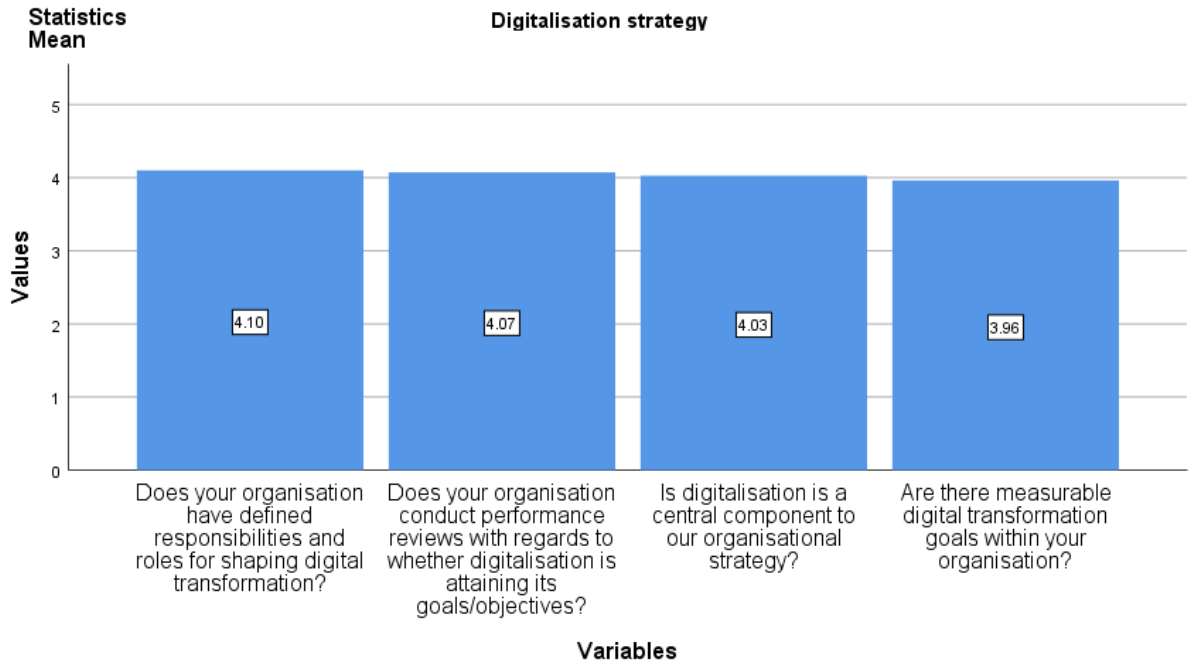


Figure 25: Digitalisation strategy

Figure 25 above shows that the participants were in agreement about the existence of a digitalisation strategy within the organisation. The four metrics used to measure the digitalisation strategy were:

i) The organization possesses clearly defined responsibilities and roles in shaping the process of digital transformation.,

ii) the organisation conducing performance reviews with regards to whether digitalisation is attaining its goals/objectives,

iii) the organisation having digitalisation as a central component of its organisational strategy and

iv) having measurable digital transformation goals.

This was reflected in the mean scores of 4.10, 4.07, 4.03 and 3.96 respectively as shown in Figure 25 above. Furthermore, the four results were combined to form the digitalisation strategy variable and it had a Cronbach's alpha value of 0.838 which suggests internal consistency as shown in Table 1 below.

Table 1: Cronbach's alpha for digitalisation strategy

Reliability Statistics	
Cronbach's Alpha	N of Items
.838	4

4.5.2 Leadership and corporate culture

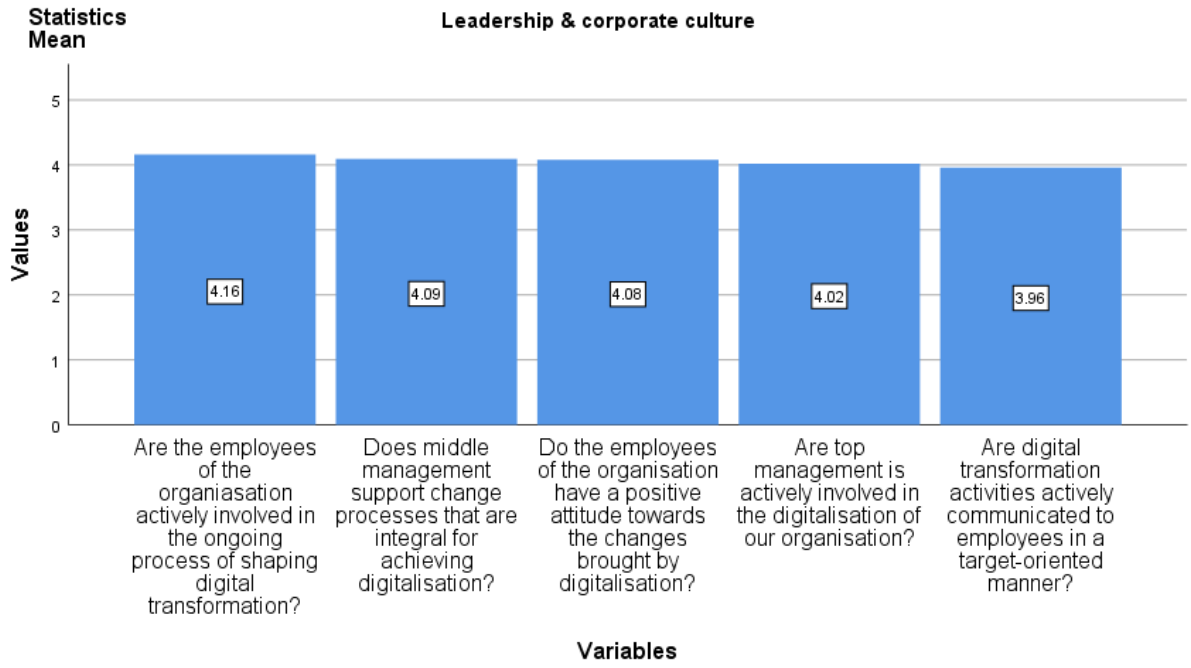


Figure 26: Leadership and corporate culture

The participants agreed that leadership and corporate culture were supportive of the digitalisation initiative within the organisation. The leadership and corporate culture variable was measured with five metrics which are:

i) The active participation of employees in the continuous process of shaping digital transformation,

ii) support of middle management for change processes that are integral for achieving digitalisation,

iii) employees demonstrating a favourable attitude towards the changes brought about by digitalization,

iv) top management being actively involved in the digitalisation process and,

v) the ability of digital transformation actively communicating to employees in a target-oriented manner.

This was reflected in mean scores of 4.16, 4.09, 4.08, 4.02 and 3.96 respectively as shown in Figure 26 above. Moreover, these results were combined to form the leadership & corporate culture variable which had a Cronbach's alpha value of 0.725 as shown in Table 2 below. This alpha value suggests internal consistency in the leadership and corporate culture variable.

Table 2: Cronbach's alpha for leadership and corporate culture

Reliability Statistics	
Cronbach's Alpha	N of Items
.725	5

4.5.3 Strategic agility

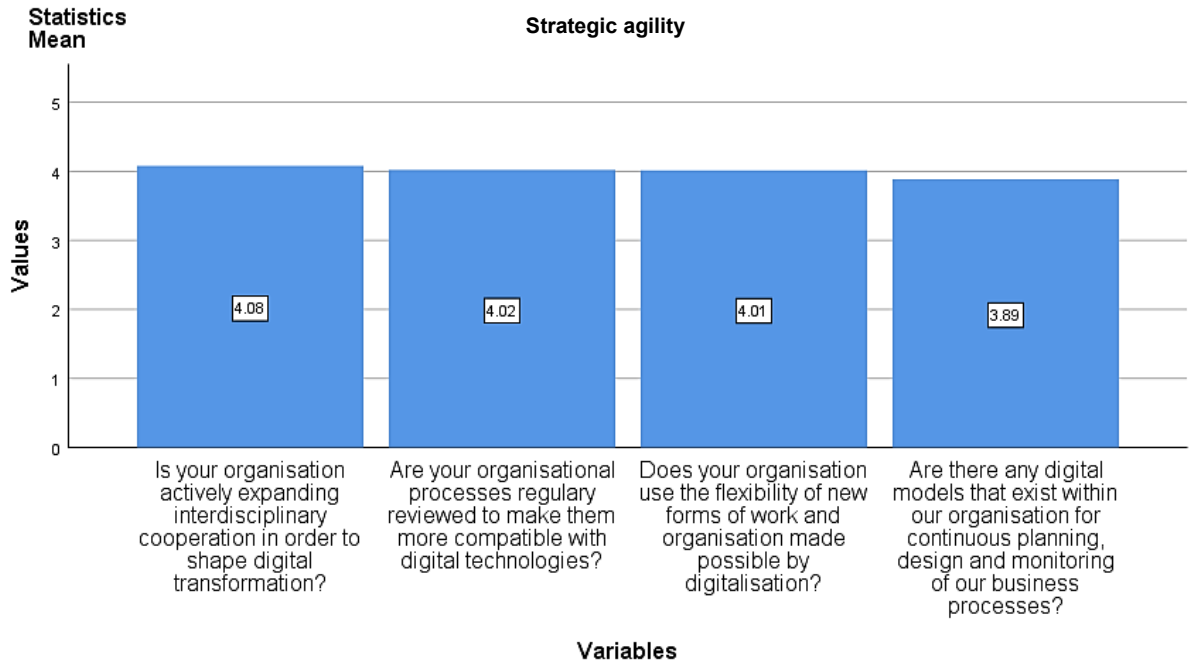


Figure 27: Strategy agility

The participants agreed that the organisation was engaging in activities that demonstrate initiatives towards strategic agility by leveraging digital technologies. In view of this, strategic agility was measured using four metrics which are:

i) expansion of interdisciplinary cooperation in order to shape digital transformation,

ii) regular review of organisational processes to make them more compatible with digital technologies,

iii) the utilisation of the adaptability offered by digitalisation to incorporate new forms of work and organisational structures.

iv) the existence of digital modes for continuous planning, design and monitoring of business processes.

These reflected mean scores of 4.08, 4.02, 4.01 and 3.89 as shown in Figure 27 above. Moreover, these four metrics were combined to create the strategic agility variable and it had a Cronbach's alpha value of 0.722 which suggests internal consistency of the variable as shown in Table 3.

Table 3: Cronbach's alpha for strategic agility

Reliability Statistics	
Cronbach's Alpha	N of Items
.722	4

4.5.4 Technology investment

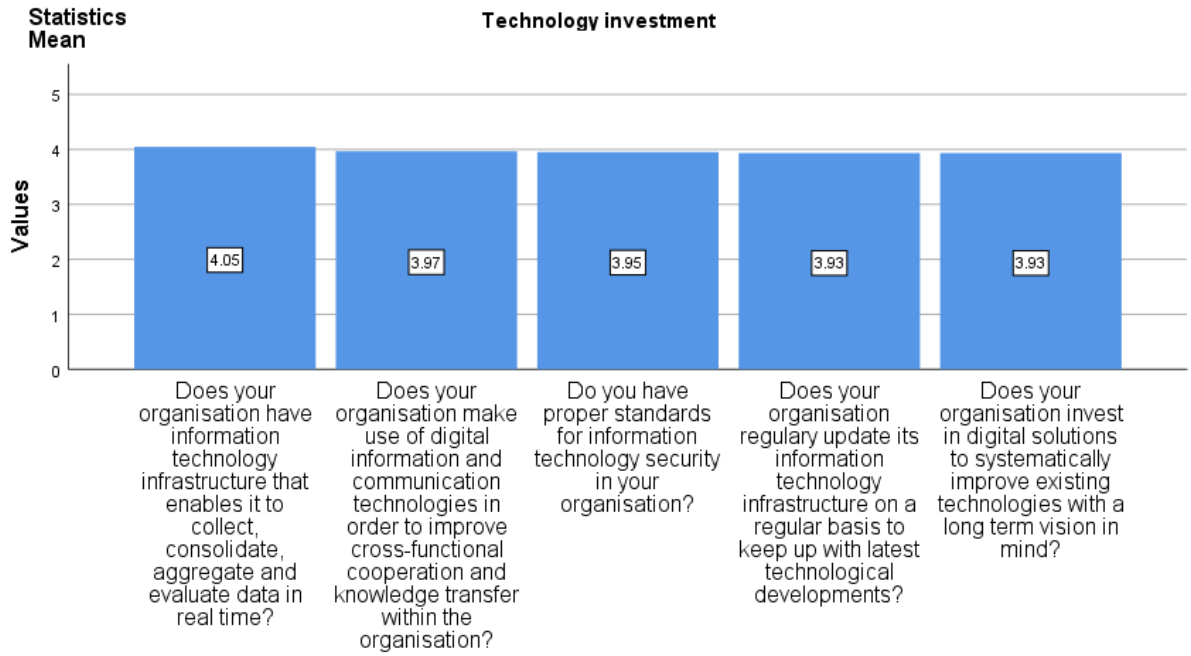


Figure 28: Technology investment

The participants agreed that technology investment is being done actively within the organisation. This technology investment variable was measured using five metrics which are:

i) existence of information technology infrastructure that enables the organisation to collect, combine, aggregate and assess data in real time,

ii) The application of digital information and communication technologies to enhance collaboration across functions and facilitate knowledge sharing within the organisation,

iii) the existence of proper standards for information technology security in the organisation,

iv) the organisation updating its information technology infrastructure on a regular basis to keep up with the latest technological developments and,

v) the organisation investing in digital solutions to systematically improve existing technologies with a long-term vision in mind. This was reflected in mean scores of 4.05, 3.97, 3.95, 3.93 and 3.93 respectively as shown in Figure 28 above.

These five metrics were combined to form the technology investment variables and it had a Cronbach's alpha value of 0.720 which suggests that it achieved internal consistency as shown in Table 4 below.

Table 4: Cronbach's alpha for technology investment

Reliability Statistics	
Cronbach's Alpha	N of Items
.720	5

4.5.5 Organisational performance

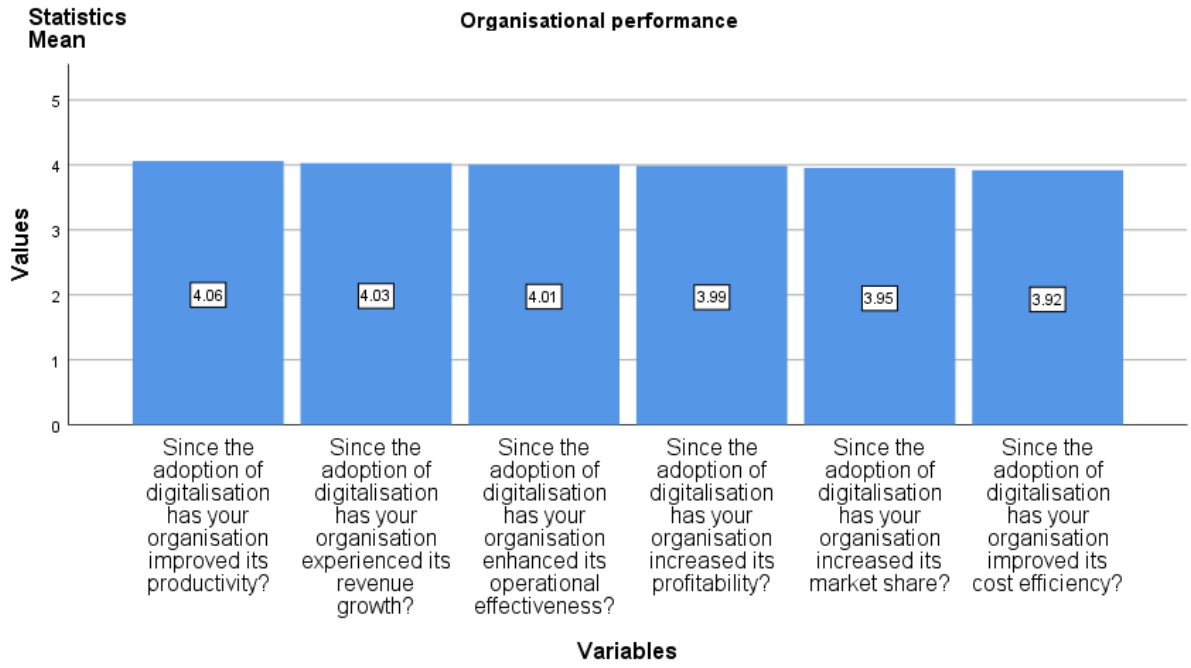


Figure 29: Organisational performance

The participants agreed that organisational performance has improved since the adoption of digitalisation. The organisational performance variable was measured using six metrics which are: i) productivity, ii) revenue growth, iii) operational effectiveness, iv) profitability, v) market share and vi) cost efficiency. This was reflected in the mean scores of 4.06, 4.03, 4.01, 3.99, 3.95 and 3.92 respectively as shown in Figure 29 above. These six metrics were combined to create the organisational performance variable and it had a Cronbach's alpha value of 0.738 which suggests that the variable attained internal consistency as shown in Table 5 below.

Table 5: Cronbach's alpha for organisational performance

Reliability Statistics	
Cronbach's Alpha	N of Items
.738	6

4.5.6 Regression outcomes

Table 6: Regression model summary

Model Summary[b]										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.640[a]	.410	.394	.42424	.410	25.204	4	145	.000	1.852

a. Predictors: (Constant), Technology investment, Digitalisation strategy, Strategic agility, Leadership & corporate culture
b. Dependent Variable: Organisational performance

The regression model summary above in Table 6 illustrates that technology investment, digitalisation strategy, strategic agility as well as leadership and corporate culture-independent variables have a significant relationship with organisational performance. The dependent variable as indicated by a p-value of less than 0.01. Furthermore, the results also indicate that the independent variables were responsible for 39.4% of the variance experienced in the independent variable as per the adjusted R square shown in Table 6 above. Also, the Durbin-Watson value is 1.852 which is below 2 suggesting that there is positive autocorrelation between the dependent and independent variables.

Table 7: ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.144	4	4.536	25.204	.000[b]
	Residual	26.096	145	.180		
	Total	44.241	149			

a. Dependent Variable: Organisational performance
b. Predictors: (Constant), Technology investment, Digitalisation strategy, Strategic agility, Leadership & corporate culture

Moreover, the regression analysis equation for the dependent and independent variables can be derived from Table 7 above. As such, the regression analysis model is $F(4,145) = 25.204$, $p<0.001$ which indicates that there is a significant linear relationship between dependent and independent variables. Furthermore, the regression coefficients presented in Table 8 indicate that an increase in each independent variable corresponds to an increase in the dependent variable. In light of this, a unit increase in the digitalisation strategy variable results in an increase of 0.498 in organisational performance, a unit increase in the leadership and corporate culture

variable results in an increase of 0.111 in organisational performance, a unit increase in strategic agility variable results in an increase of 0.119 in organisational performance and a unit increase in technology investment variable results in an increase of 0.036 in organisational performance. This suggests that, in optimising the organisational performance outcomes it may be necessary to prioritise independent variables according to their effect on the organisational performance. Given that the digitalisation strategy variable has a higher influence on organisational performance it should be prioritised ahead of the other independent variables. Additionally, it should be followed by strategic agility, leadership and corporate culture and then, lastly, technology investment in terms of prioritisation ranking.

Table 8: Regression coefficients

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% confidence interval of B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.909	.492		1.848	.067	-.063	1.881
	Digitalisation strategy	.498	.051	.620	9.679	.000	.396	.599
	Leadership & corporate culture	.111	.065	.110	1.707	.090	-.018	.240
	Strategic agility	.119	.058	.131	2.057	0.41	.005	.233
	Technology investment	.036	.062	.037	.586	.559	-.086	.159

a. Dependent Variable: Organisational performance

4.6 Conclusion

This chapter highlighted the results of the respondents' online questionnaire survey and presented the in-depth quantitative interactions that emanated from the process. Further analysis of the results with reference to the literature review is discussed in Chapter 5.

Thorough data analysis and presentation of results generated from the collected data were discussed. The chapter will be concluded with a chapter summary which highlights the important and key findings from the study.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

The key findings of the research on the relationship between digitalisation and strategic agility are summarised in this section. This is followed by a brief discussion of the research findings' implications for both the academic and corporate worlds. Based on the study findings, the section concludes by proposing recommendations for further research and for the South African mining company.

5.1. Principal findings

The study aimed to examine the relationship between digitalisation and strategic agility, with the objective of evaluating the influence of digitalisation on strategic agility. Furthermore, the contribution of how digitalisation improves organizational performance had yet to be investigated.

Management-level personnel within a South African mining company were the target participants, as they frequently engage in matters concerning the formulation, implementation, and adjustment of strategies in response to the business environment. The perspectives of these participants on the implications of digitalisation on the strategic performance of the study were sought.

The primary finding uncovered by the study indicated that, based on a categorical analysis of the data, organisational departments with limited digitalisation displayed noticeably lower levels of strategic agility compared to those with extensive digitalisation. This aligns with research on related studies looking at digitalisation and strategic agility (Park et al., 2017; Chen et al., 2014; Tallon & Pinsonneault, 2011). Some business units placed in the medium digitalisation category illustrated dual characteristics, characterised as having a high level of strategic agility, while others were characterised as having a low level of digitalisation.

The second principal finding was that there was a nuanced awareness of the relationship between the breadth of digitalisation and strategic agility within the South African mining industry. Depending on the degree of digitalisation they themselves

had obtained, the mining company's personnel showed similar degrees of understanding of the link between digitalization and strategic agility.

The third notable finding of the research was that the constructs as per a 2017 McKinsey survey, indicate that a mere 8% of participants indicated that their existing business model would remain financially sustainable in the face of ongoing digitalisation at the current rate. This implies that a significant 92% of businesses acknowledge the crucial importance of adaptability and flexibility in navigating rapid digitalisation. With evolving products, declining traditional revenue sources, and shifting customer expectations, the business landscape has undergone significant changes in recent years.

5.2. Recommendations for further research

Despite the fact that this study has advanced the conversation on how digitalisation and strategic agility relate to one another, this study acknowledges the existence of a knowledge gap due to the intricate nature of the business environment, emphasizing the need for additional research in this area. As a result of this research, the following potential areas of interest are suggested:

- The study's results established a solid foundation for the claim that there was a substantial interaction between the constructs under investigation. A potential area of study would be to look at how digitalisation affects value capture and creation, which improves the strategic agility of organisations. The value that this aspect brings to the strategic direction of businesses in the digital economy has not yet been thoroughly investigated, despite the fact that it is generally recognised and has received substantial resource-based research (Bharadwaj et al., 100 2013).

- The goal of digitalisation is constant optimization- an organisation that can recognise changes in the market and responds swiftly. Transformation of such nature seldom occurs organically and is not an accident. Instead, digitalisation

is a journey and a process that requires a map, in this case, a distinct roadmap that is guided by a strategy. Specifically, a digital strategy.

The fact that an organisation's IT department has a plan and a comprehensive set of actions to support it may lead some businesses to assume they have a digital strategy. The fact that an organisation's IT department has a plan and a comprehensive list of projects to support it may lead some companies to assume they have a digital strategy. It is likely that the company is organised around specific technology groups such as cloud, company website, digital modelling, development of products with digital components, social media strategies and mobile strategies. All of the above does not constitute a digital strategy, and they will not drive the kind of sweeping transformation demanded by the future. Through the research, it has become apparent to the author that digitalisation is neither an IT project nor a marketing initiative. It is a transformation of the entire organisation that requires a corporate strategy in order to achieve effective strategic agility. The author believes that the digitalisation journey does not belong to one individual or department and although business units may be tasked with executing on part of the strategy, the whole company should be working towards a common goal.

The researcher recommends to South African organisations invest in developing a digital strategy for the efficient impact of digitalisation on strategic agility.

- Moreover, the research analysed the executable elements of digitalisation without exploring the human component. It has been proposed that the human aspect of digitalisation has an influence on the effectiveness of how digitalisation ties in with strategic agility; see, for example, Fitzgerald et al. (2014), Long (2011), Park et al. (2017), and Panda and Rath (2016). Among these are: the ability and effectiveness of management and employees to acquire digital capabilities, the unity of management's drive towards digitalisation, legacy inertia (e.g. "the way things have always been done here"), a common vision with regard to digitalisation, innovation and change fatigue, and the power relations of organisations. The examination of each of these

human elements will provide an opportunity to understand what makes up the rest of the variance examined in this study's relationship between digitalisation and strategic agility.

- Despite the promising outcomes presented in this paper, there were certain limitations that affected the execution of the research, offering potential avenues for further exploration. The study was conducted with a small sample size exclusively in the mining industry in South Africa. To enhance the study's comprehensiveness, future research could expand by gathering data from a larger sample comprising mining organizations and sectors across diverse African or global mining regions, each characterized by varying levels of digitalization maturity.

  Furthermore, there exist external factors that could impact digital strategy, which were beyond the scope of this paper. In addition to the variables not included in this study, it would be valuable to investigate aspects such as digital culture (Weritz et al., 2020; Abhari et al., 2021) and knowledge management (Zoppelletto et al., 2020), and innovation (Abdalla and Nakagawa, 2021).

5.3. Recommendations for business

Although the specific form of digitalisation will differ depending on the industry, operational context, and strategic direction of a company, its effectiveness is maximised when accompanied by a digitally intentional corporate strategy. Thus, introducing a digital strategy within an organisation is crucial. The researcher recommends that the South African mining company should invest in the following:

- Digital Strategy: a plan that employs digitalisation initiatives to accomplish company objectives, enhance profitability, and enhance dynamic capabilities. improve operational processes and enhance its ability to adapt to changing market conditions. The digital strategy is an opportunity for organisations to look for ways to use technologies such as the Internet of Things (IoT) to transform activity and business.

- Continuous Evaluation and Improvement of organisational performance Metrics: the South African mining company should continue to refine and enhance its metrics for measuring organisational performance. Regular monitoring and analysis of key performance indicators (KPIs) aligned with strategic objectives will enable better tracking of progress and identification of areas for improvement.

- Integration of digitalisation in strategic decision-making: the South African mining company should ensure that digitalisation is integrated into its strategic decision-making processes. By leveraging digital tools and data-driven insights, the decision-making process can become more agile, informed, and responsive to market dynamics. This can lead to faster and more effective decision-making, contributing to strategic agility.

- Promotion of innovation and creativity: the South African Mining company should foster a culture of innovation and creativity within the organisation. This can be achieved by encouraging employees to embrace digital technologies, experiment with new ideas, and collaborate across business units to identify innovative solutions that enhance organisational performance and strategic agility.

- Upskilling and training programmes: the South African mining company should prioritize upskilling and training programs to ensure that employees have the necessary digital competencies to effectively utilize digital tools and technologies. This will enable a smoother transition to digitalisation and maximize the benefits derived from these initiatives.

- Collaboration with technology partners: the South African mining company should consider forming strategic partnerships with technology companies and industry experts to stay updated with the latest digital advancements and leverage external expertise. Collaborative efforts can accelerate digital

transformation, improve strategic agility, and enhance overall organisational performance.

- Monitoring and benchmarking: regularly monitor and benchmark the digitalisation progress and outcomes against industry best practices and competitors. This will help identify areas where the company can further improve its digital capabilities, strategic agility, and organisational performance.

- Change Management and Communication: implement effective change management strategies to ensure the smooth adoption of digitalisation initiatives across the organisation. Clear communication and stakeholder engagement are crucial to obtaining buy-in, addressing concerns, and creating a shared understanding of the benefits and importance of digitalisation.

By considering these recommendations, the South African Mining company, and potentially other organisations, can further leverage the potential of digitalisation to enhance strategic agility, improve organisational performance and maintain a competitive edge in the South African mining industry.

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APPENDIX 1: QUESTIONAIRE

Questions (questionnaire) for Applied Research Project

Title: The influence of Digitalisation on Strategic Agility of a South African mining company

Section A.

1. How long have you been employed at the Mining Company?
   (Range in years [0 – 5], [6 – 10], [11 – 15], [15 or more])
2. What is your designation level?
   (Lower Management, Middle Management Senior Management)
4. What department are you working in?
   ([Projects and Environment], [Corporate affairs and sustainable impact], [Finance], [Human Resources], [Digital transformation], [Operations & technical] , [Asset Reliability, Safety and Health], [Market and Product Development].
5. What is the size of your department?
   ([Small [0-30 employees], Medium [30-100 employees], Large [100 or more employees])

Section B

1. What is the level of digitalisation in the company? (Low, Medium, High)
2. What is the level of digitalisation in your department? (Low, Medium, High)
3. At which level does your role require you to make strategic decisions? (Low, Medium, High)
4. Is it evident that digitalisation is working at your organisation? (Yes, No)
5. Does your role/area of work require you to transform digitally? (Yes, No)

6. **Which key areas in the adoption of Digitalisation have had an effect on the organisation? Choose applicable:**
   - Empowering of employees,
   - Engaging customers,
   - Optimize operations,
   - Services and products

7. **Why do you believe the notion of digitizing is important for companies today? Choose applicable:**

- Increased efficiency,
- greater business agility,
- the unlocking of new value for employees, customers and shareholders,
- optimize existing business processes,
- make processes more effectively coordinated

8. Is digitalisation a response to disruption? (Yes, No)

9. In your opinion, what are the benefits of undergoing digitalisation? Choose applicable:

- Improved management
- Managed Human Resources
- Improved marketing of the organisation
- Controlled finances
- Redefining customer needs
- Providing more automation and accuracy to businesses

10. What challenges exist when undergoing digitalisation? Choose applicable:

- Risk-averse organisational culture.
- Employee pushback
- Insufficient budget for technological change.
- Looming digital skill/talent gap.
- Shortage of technological resources.
- Increased security risks
- Lack of developing a relevant digitalisation strategy.
- Lack of understanding its impact on the business

- Change management: organisations facing resistance to adapt new technologies

11. How do you consider digitalisation to be a source of value creation for your organisation?

- Through digitalisation, the company can restructure work processes to leverage opportunities and circumvent risks in the environment
- Digitalisation enables robust data collection and centralized data storage
- The creation of tools to analyse and translate data into information that promotes informed corporate decision-making.
- Digitalisation eliminates roundabout communication, redundancy, slow response times, lost information, and ineffective idea-sharing.

12. What strategic advantages do you believe can be gained through digitalisation?

- Digitalizing the internal communications of the business will increase productivity, accountability, and creativity, and gain the edge necessary to outperform the competition.
- Digitalisation aids digital processes to stop errors by eliminating time-consuming manual data entry and human inefficiencies. Thus, digital processes are inherently smoother and less risky than any process that involves error-prone humans
- Increased operational efficiency. such as consolidating messy manual processes and reducing overhead costs by integrating with back-office systems, automating delivery processes and product/project updates.
- Increases Agility: A digital business environment will be able to anticipate challenges and build solutions pre-emptively so that you can remain viable for years to come.

Section C.

Likert Scale (Strongly disagree = 1; Strongly agree = 5)

1. To maintain a proactive digitalisation approach, the company:

- Maintains a constant awareness of the latest developments in digital technology

- Continually experimenting with new digital technologies
- Ensures that a digital technology-friendly environment is maintained
- Enhances the effectiveness of the use of digital technology continuously.

Likert Scale (Strongly disagree = 1; Strongly agree = 5)

2.Digitalisation in the organisation has sped up:

- How well new strategic directions have been implemented
- Improved strategic decision-making through effective organisational learning
- Effective organisational learning for improving action toward adaptation
- Cycle of perception and response
- The responsiveness of the company to issues related to the environment and social welfare
- Providing complementary agile capabilities by forming business networks

Likert Scale (Strongly disagree = 1; Strongly agree = 5)

3.

- The organisation has developed strong change capabilities due to digitalisation
- Learning capabilities have been effectively improved through digitalisation
- Because of our digitalisation, innovation capabilities are robust, effective, and current

Likert Scale (Strongly disagree = 1; Strongly agree = 5)

4. The digitalisation management capabilities developed by The South African mining company have enabled us to:

- Establish a clear vision of the business impact of digitalisation
- Integrate digitalisation planning with business strategic planning
- Provide access to the value of digitalisation investments in functional areas and general management
- Plan digitalisation in an effective and flexible manner.

Likert Scale (Strongly disagree = 1; Strongly agree = 5)

5.

- The degree of digitalisation has fused digital technology with strategy
- Digitalisation has enabled the company strategy to transcend functional and process silos
- Digitalisation enables the strategy to be more adaptive to the environment

Likert Scale (Strongly disagree = 1; Strongly agree = 5)

6.

- In support of our dynamic strategic capabilities, we are able to scale our resources up and down thanks to our level of digitalisation
- Digitalisation has enabled the leveraging of strategic networks and multisided platforms at all levels of the company
- There is clarity that the depth and extent of digitalisation translates to strategic agility for the company

Likert Scale (Strongly disagree = 1; Strongly agree = 5)

7. Digitalisation in the company has sped up:

- How effectively new strategic directions launched
- Effective organisational learning for improving strategic decision making
- Effective organisational learning for improving action toward adaptation
- The respond cycle
- The responsiveness to social and environmental issues

Likert Scale (Strongly disagree = 1; Strongly agree = 5)

8.

- Due to digitalisation, the company has a strong change capability
- Digitalisation has enabled the company to develop effective learning capabilities
- There are robust, effective and current innovation capabilities as a result of the company's digitalisation

Likert Scale (Strongly disagree = 1; Strongly agree = 5)

9. Digitalisation has allowed us to take advantage of the market by:

- Adaptability to market and customer changes - enabling quick decisions to be made and implemented
- Enabling us to continually reengineer and reinvent our organisation to deliver better services to our customers
- The ability to see opportunities in the apparent chaos of the market related to changes in the market.

Section D

How would you rate the revenue growth of the organisation over the past 3-5 years?

- Very low
- Low
- Average
- High
- Very high

2. Please indicate your perception of the organisation's profitability compared to its industry peers.
    - Significantly lower
    - Slightly lower
    - On par
    - Slightly higher
    - Significantly higher
3. How would you assess the cost efficiency of the organisation's operations?
    - Very inefficient
    - Inefficient
    - Neither efficient nor inefficient
    - Efficient
    - Very efficient

4. In your opinion, has there been an improvement in productivity within the organisation due to digitalisation efforts?
    - No improvement
    - Slight improvement
    - Moderate improvement
    - Significant improvement
    - Don't know/Not applicable
5. How effective do you perceive the organisation's operations to be in achieving its objectives?
    - Not effective at all
    - Slightly effective
    - Moderately effective
    - Highly effective
    - Extremely effective
6. Please rate the market share of the organisation compared to its competitors.
    - Very low
    - Low
    - Average
    - High
    - Very high
7. Has the introduction of digitalisation resulted in increased market competitiveness for the mining company?
    - Not at all
    - Slightly
    - Moderately

- Significantly
- Don't know/Not applicable

8. How would you evaluate the financial performance of the South African Mining company in terms of return on investment?
    - Very poor
    - Poor
    - Average
    - Good
    - Very good
9. To what extent do you believe digitalisation has contributed to the organisation's overall business success?
    - Not at all
    - Slightly
    - Moderately
    - Significantly
    - Don't know/Not applicable
10. Based on your knowledge and experience, do you believe digitalisation has positively influenced the organisation's overall organisational performance?

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

APPENDIX 2: PERMISSION LETTER

Request for permission to conduct research at Anglo American Platinum.

17 October 2022

Dear Sir / Madam,

Research project title: The influence of Digitalisation on Strategic Agility: The case study of a mining house.

I, Nthabiseng Mosena, am doing research under the supervision of Professor Milford Soko in the Faculty of Commerce, Law and Management towards a Master of Business Administration (MBA) degree at the University of Witwatersrand.

The purpose of the research is to develop a critical understanding of the nature of the relationship between Digitalisation and Strategic Agility. The intended data collection aims to identify if integrating digitalisation practices in a successful company (mining house) impacts its strategic performance, thus improving organisational performance.

For the purpose of this study, a qualitative research methodology will be used in order to provide an accurate presentation of information. This will be conducted in the form of an online survey intended to be emailed to participants with a link. The survey will take no longer than 10 minutes. All aspects of this study will follow strict ethical compliance in accordance to very high and internationally accepted standards.

This will be an anonymous online survey, and names and any details pertaining to participants will not appear on the questionnaire. The name of Anglo American Platinum WILL NOT appear or be published in any part of the research but rather be tabled as a Mining house. The information the participants provide will be used for academic purposes and will be treated in strict confidence. Participation in this research is voluntary and participants are free to withdraw at any time with no ramifications. The results of this envisaged study will be pooled for the research report project and individual results of this study will remain absolutely confidential and anonymous. Should this study be published, only pooled results will be documented. No costs will be incurred by your organisation or the individual participants.

Your approval to conduct this study will be greatly appreciated. I am happy to answer any questions or concerns that you may have. You may contact me at the following information below.

Yours sincerely



Nthabiseng Mosena
Student number: 0701438D
Email address: 0701438D@students.wits.ac.za
Telephone: 073 928 5806

Date: 13 July 2022

MB **A Research Proposal Panel Evaluation Report 2022**

Student name: Nthabiseng Mosena Student number: 0701438D	Title: The influence of digitalisation on strategic agility of a South African mining company.

Assessment Criteria	**Feedback**
Research title accurately reflects study. The research gap and problem (theoretical and practical) are stipulated. The research purpose, objectives, and questions are formulated. Relevant theories are presented in the context of the study. The theory section reflects current research. Study contributions are clearly articulated.	Student discussed with supervisor and revised research objectives 1 and 2 as the difference between them was unclear.
Criterion-referenced assessment :-	
Sufficiently referenced, scholarly, integrated literatures review. Focused literature sourced from leading journals. Consolidating tables required to indicate major theory underpinning hypotheses. Literature review is critical evaluation and not a summary. A clear conceptual framework is required.	Adequate
Criterion-referenced assessment :-	
Hypotheses/research questions which arise directly from the literature review and are clearly related to the applicable study objective. Testable hypotheses are formulated that are linked to past theory and/or empirical work.	Adequate
Criterion-referenced assessment :-	

Research design: Rationale and argue the choice of an appropriate research paradigm and methodology; methodological rigour evident for empirical work and hypotheses testing. Include sections on: population, sampling frame and sample, data collection methods; instrument(s) with variables identified and tabulated in terms of sources and items used; data analysis and quality checks; ethical concerns addressed comprehensively (refer and attach to ethics form and requirements as per research pack) .	Do not confuse population with sample. Specify what your population is and what your sample is, and then justify that number you selected for your sample size. Population: 150 participants Sample size: 40 participants Research instrument: Online Survey Research approach: Quantitative. Supervisor and I agreed this will be best approach.
Criterion-referenced assessment :-	
Data analysis: Relevant technique(s) employed sufficient rigour to test hypotheses, validity and reliability issues addressed, match tests with data type, use of multivariate techniques.	Adequate
Criterion-referenced assessment :-	
Referencing formatted as per WBS req. Must include in-text references and be aligned with bibliography. Majority recent journal and scholarly references.	Adhere to the WBS stipulated referencing style.
Criterion-referenced assessment :-	
Literary style including formatting, grammar and spelling – appropriate level of formality, academic style and consistency.	

Criterion-referenced assessment :-	

Adheres to exemplary ethical standards, and ethical clearance form is comprehensively completed in terms of: • Does data collection include human participants? YES/NO • Are there any ethical risks associated with the study? YES/NO • Are there potential unintended consequences of the study? YES/NO • Are there any actual or potential conflicts of interest? YES/NO • Is formal permission required from any stakeholders? YES/NO If the answer to ALL of the above questions is NO, then the following questions do NOT need to be answered. If the answer to ANY of the above questions is YES, please answer the following questions: Please categorise the level of risk associated with the study: Minimal / Low / Medium / High Have all risks, unintended consequences, and conflicts of interest been adequately mitigated? YES/NO If NO, please specify what mitigation measures are required. Are any amendments required to the research instrument, the participant information sheet, or consent arrangements? YES/NO If YES, please specify. Please note: An ethics clearance certificate cannot be issued if the level of risk is medium or high, if risks, unintended consequences, and conflicts of interest have not been adequately mitigated, or if	• Does data collection include human participants? YES • Are there any ethical risks associated with the study? NO • Are there potential unintended consequences of the study? NO • Are there any actual or potential conflicts of interest? NO • Is formal permission required from any stakeholders? NO Please categorise the level of risk associated with the study: Minimal Have all risks, unintended consequences, and conflicts of interest been adequately mitigated? YES. Amendments made to the research instrument, the participant information sheet, or consent arrangements. All included in submission.

amendments are required to the research instrument, the participant information sheet, or consent arrangements.	

Descriptor	**Explanation**
Unsatisfactory	Flaws in all aspects of the research or major flaws in some aspects. Minimal understanding of the principles of research. Inappropriate or inadequate communication and analytical skills. No meaningful or practical research outcomes.
Sufficient to pass	Covers the assessment criteria adequately. Work would tend to be more descriptive and would not demonstrate critical insight, analytical depth or evidence of original thought.
Generally good	Demonstrating a competent understanding of the principles of research and their application, but meriting some criticisms in respect of the assessment criteria. Adequate communication and analytical skills. Some evidence of original thought.
Very good	Demonstrating a comprehensive understanding of the principles of research and their application. Good communication and analytical skills. Good level of critical analysis. Good evidence of original thought.
Excellent	No material criticisms in respect of the assessment criteria. Demonstrating a comprehensive understanding of the principles of research and their application. Evidence of originality and independence of thought, intellectual curiosity and initiative. Excellent communication and analytical skills. Little or no irrelevant material presented.

DECISION		**APPROVED BY PRG. DIRECTOR/PANEL CHAIR/MEMBERS**		**MARK AWARDED**
Proceed with Supervisor	**X**			
Revise and re-submit				

General comments:		

	Supervisor	CHAIR	Panel Member
Name:	Prof. Milford Soko	Professor Jones Odei-Mensah	Dr Nomusa Mazonde
Signature:			NBM
		Panel Member	**Panel Member**
	Name:	DR ORO UFUO ORO	
	Signature:	*OUORO*	

Recommended examiners – <u>not to be disclosed to students under any circumstances</u>:

Internal:		External:	

:

APPENDIX 3: CONSISTENCY MATRIX

Literature Review	Research questions	Source of data	Type of data	Analysis
Lycett, 2014) Teece, (2016) Overby, Bharadwaj & Sambamurthy, (2006). Fitzgerald, (2014)	• Does the introduction of digitalisation influence and improve the strategy/strategic significance of a company? • Is there an impact on organisational performance with the introduction of digitalisation? • Does the implementation of Digitalisation, particularly in a company with a legacy of success, reflect the significance of the influence of digitalisation on strategic agility?	• Respondents in online interviews • Academic books, company documents (annual reports, brochures) • Press articles, • Independent analysis	Quantitative data	Data reduction Data display Conclusion drawing/verification