Organisational Readiness for Digital Innovation within the Automotive Manufacturing Sector in South Africa

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KEYWORDS

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Automotive

ABSTRACT

Global digital disruption is an inescapable fact of the 21st business environment. The consequences thereof have major implications for all sectors, including the automotive manufacturing industry. The advent of electric cars and self-driving vehicles are just some examples of digitial innovations in the sector. Digital technologies have significantly advanced the automotive manufacturing industry, altering how processes are executed, customer interactions are carried out, and supply chain management is handled.However, despite the benefits of Digital Innovation, many organisations struggle to adopt and integrate these technologies effectively, with one of the challenges being organisational readiness for Digital Innovation.

It is against this backdrop that the current study investigated the factors that influence organisational readiness for Digital Innovation in the South African automotive manufacturing context, specifically at Company X, and how organisations can overcome those barriers/ factors. A review of extant literature showed a dearth of studies on Digital Innovation in this sector within the SA context. Therefore, there was a need to investigate the factors that influence organisational readiness within the automotive industry in South Africa, and to identify strategies that can help with overcoming the barriers.

The study adopted a qualitative methodology, using interviews as a research tool in which 12 participants were interviewed. The data analysis yielded 3 main themes and various related sub-themes, namely
(a.) Understanding and involvement of Digital Innovation, (b.) Readiness FactorVersus Digital Innovation and (c.) Challenges and Barriers that hinder Digital Innovation

As with many other businesses, automotive manufacturing is also compelled to respond to the challenge posed by technological advancements. For Company X, leadership and management were the most highly ranked factors influencing organizational readiness. The perceived meaning of Digital Innovation revolved

around improving processes and adding value to both internal and external customers, making use of technology to improve decision-making. The use of technology such as AI, IoT and Power BI has gained momentum as well.

This study covers a wide range of topics that are relevant to the business, management, organizational and professional areas. It emphasizes the significance of management and leadership as key factors impacting organizational readiness.

Managers, engineers, and IT professionals can gain valuable insights regarding the challenges and best practices for implementing digital technologies from this work as it also clarifies organizational dynamics and the prerequisites for successful digital innovation, offering practical strategies for organisations to enhance their readiness

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To my non-academic friends Nosihhle Dlamini, Maididi Tsie and Dikeledi Mjilo, thank you for being part of my life and for your unwavering support and encouragement throughout this journey.

DECLARATION

I declare that this research is completely done by myself. During the research process, my supervisor participated in the theoretical guidance and supervision of the research. It is submitted as part of the requirements for the Master of Management in the field of Digital Business at UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG. It has not been submitted before obtaining any degree or exam at any other university. I further declare that I have obtained the necessary authorization and consent to conduct this research. Mendy Konanani Mufamadi 29/04/2024

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AI - Artificial intelligence

IOT -The Internet of Things

NAAMSA - National Association of Automobile Manufacturers of South Africa

CHAPTER 1. INTRODUCTION

1.1 Statement of purpose

This research is a case study which seeks to examine organisational readiness for Digital Innovation within one of the automotive manufacturing companies in South Africa.

1.2 Background of the study

Digital Innovation has become a key driver of competitiveness and growth for organisations in various industries, including manufacturing (Chesbrough, 2010). According to a report by KPMG (2022), global tech leaders have reported that performance and profitability has improved over the last two years due to their digital evolution.The Automotive Manufacturing Sector has undergone remarkable advancement through digital technologies that have changed the manner in which processes are carried out, customer engagement is conducted, and the supply chain is managed. However, regardless of the benefits of Digital Innovation, many organisations struggle to adopt and integrate these technologies effectively. One of these challenges is organisational readiness, which refers to the organisation's ability to identify, plan and execute initiatives (Lokugea, Sedera, Grover & Xu, 2019).

In order to garner a holistic view of organisational readiness for Digital Innovation within the Automotive Manufacturing Sector in South Africa, it is important to understand what the factors influencing organisational readiness are, but these are not yet well understood. Although research in other industries has identified various factors such as organisational culture, leadership and technology infrastructure that can facilitate or hinder Digital Innovation readiness, these factors may differ in the context of the Automotive Manufacturing Sector.

Therefore, this research aims at organisational readiness through the process of exploring these factors.

1.3 Research Problem

The Fourth Industrial Revolution is transforming almost all industries in every country, creating new opportunities for growth and innovation (Klaus Schwab,2016). This has forced organisations to adopt digital technologies in order to remain competitive and sustainable. However, many organisations seem to be lagging regarding readiness and adoption.

Although South Africa has shown that it is committed to embracing and utilising 4IR technologies to overcome its challenges, South Africa is not yet positioned to take full advantage in order to get maximum benefit and to manage the risks that come with these new technologies (Olaitan, Issah, & Wayi, 2021).

And for organizations within South Africa to be well positioned, they need to understand the factors that influence organizational readiness for Digital Innovation and how they can overcome these barriers/ factors. Therefore, there is a need to investigate the factors that influence organisational readiness within the Automotive Manufacturing Sector in South Africa, and to identify strategies that can help in overcoming the barriers.

1.4 Research Objectives

I. To identify factors that influence organizational readiness for Digital Innovation within the automotive manufacturing company in South Africa (Company X).
II. To explore the perceived meaning of Digital Innovation and the extent in which Digital Innovation is adopted by Company X
III. To explore how the factors impact on the readiness for Digital Innovation and provide recommendations / practical insights for improvement.

1.5 Rationale

This study is an attempt to contribute knowledge to extant literature regarding organizational readiness for Digital Innovation within the Automotive Manufacturing Sector in South Africa through conducting a case study of one of its dominant players.

The Automotive Sector contributes 6.4% of the country's GDP, 4.0% of which is manufacturing and 2.4% retail. This sector has many challenges, including market contractions, supply chain disruptions that were worsened by Covid-19, high competition, and environmental challenges. Technology can be used to mitigate or resolve all of these challenges. According to Chen (2017), innovation is essential in driving economic growth, sustainability and competitive advantage, not just for organisations but for the country as well. Therefore, studying the factors that influence organisational readiness for Digital Innovation is essential for improving the sector's competitiveness and sustainability, which will lead to the country's economic growth and development. This study has been conducted within Company X, which is a multinational subsidiary of Company X Corporation. Its market leadership indicates that Company X has techniques for competitiveness, and it has evolved through various innovation and technological advancements, which makes it an ideal candidate.

1.6 Delimitations of the study

I. The scope for this study limited as it focuses on automotive manufacturing sector in South Africa
II. Due to time constraints, this study was limited to ‘one automotive company (Company X) and results for this research cannot be generalised.
III. Sensitive information has been omitted to protect the company.
IV. Qualitative methodology and purposive sampling were applied, and the results of this study may have been impacted by the researcher’s interpretation and biasness as these are subjective processes.

V. Perceptions about Digital Innovation may have been influenced by the number of years of service with the organisation. However, the length of time employees has worked for their current organisation was not the focus on this investigation.

1.7 Definition of terms

Multinational Company – a company that has operations in many markets which are not its home country.

Multinational Subsidiary – a branch of a company from a different country.

Global tech Leaders – Organisations that have successfully implemented technology.

1.8 Assumptions

I. Business has some understanding of Digital Innovation.
II. Business has a digital transformation road map.
III. This study can identify if the changes in the factors identified will likely lead to changes in Digital Innovation readiness within the business.
IV. The research method used is valid and reliable measures will be used to identify the factors influencing Digital Innovation.

1.9 Chapter Outline

There are six chapters in this report and below is the outline.

Chapter 1 outlines purpose, background, objectives and rational of the research.

Chapter 2 discusses theoretical literature that supports the study. Starting from the perspective of Digital Innovation and organizational readiness supported by the theory of dynamic capability and ambidexterity. This provides a theoretical foundation for the study, to determine organizational readiness for Digital Innovation.

Chapter 3 introduces research methodology to be utilized in this study. Data will be collected through purposive sampling, utilizing interviews as primary source of information, it will be consolidated and analysed in order to combine theoretical literature and practical research results for academic discussion.

Chapter 4 presents the findings of the research conducted.

Chapter 5 contains the interpretation of the results from the data collected.

Chapter 6 provides recommendations.

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This literature review provides a foundation and framework for research on organisational readiness for Digital Innovation within one of the automotive manufacturing companies in South Africa. This chapter examines the ideas of readiness, what it is and what influences it. It looks at Digital Innovation, what it means and how it is impacting automotive manufacturing.

2.2 Background

Currently, there is only one publication regarding organisational readiness for Digital Innovation in which (Lokugea, Sedera, Grover, & Xu, 2019) developed multidimensional construct of readiness for Digital Innovation at an organisational level and the underpinning it on change theory.

These authors developed a priori model and tested it using a quantitative study, which surveyed 189 CIOs and line-of-business managers of organizations that are mostly within the manufacturing and service industries and resulted in 7 constructs: (1) Resource readiness, (2) Cultural readiness, (3) Strategic readiness, (4) IT readiness, (5) Innovation valence, (6) Cognitive readiness and (7) Partnership.

However, this study intends to investigate organizational readiness for Digital Innovation within Company X and it has been supported by the theory of ambidexterity and dynamic capability. This literature review therefore aims to clarify the important concepts to gain an understanding of what is currently existing within the body of knowledge.

2.3 Digital Innovation and Organisational Readiness

2.3.1 *Digital Innovation*

There are many definitions of Digital Innovation, with it being a combination of the physical and the digital in order to produce best-selling products and services (Yoo, Henfridsson, & Lyytinen, 2014). However, for this research, Digital Innovation is referred to as using digital technologies for the innovation of processes and generating an innovative digital outcome whilst considering the complex and dynamic dependencies between both (Nambisan, Lyytinen, Majchrzak, & Song, 2017) . It involves leveraging digital technologies such as AI, machine learning, IoT, cloud computing, big data analytics and other digital tools to drive a transformative change and generate value (Westerman, 2014), which has become a trend within manufacturing industries.

According to Li, (2018), these digital technologies have three main roles in Digital Innovation, namely: automation, extension and transformation (AET). Whereby automation is when a firm utilises digital technology to automate or enhance its existing operations and procedures. Extension is when a firm uses digital technology to enable new operational methods that enhance rather than replace existing activities and procedures. Transformation refers to a situation in which a firm uses digital technology to enable new business models in replacing existing ones.

Company X is a multinational subsidiary. Regarding innovation in multinational subsidiaries, Phene and Almeida (2008) suggests that parent firms can also positively affect the scale of subsidiary innovation. These multinational parent company influences include organization practices; systems and modes of structuring; and relationships with firms in their home country, leading to knowledge assimilation. Company X, as a multinational subsidiary, is a dynamic and independent firm with the ability to direct its own growth. However, the strategic mandate given to it by its parent firm has an impact on the growth of its

innovation capabilities and determines its level of autonomy (Davy, Hansen, & Naygaad, 2021). This research explored how this context impacts on the readiness for Digital Innovation.

2.3.2 *Organisational Readiness*

Although the introduction of digital technology is intended to boost most firms' capacity for innovation, most organisations find it challenging to apply digital technologies for an innovative purpose because of the lack of organizational preparation (Gandhi, Khanna, & Ramaswamy, 2016) (Lokugea, Sedera, Grover, & Xu, 2019) , and (Williams, 2011) highlights that readiness with regards to digitalisation is important. Of which readiness refers to the state of being prepared to effectively address or engage in a particular activity or change. It involves having the necessary resources, knowledge, skills, and mindset (Weiner, 2009).

(Weiner, 2009), established that contextual influences, valence changes, and valence efficacy changes are the three factors that promote readiness for change.

For this study, organisational readiness for Digital Innovation is referred to as the ability of an organisation to initiate innovation with digital technologies (Lokugea, Sedera, Grover, & Xu, 2019).

2.3.3 *Proposition 1*

Adoption of Digital Innovation inside Company X and its perceived meaning are related. Which means that the degree to which the organisation is ready for Digital Innovation or the degree in which the organisation adopts Digital Innovation will depend on how Digital Innovation is perceived and understood inside Company X. This proposal also notes that contextual influences, valence changes, valence efficacy and outside influences can affect how Digital Innovation is adopted within Company X.

The goal of this study is to investigate how Digital Innovation is understood inside Company X and to examine the factors that either facilitate or hinder its adoption / readiness for adoption. The study's findings will contribute to a better understanding of the dynamics related to organisational readiness for Digital Innovation by revealing how perceived significance and adoption of new technologies interact.

2.4 ANALYTICAL FRAMEWORK

2.4.1 Ambidexterity Theory

Raisch, Birkinshaw, Probst, & Tushman, (2009) argue that organizational ambidexterity is crucial for organizations to adapt to changing environments and effectively engage in innovation. They define organizational ambidexterity as the ability of an organization to simultaneously pursue both exploratory and exploitative activities, in which exploration refers to the activities related to discovering and developing new knowledge and capabilities, whilst exploitation focuses on refining and optimizing existing knowledge and capabilities. According to Winter (2003), these capabilities can be classified as dynamic or operational. whereby operational capabilities include all the skills and resources that provide a company with the ability to run its daily operations effectively and efficiently.

With Company X being an Automotive Manufacturing company, its operational capabilities can be classified as its manufacturing capabilities, which are production capacity, process innovation, quality control, supply chain management, technology integration and workforce skills specific to their operations. Company X’s ability to explore and exploit these capabilities will display a high level of readiness for innovation. Therefore, it is expected that Company X’s level of ambidexterity will impact on its readiness for Digital Innovation.

2.4.2 *Dynamic Capability*

Dynamic capabilities are a firm's ongoing focus on integrating, re-configuring, renewing and creating its resources to achieve and maintain a competitive advantage through upgrading and reconstructing its key capabilities in response to the changing environment (Wang & Ahmed, 2007). These capabilities are usually hard to imitate as they are incorporated into the firm's long-standing practices and culture (Teece, The Foundations of Enterprise Performance: Dynamic and Ordinary Capabilities in an (Economic) Theory of Firms, 2014) in which firms learn and build through creating and changing their operational procedures systematically in an effort to increase effectiveness (Zollo & Winter, 2002). However, they are moulded by internal positions and paths which influence deployment, resulting in temporary or sustained advantage depending on the environment (Teece, Pisano, & Shuen, 1997) (Ambrosini & Bowman, 2009).

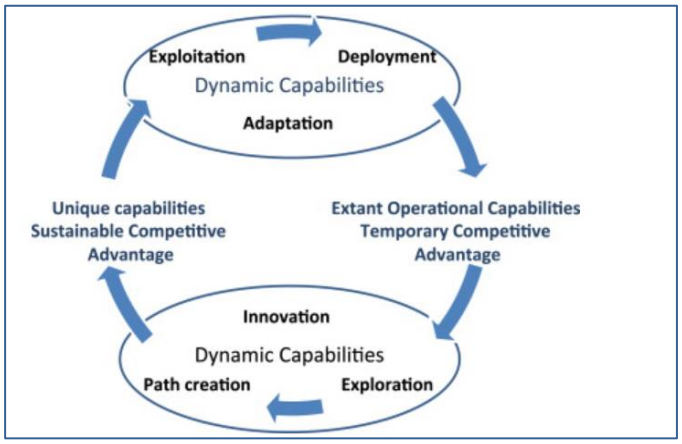
Teece (2007) suggested that dynamic capabilities could be divided into the three capacities of sensing, seizing and transforming. A study by Karimi and Walter (2015) shows that dynamic capabilities support the firm's reaction towards disruptive innovations. In order for the firm to react/adapt to the changing environment imposed by rapid technological advancements, it needs to sense the changes; identify relevant resources required to address the changes and/or opportunities; and then transform whilst aligning them to the firm's strategy.

Based on the idea that dynamic capabilities involve a continuous focus on integrating, re-configuring, renewing and creating resources to achieve and maintain a competitive advantage, dynamic capabilities will play a significant role in determining the factors influencing Company X's readiness for Digital Innovation since these capabilities help businesses to respond to changing environments. Therefore, it is anticipated that Company X's ability to sense, seize and transform will have an impact on its readiness for Digital Innovation.

2.4.3 *Conceptual Framework*

A dynamic lifecycle model (Figure 1) will be adapted to identify and analyse factors influencing organizational readiness for innovation within Company X through pinpointing the capabilities required to strike a balance between exploitation and exploration activities to improving organizational readiness for the adoption of Digital Innovation. And therefore, using Dynamic Capability as main theory and Ambidexterity as a dynamic capability.

Figure 1: Dynamic Capability Lifecycle



(Dixon, Meyer, & Day, 2014)

2.5 Conclusion of Literature Review

From the review, it can be deduced that Company X's ability to sense, seize, and transform will play a significant role in determining factors influencing its readiness for Digital Innovation and its level of ambidexterity will have an impact thereof.

CHAPTER 3. RESEARCH METHODOLOGY

This chapter outlines the process to be followed in conducting the research and analysing the findings.

3.1 Research Approach

This research followed a deductive qualitative approach in order to analyse the data to allow themes to emerge from the interviews (Creswell, 2007).

3.2 Research Design

The overall research design adopted for this study is an exploratory case study of Company. The Case study research is an effective technique for the preliminary exploration stage of a research project since it lays the groundwork for the development of structural research tools necessary for surveys (Queirós, Faria, & Almeida, 2017). This design allowed the researcher to do an in-depth study, providing a comprehensive understanding of the factors influencing organizational readiness for Digital Innovation within Company X. This choice of exploratory method was because it allows the study to be done in an unrestricted manner (Saldaña, 2013). A qualitative approach was utilised, in which the researcher explored these factors through interviews, documentation, and reports (Creswell, 2007)

The research participant for the case is Company X, a subsidiary of Company X Corporation. In addition, Company X is one of the major players in the local automotive cluster and therefore making it an ideal candidate.

3.3 Data collection methods

The data collection methods for this study included conducting semi structured interviews with open ended questions to an engineer, senior managers, general managers, and executives from Company X. These leaders have been questioned on their lived experiences, opinions, points of view, and knowledge in relation to the case being studied.

For this case, Interviews have been a primary source of data, and the secondary source of data was through integrated financial reports, Company X websites and automotive journals.

3.4 Population and sample

3.4.1 *Population*

The population for the research study included an engineer, senior managers, general managers, and executives at Company X, with experience, skills, and knowledge in Digital Innovation. The targeted research participants occupy critical positions in management positions for more than five years, have influence on the strategy and therefore, they were able to share knowledge on the drivers of organisational readiness in Company X context.

3.4.2 *Sample and sampling method*

This research included purposive non-probabilistic sampling as the primary method, with the secondary method being opportunistic sampling whereby the researcher chose participants based on their knowledge, experience and position held within the organisation. The researcher was intentional about following new leads and took advantage of the unexpected to answer the research objectives and to achieve the objectives of this study, as suggested byCreswell (2007).

Purposive sampling was used because it involves selecting specific participants who are knowledgeable and relevant to the case being studied (Palinkas, et al., 2016). Furthermore, the researcher used their judgment to identify and select participants who can provide rich, diverse perspectives, experiences and insightful information related to the research objectives (Creswell, 2007).

A sample size of 12 participants was considered for this study which utilised semi-structured interviews as recommended by (Saunders, Lewis, & Thornhill, Understanding research philosophy and).

3.5 The Research Instrument

According to Creswell (2007) , the researcher is a key instrument because they are the ones who gather the data by themselves by looking over documents, observing behaviour, coming up with interview questions, and speaking with participants.

A guideline for semi-structured interviews was created with the aim of answering the research objectives, this was supplemented by a power point presentation introducing the researcher, research topic and reason for the research.The interview was structured to last 30 minutes and allowed approximately 15 minutes for follow-up questions in order to get clarity on a matter. All respondents were given an opportunity to choose between face to face meeting and teams meeting, and all interview meetings were set according to each respondents preference.

For both face-to-face meetings and Teams meetings that had video enabled, different probing techniques were applied in order to encourage participants to continue (Kallio, Pietil€a, Johnson, & Kangasniemi, 2016). Lastly, a dry-run interview was conducted to anticipate the discussion's length and refine the interview questions and techniques (Saunders, Lewis, & Thornhill, Understanding research philosophy and)

A shortcomings of having interviews using MS Teams was that it was difficult to observe the participants' non-verbal expressions even though video was on as the researcher could not control the position or angle in which the respondent would sit in relation to the camera.

3.6 Procedure for Data Collection

Creswell (2007) emphasized the importance of the researcher using strict data collection techniques, which implies that the researcher gathers data in a variety of formats.

In order to guarantee that the research was conducted in an ethical manner, a request to conduct case study research on Company X was forwarded to the Senior Vice President of the Manufacturing Assembly Group to grant approval for the research and to authorise interviews to be conducted. Thereafter, an email was sent to the interviewees with the following attachments:

I. Ethics certificate obtained from the university;
II. Semi-structured interview guideline to allow participants to prepare beforehand in order to ensure consistency in information collection;
III. A Gate-keeper's letter (Senior Vice President approval for research to be conducted within Company X);
IV. Consent letter to ensure consensus regarding data to be collected as well as asking for permission to record the interview; and
V. A cover letter introducing the researcher, research topic and reason for the research.

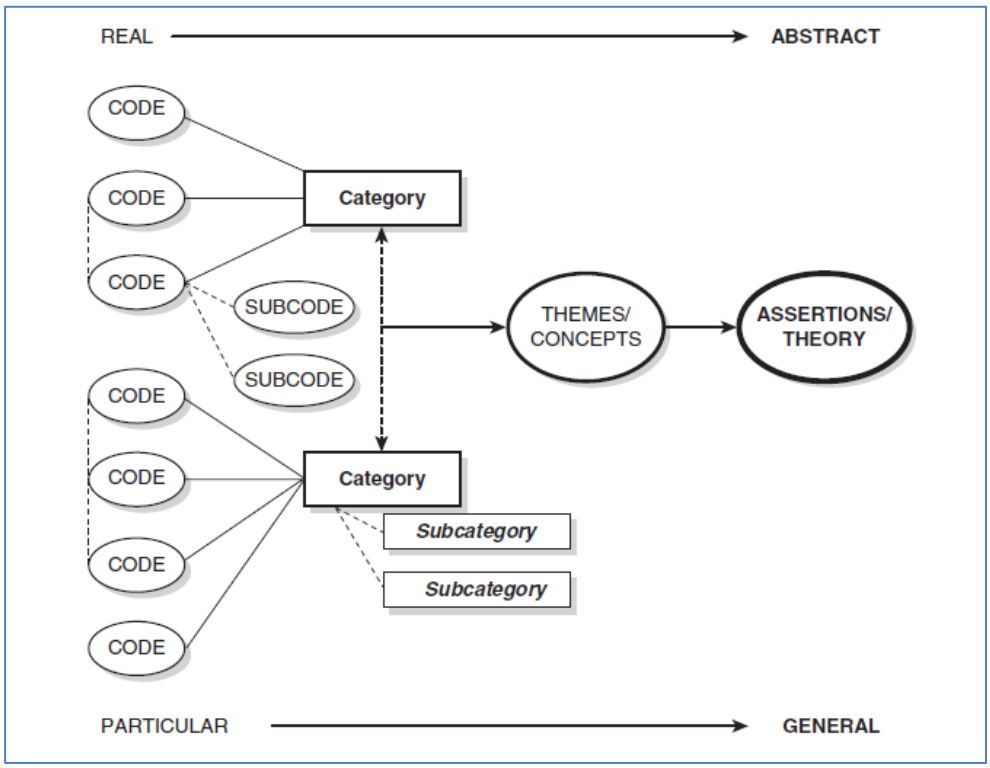
Interviews were both in-person and virtually through Microsoft Teams for the participants who preferred Teams.

3.7 Data Analysis Strategies and Interpretation

The data gathered from the interviews was transcribed using a speech-to-text transcription. The researcher proofread the scripts and used the audio-recordings and notes taken during interview to ensure that the information is correct.

Qualitative data analysis was done simultaneously with data collection so that the researcher could develop / identify emerging themes, which in turn influenced the questions being asked and the sampling. This process led to a point in the data gathering process where no new themes added (Bloom & Crabtree, The qualitative research interview, 2006), which is a point of saturation.

Figure 2: A streamlined coded to theory model for qualitative inquiry



(Saldaña, 2013)

In order to simplify and make sense of the data gathered, the researcher used inductive thematic analysis and followed 4 steps as endorsed by Saldaña (2013), namely:

1. Identifying codes in data;
2. Grouping the codes into categories;
3. Identifying / Creating themes or concepts; and
4. Applying emerged themes to theory/ research objectives .

3.8 Limitations and challenges of the study

I. Findings cannot be generalised;
II. The researcher was at risk of being biased as they are employed by Company X;
III. The researcher faced some limitations in accessing certain information in order to get clarity of what the respondent meant;
IV. The researcher was at risk of being subjective when analysing the data;
V. This research findings could not capture readiness from an implementation point of view as interviews targeted were mostly senior management.

3.9 Quality Assurance

3.9.1 *Transferability*

Due to the study being a case study, only individuals in Company X were consulted, so findings of the study cannot be generalised to all other automotive organisations within sector.

3.9.2 *Credibility*

In order to achieve credibility, the following methods indicated by (Tracy, 2010) were considered;

I. Triangulation – making use of interview recordings and taking notes during the interview to validate the information captured.
II. Seeking member / participant's feedback – this was be achieved through allowing participants to read interview findings and give feedback and their views on the findings.
III. Peer reviews – as this study is done under a supervisor, this was achieved through planned review and debrief sessions.

3.9.3 *Dependability*

Dependability refers to the reliability and consistency of the research findings.

It is achieved through audit trails (Creswell, 2007). It states that the results are unique to a certain period. However, the explanations remain consistent throughout the data (Lemon & Hayes, 2020). For this research, it was be achieved through keeping detailed documentation of the research process which includes and is not limited to data collection procedures, data was collected, data collection process stopped when a point of saturation was reached and in order to analyse the information received through the interviews, a software package called Nvivo was used in conjunction with various data manipulation techniques such as tree maps, hierarchy charts, cluster analysis, word clouds and word trees for cross-checking, and to ensure data quality of the coding decision

3.10 Ethical Considerations

The following ethical considerations were in place:

I. The researcher obtained a gate keeper's letter.
II. The research objectives clearly be communicated to the participants.
III. A consent form requesting a voluntary interview, indicating assurance of anonymity and confidentiality and as well as details of the interview was sent to the participants.

IV. Participant were informed that they have the right to withdraw from the interview at any time (Glesne, 2016).
V. A copy of the ethical certificate was sent to the participants.
VI. The researcher asked for permission to record the interview and reminded the participant that the interview is recorded during the interview.
VII. The researcher informed the participant that notes were taken during the interview and what the next steps are after the interview (Transcribing, data analysis and report writing). As well as offered them an opportunity to read the final report once complete.
VIII. Participants names, positions and company and department name have been omitted from the report to assure anonymity.
IX. Company strategic information have been omitted from the report.
X. Participants names have not been shared with each other.

3.11 Conclusion

The chosen research methodology for this research enabled the researcher to gather data in a flexible and adaptable manner which resulted in rich data to be gathered. Conducting semi-structured interviews in an ethical manner allowed participants to be able to share their view points and experiences at free will.

PRESENTATION OF FINDINGS

3.12 Introduction

This chapter presents the key findings from in-depth, semi-structured interviews with key individuals who occupy various senior positions within Company X. The point of saturation was reached at interview 12 as there was no new information coming out from the responses.

A thematic analysis was conducted on the data collected during the interviews whereby codes were generated and grouped together in order to create themes. The results are outlined as shown on table 1 below (refer to Appendix for detailed information).

Table 1: Results of thematic analysis

	Name
Theme	Challenges and Barriers that hinder Digital innovation
Sub-theme	Challenges- balance between exploration and exploitation
Element 1	budget
Element 2	capacity
Element 3	infrastructure
Element 4	KPI Alignment
Element 5	management direction
Element 6	structure
Sub-theme	Culture
Element 1	exposure and experience
Element 2	fear and hesitance to contribute
Element 3	lack of understanding and dismissive of ideas
Element 4	repetitive
Element 5	traditional mindset

Source: :Author (2024)

3.13 Participants Demographics

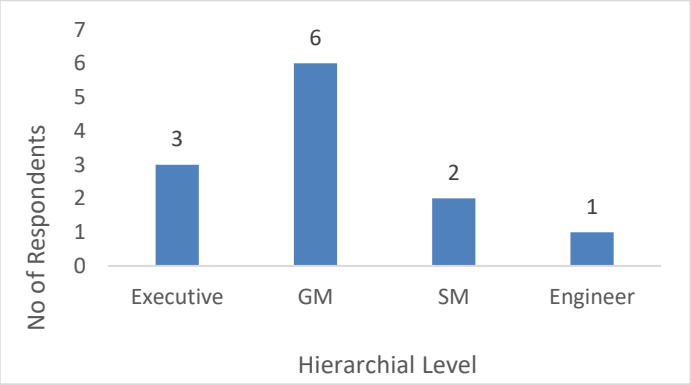
The section below provides data on the demographics of the participants in terms of hierarchical level, years of employment within the organisation and gender of the participants.

Although this data is not linked to any of the research objectives, this information serves as one of the key lens through which the researcher was able to contextualise and interprete the findings. Considering a sample within similar demographics also enhances the quality of the research as the respondents similar lived experiences .

3.13.1 *Hierarchical levels*

The figure 3 below shows the different positions that the respondents hold within the company.

Figure 3: Respondents Positions



Sourec : Author(2024)

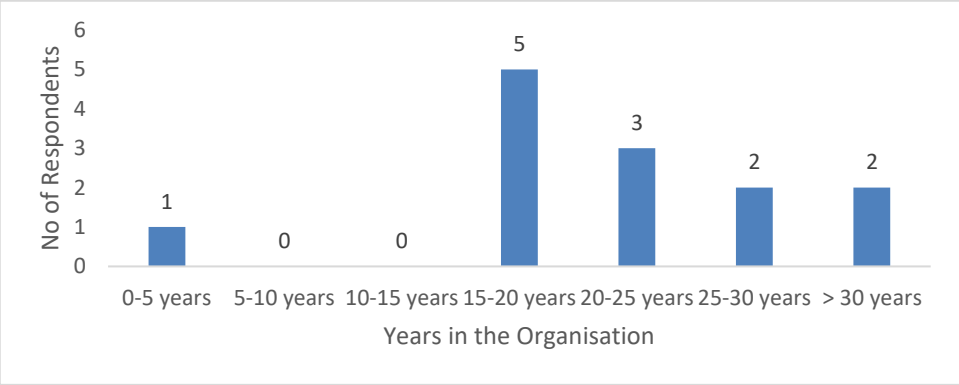
The sample comprises 3 executives, 6 general managers, 2 senior managers and 1 engineer. The majority of these respondents occupy senior management

roles and are involved in the strategic and operational activities of Company X. However, there was an exception of one engineer as he was one of the first people to set-up innovation department for Company X. All participants were able to share valuable information and insights on the topic under study.

3.13.2 *Years in the organization*

The figure 4 below shows the number of years that respondents have been working within the company.

Figure 4: Years in Company X

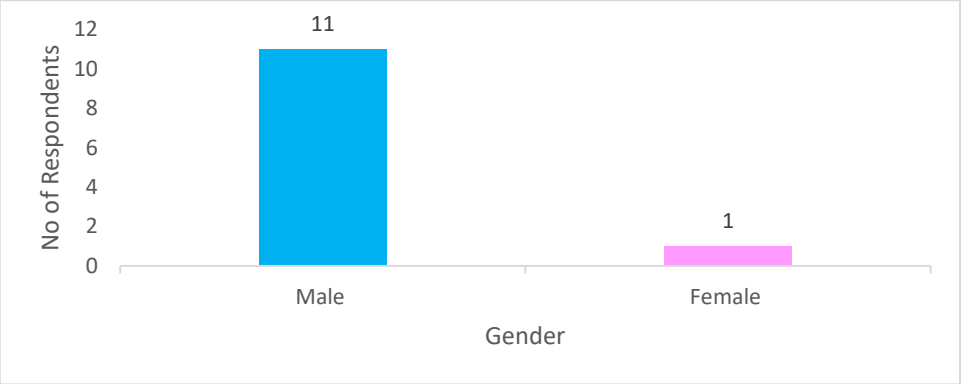


Source: Author (2024)

The above figure shows that the majority of respondents have been working in the company for more than 15 years, this indicates that the respondents have a very good understanding of the organisation.

3.13.3 *Gender of Respondents*

Figure 5: Gender of Respondents



Source: Author (2024)

For this study, the majority of the respondents were males. Although this could unintentionally reinforce gender biases regarding interest and involvement of new technology and may limit diverse perspectives as both males and females experience things differently, this is a fair representation of the automotive manufacturing environment as it is still male-dominated. Research by Ruggles (2024) suggests that as at 2020, women remained underrepresented in the Automotive Industry.

3.14 Interpretation of Results

This section presents an analysis of the findings on the factors that influence organisational readiness for Digital Innovation. Three key themes emerged from the codes.These were related and dealt with similar ideas, and shall be discussed in this chapter.

Themes

The analysis for this study was aligned to the following 3 key themes:

i. Theme 1: Understanding and involvement of Digital Innovation

ii. Theme 2: Readiness Factor Versus Digital Innovation
iii. Theme 3: Challenges and Barriers that hinder Digital Innovation

3.14.1 *Theme 1: Understanding and involvement of Digital Innovation*

This primary theme addresses Research Objective 2, which explored the perceived meaning of Digital Innovation within Company X and attempted to understand the extent to which Digital Innovation is adopted by Company X. It provides insights into the respondents' understanding and involvement with Digital Innovation. The following are the findings:

Sub-Theme 1.1: Existence and Involvement in strategy

In order to get a glimpse of the organisation in terms of its readiness for Digital Innovation, it was important to find out about the existence of a Digital Innovation strategy.

- **Roadmap**

The organisation has a 5-year Roadmap which was initiated 2 years ago, and was seen as the most prominent strategy currently in existence. A number of measures are included in this plan, for example vision systems, co-botics, and AGVs. The plan is flexible and adapts to the opinions of Company X's global affiliates. The plan is intended to be in place until 2024 and is driven by the Strategic Maintenance Department. The roadmap is evolving in nature, driven by ongoing discoveries in terms of the practical uses of AI and related technological cases. This was described by the following respondents:

Respondent 3 stated: *"We do have a roadmap and it started about two years ago. It's in our strategic maintenance department, on how we are tackling Digital Innovation.''* and further added that *''it's a five-year roadmap going through the various phases of innovation. As I mentioned, vision systems were one of the first*

steps. And then co-botics, AGVs, etcetera, all the following steps over the next couple of years."

Respondent 1 echoed: "*Our road map is continuously changing as we get feedback from other global Company X affiliates, as to how they are adapting. Of course you know, we're a developing country, and primarily a follow-on type of plant. We take a lot of the initiatives from some of the first world countries in the advancement of their factories."*

Respondent 11 shared the same sentiments that: *"Our road map is up to 2024. So far everything we had put into our roadmap has been implemented. For example, vision system. Our mother plant had asked as to design our own in-house vision system, to investigate it and increase our learning in artificial intelligence. We have been doing that progressively since 2020 and we are now in the position where we can roll out and share best practices more widely throughout the whole plant."*

And Respondent 11 further elaborated by: *"It is not fixed because as we learn and grow regarding artificial intelligence, what we have realised is that no one has absolute answers. Even the industry expects, they are also learning and discovering, with time, what the practical used cases are and what the theoretical features of AI are. And it is us who have to implement and execute these AI technologies in the manufacturing environment, it is us who have filter out what is theoretical not ready for production environment and what can be immediately implemented in production."*

❖ **Planning and changes**

Digital Innovation revolves around the concepts of planning and technological changes.

- **Planning and roadmap**

Strategic plans and roadmaps were being conceptualised and research on emerging technologies was being conducted in order to support strategy. Respondents were working with the General Managers to develop a Strategic Roadmap that aims to integrate AI and Big Data technologies into current production systems. This was shared by Respondent 11: *"We investigate new technologies and we advise on the roadmap as to how this can benefit the organisation and to strategically plan towards including these technologies."*
The respondent stated further that*: "We sat with general managers and made up a road map as to where we want to be with regards to new technologies, mainly artificial intelligence, and big data."*

- **Trends and changes**

By working in partnership with the Engineering Group and IT and actively discovering new Technology advancements, the team informs the company about such available technologies. They are constantly on the lookout for global changes, thereby bringing such knowledge home to analyse and consider how best to use those technologies in Company X's respective operations.

Respondent 1 stated: *"They tell us what's available, they're the ones that go and find some of the new technology between our engineering group and the IT people. They're exposed to a lot of the global changes and then they come back and feed them back to us. Then, we study how to implement them in our operation."*

- **Smart Factory Plan**

The IT, manufacturing and R&D teams are driving the "smart factory" strategy. The aim of this is to increase the organisation's digital footprint. Additionally, various departments are incorporating innovative digital technologies. The factory for the future strategy is well-known throughout the organisation.

Respondent 1 commented: "*Well, the initiatives are driven through the IT system, IT team or the teams within manufacturing which are researching, studying, doing, and then sharing. So, it's not a direct strategy, if you look at it falls within our smart factory plan, and our strategic maintenance plan on how we want to promote and increase our digital footprint."*

Respondent 9 added:" I *think the business strategy is clear and as a part of the ABC strategy the factory for the future is something that's kind of well-known throughout the organization. I think there's a lot of different departments that are bringing in innovative digital technologies. And I think the readiness of those departments is rather robust."*

- **Overarching strategy**

The strategy is overarching in nature, with a high-level oversight and strategic perspective rather than tactical planning. It highlights the organisation's efforts to digitise aspects of the workforce to ensure quality and safety, with the goal of ensuring efficiency and rapid vehicle production. Moreover, the strategy is dynamic and adapts as needed on a real-time basis.

Respondent 8 highlighted that: *"It's more a helicopter view, it's not tactical planning. It is a strategy at that point in time that might become a reverse strategy three hours later. So, it is a bit high level overview of Company X trying to digitize the various aspects of the workforce to ensure that we reduce any quality issues or any accidents or trying to get to build the vehicle more efficiently and faster, get it to the customer as soon as possible. So it doesn't go into the detail of how things are going to be done."*

- **KPIs**

One respondent mentioned departmental key performance indicators (KPIs), whereby the focus is on improving existing systems in line with the KPIs by leveraging Digital Innovation to support them.

Respondent 10 mentioned that*: "based on the department's strategic direction or KPIs, we look at how we can improve current systems or current way of doing things in line with the departmental KPIs and how the Digital Innovation can support the KPIs. So how do the emergent digital technologies support the current KPIs. So, I can't go in a tangent and do something that is outside the parameters. I have carte blanche or leeway to strategize but within the departmental KPIs on how we can better improve and transform the department."*

Sub-Theme 1.2: Understanding and importance of Digital Innovation

This primary sub-theme gauged the respondents' understanding of Digital Innovation, as well as if they saw it as important.

❖ **Process improvement and optimisation**

Most respondents perceive Digital Innovation as related to process improvement and optimisation. This was informed by the following:

- **Manual to automated**

Many of the current processes are manual, including the ordering of raw materials, and other customer-related processes. Therefore, the need to move to a more automated system brings about Digital Innovation.

Respondent 7 commented: "*As we stand and right now, we have a ordering system that orders raw material. We have a production system that tells us what the customer wants. We have a SAP system that tells us by part number what we should be ordering for that particular part number, for that particular quantity. So currently, there is an electronic version of what raw material has been ordered. There is a manual system of working out the production pattern".*

- **Analogue to digital**

Similarly, another respondent felt that Digital Innovation was the process of moving from analogue systems such as MS Excel to specialised automation systems for improved efficiency.

Respondent 10 described: *"And from a digital perspective is how we take analog systems or normally, physical systems or I'll say for example, excel per-se and we're making it, we automate it and making it more digital, if I can put it lack of a better word. So for me, Digital Innovation is making things better by digitizing the system and automating. "*

- **Driven by workplace innovation**

One respondent made an interesting point whereby workplace innovation drove Digital Innovation. Hence, Digital Innovation must support the innovation required in the workplace so that the benefits can be understood.

Respondent 12 stated: "*To me, it first starts with workplace innovation, before it goes to manufacturing environment. Otherwise, people cannot understand why you want to use Digital Innovation technology in the manufacturing environment if you not using it for the basics. If people can see the benefit of Digital Innovation within the office space, it makes it easy for them to visualise benefits of using technology in manufacturing environment as well as come up with ideas."*

- **Quality operations**

The technology should improve quality and operations, whereby it must enhance the overall quality of work for the team members as well as the working environment.

Respondent 4 elaborated: "*As in helping operators on the line-side to use the technology or to be assisted by the technology for the purpose of trying to get better quality vehicles coming off at the end of the line."* Respondent 4 further added: *"And then also to make the best impact for our operators on the line side to try and get them the best digital solution so that they can be assisted by this digital solution and have better operation and better quality of work area."*

- **Improve business model**

Digital Innovation should be used to complement or improve the business model of the organisation.

Respondent 2 stated: "*it's an opportunity to improve, optimize brand, our processes, our customer experience and then to deliver on a new business model."*

❖ **Digital information and data**

Digital transformation was also about digitising information and data.

- **Intelligence**

Digital transformation empowers the business by using real-time data to gain insight to improve operations. This involved using IoT and other related intelligent

technologies to convert data into ‘intelligence’. Artificial intelligence can also be used to analyse data for risks and gaps and continuous improvement.

Respondent 7 shared that: “*it's about digital information that is analysed through intelligence, whether it's an AI intelligence or a prewritten program that analyses digital data and gives you scenarios that either identifies risks or identifies opportunity for Continuous improvement. So, basically, Digital Innovation is innovating digital data to help us enhance the business”.* Respondent 6 added: “*Give me data, give me live information and controls that we know exactly what's the direction we need to follow in improving. Either being a process and could be a vehicle out on the road via IOT.”*

- **Accuracy**

Digital Innovation can allow for more streamlined and accurate information, thereby enabling better decision-making.

Respondent 5 explained: “*And obviously more accurate so it's readily available, I think one of the problems we have is with a lot of paper especially in manufacturing. And how do we make it easier and slimmer so we can get information that's better and can make better decisions with it.”*

- **Big data**

Big Data is prominent in the current era and Digital Innovation must focus on how to analyse and leverage big data, as stated by Respondent 12: *“by using some form of technology to manage big data which in turn will make us more productive.”*

- **Graphical**

Graphical and visual representations through touchscreens and dashboards can be very helpful in enhancing the ability to address issues more effectively by linking the information across different sections. This would be especially valuable between different production stages, such as linking the Weld Shop with the Paint Shop, and thereafter with the Assembly Hall.

Respondent 5 highlighted the following in this regard: "*I think from a production perspective, maybe how do we link weld shop with paint shop, paint shop with assembly hall in terms of defects so we can get detailed information. A dent is a dent but if we can get information on where it is with some sort of graphical representation on like touchscreens in paint and touchscreens in weld, so we can link it to the plants, I think it would be a good thing to do and will reduce the time taken to find and fix the defect."*

- **Traceability**

Traceability can be enhanced through the move to digital platforms such as cloud computing, whereby data will not be lost or damaged, as opposed to physical paper. Such a practice can also expand access to data. Moreover, comprehensive databases can also be used to store historical records.

Respondent 9 explained: *"I think in our context, it's about taking existing paper-based systems and processes and moving them into a digital space. And the objective of wanting to do that will be to ensure that we are able to create a kind of database and a history of activities related to the processes and systems which essentially leads to traceability of data and information in the long term. Papers get lost but if saved in a cloud, for example, you'd be able to maintain it for a long period of time."*

❖ **Efficiency**

Respondents felt that Digital Innovation can bring about efficiency in the following ways:

- **Balance of Humans and systems**

There will be a balance between humans and technology, whereby processes will not be human-driven only. Furthermore, technology integration through systems can promote faster and better processes.

Respondent 3 stated: *“at the end of the day it's all about improving efficiency throughout the plant. There's items that a human can do, but there's items that um systems can do probably better.”*

- **Real-time**

Information can be available in real-time, which can boost efficiency, especially when it comes to addressing problems, decision-making and process improvements.

Respondent 5 responded: *“No, so line- side like, I want to say digital displays linking the two plants together. So that whatever I find in plant 1 last and the same information will come up on a bar in plant 2 to say listen, focus on the left-hand front door 1. That information gets sent into plant 1 and 2 section leaders so they can start having a look at their processes, so it's real time feedback.***”**

- **Reduced workflow processes**

The workflow process can be reduced through digitalisation. Traditionally, manual operations involved going through various stages, whereas technology can cut out unnecessary stages and enable getting to the end-result much faster.

Respondent 8 stated*"the question is, how do I do this in half the time? Right? It might not involve bringing a robot into it you know, it can potentially involve taking out half the manpower, and instead of passing the ball from one to two to three to four, take out two and three and pass the ball from one to four, that's innovation,"*

❖ **Importance placed on Digital Innovation**

This sub-theme determined the importance placed on Digital Innovation. The results imply that there is insufficient attention given to this element.

- **Not enough attention**

Most respondents felt that not enough attention was given to Digital Innovation, which lacks the attention it deserves within the organisation. The lack of awareness amongst most staff creates little support because there are no resources allocated to Digital Innovation. Although there are some efforts made on paper, it is not collectively addressed and defined by the organisation and management. Hence, a more unified effort is needed to establish a clear vision and purpose thereof.

Respondent 8 expressed the following: "*So it's on the radar, but it doesn't get the attention it should. Because we are very worried about the models that we need to produce, the people, the quality, you know, OPR, we're worried about those things whereas what we want to do can enhance all of this".*
Respondent 10 added:" *But nobody really understand it fully and nobody really has time for it."*

Respondent 6 highlighted:" *I think right now it's on a piece of paper. We really haven't defined it as an organization. I'm not going to blame anyone and anybody. We haven't sat together and defined it and I'm talking whether it's senior manager engineering, senior manager maintenance, all the way up to whichever*

levels we need to take it up to. We really haven't sat down to really get it clear as to what is our end goal, that end in mind to build up what we want."
This was supported by Respondent 11: "*Currently, most people in the organisation are not aware of the benefits of using this technology so the support is minimal. There is no reserved resources for Digital Innovation within each department."*

- **Avoid being left behind**

One respondent felt that Digital Innovation was important so that the organisation would not get left behind. Being a global company, it was important to keep abreast of the latest developments. This was stated by Respondent 1: "*Ah, it's very important, if you don't keep up with it and again I'm not saying, just purely from an investment side, but understanding how the world and industry is adapting and moving forward with it. You will get left behind, and you know, as a global leader, Company X being a global leader, you have to adapt, it's imperative."*

- **Increasing**

Another respondent felt that it was slowly increasing as the focus on Digital Innovation has increased in recent years. This is due to its role in decision-making using real-time data. Hence, there was a growing expectation for the teams to make greater use of digital platforms.

Respondent 9 highlighted this by stating the following: "*I think it's increasing especially over the last couple of years, and more attention is being placed on the importance of Digital Innovation. I think there's a good recognition even from seeing that if we want to be able to have traceability of various elements and we want to move into a more kind of a predictive environment where we use data to*

be able to drive our decisions in real time uh then we need to adopt digital technologies. “

And:

“I think operators are increasingly being asked to use digital platforms.”

Furthermore, there is some acceptance by the Manufacturing team (operators) as this is where Digital Innovation benefits were most seen, as stated by Respondent 2:

“ I think, I think the acceptance by the manufacturing team is pretty good. I think they've accepted it and they see the benefits.”

Sub-Theme1.3: Involvement in Digital Innovation

This primary sub-theme examined the involvement of respondents in Digital Innovation in order to understand the extent in which Digital Innovation is implemented in Company X.

❖ **Monitoring and Quality**

Monitoring and Quality management was one of the key roles fulfilled by various respondents. This was informed by the following:

- **Production line**

There is an integration of additional cameras into the production line. These cameras are low-cost and are programmed to detect deviations and monitor hand movements and component changes. If discrepancies or quality issues are detected, the AI-powered systems can stop the production line, giving the operator an opportunity to resolve the issue to prevent defects outflow. This becomes very valuable for promoting quality management and real-time monitoring.

Respondent 8 commented: "*introducing additional cameras on the production line.*

That has been programmed with the correct process. So the cameras know that during a certain process production line A to D should happen, A, B, C, D, if two of the cameras pick up that a member of the line is not following the process A, B, C, D."

Respondent 8 Further described: *"That is predefined with processes, and it picks up hand movement and detects the actual movement of a part moving from the one, one position to the next position. If, it picks up anything in terms of quality, if it picks up anything in terms of the process, what it picks up that is shortcuts, it will stop the line, that's just one we're using there."*

Respondent 11 added: "*For now, we are working on Vision systems. These vision systems are implemented in the manufacturing environment, and it comprises of a camera which is not an industrial camera in most cases, it is a low-cost camera. What AI does, it enables a low-cost system to be deployed in the plant to be able to detect defects that can occur while the vehicle is being built at the point of fitment".*

This was supported by Respondent 4: "*Uh generally they will sell you some high-tech cameras for the purpose of this. But in hind side we thought using the basic stuff because the technology, and the programming was the main thing for us."*

- **Driver behaviour**

There were also systems in place to monitor driver behaviour in the following ways:

✓ **Sensors**

Some drivers drive tow motors recklessly and can lead to accidents with other tow motors, or to parts falling from the delivery trollies. Hence, sensors are being installed in the tow motors to monitor driver behaviour and gather data on driving habits.

Respondent 8 commented: "*Because they drive like formula-1 drivers, we are in the process of putting sensors in tow motors so that we can pick up driver behaviour. So, this is not to gauge how the driver is performing."*

✓ **Efficiency of routes**

In addition, sensors help in the transportation of parts to the assembly hall for car production. During operation time, these sensor monitoring systems assess driver safety measures and determine the most efficient routes to choose for a production line.

This was shared by Respondent 8: "*This is to gauge what driver patterns are there because from imported parts and local parts centers, there are parts coming into the assembly hall for the purpose of building the car, and these drivers take should be taking the most efficient route to get the parts to the production line so it can be fitted into the vehicle."*

Respondent 8 further explained*: "Now, these sensors allow us to pick up when we have peak times, how the drivers are getting the safety qualities, whether they are choosing the shortest possible route to get to the line, or whether we should then program for them. We'll then absorb all this information and provide the driver with the most efficient route to take at any point during the day."*

✓ **Error prevention**

By using digital analysis, potential risks or issues are detected in advance and information is used proactively to prevent future problems. Relating to this, Fail-safe systems contribute to the elimination of human error as it stops the flow to prevent errors.

Respondent 7 described this as follows: "*the second area of my business, from the quality challenges that we have, how to rely on the technical data that's already there from either the equipment or the daily quality activities and*

production and through digital, understand that we have a risk or a potential issue that could arise in the future that then allow us to use this kind of information proactively to prevent that risk."

Respondent 7 also stated: "*Fail safe systems are systems that basically stop the flow out and, and that gives us you know, human error elimination as such."*

❖ **Efficiency-driven systems**

Respondents were also involved in Digital Innovation in relation to production and future factories.

- **Innovation for Efficiency**

Some respondents did assert that the company maintained its pace with technological advancements and enhanced operational efficiency through Digital Innovation. Despite limited resources, the team initiated the digital revolution at Company X.

Respondent 8: "*my task as a manufacturing head of IT is to ensure that we probably move with the times and ensure that we use digitization and innovation to enable the business more efficiently and more effectively."*

Respondent 2

" I was responsible for setting up the innovation team in the company and that was under our support coordinator from our mother plant. They had seen innovation teams set up globally and felt it was time for us to do it."

Respondent 4

"Our support coordinator from our mother plant and Respondent 2 were the ones that initiated the digital revolution of COMPANY X. So they put me in there by myself, and they said, try to go do this. So, it was kind of difficult with no resources to actually start.But with reading, gathering some of the resources and

begging and borrowing we put a team together. I say that uh intentionally, begging and borrowing."

- **Business Intelligence**

The organisation uses Power BI systems which analyse down time, potential interruptions and spare parts usage in various areas. This system allows for the identification of areas experiencing more frequent interruptions, thereby enabling targeted measures to be taken.

This was informed by Respondent 5: *"Well Maximo is in weld-shop, it's just arrived and Power BI has always been there, but we've never looked at the maintenance side. So, in weld-shop specifically, we've started with Power BI and Maximo. It's probably been running for quite some time now."*
Respondent 5 elaborated that: *"some of it is predictive, but it's also spares, and it works out downtime per area. It works out potential failures, it's got quite a merge of things. It also explains which areas got more downtime than others. For example, underbody might have more downtime than main body. So it gives you quite a scenario of events that you can act upon."*

- **Future systems and factories**

With a focus on implementing smart-factory technologies, the company has an innovation team dedicated to exploring new technologies, ranging from vision systems to co-bots and other advanced technologies.

This was stated by Respondent 3: *"We've got an innovation team that looks at new technology for the future, starting with systems such as vision systems and moving on to co-bots and other systems called future factory implementation."*

❖ **Solutions and development**

Some respondents were involved in providing business with solutions and development some of the technologies inhouse.

- **Written data to electronic**

Some respondents were involved in converting manual written data systems into electronic systems. They used such innovation to obtain real-time insights and make use of digital information, which was seen to improve business efficiency in any particular area of their operations.
This was described by Respondent 7: *"So, how do we now digitize this information? In our systems, there's a lot of written data. How do we now put it into an electronic system and then through innovation, how do we understand where we are from a real-time point of view and how do we understand where the gaps are and how do we move forward using information digitally to run the business efficiently? That's in one area of my business."*

- **In-house development**

Respondents mentioned the Big Data Integration Strategy that they have implemented within the company. They either design their own equipment or obtain the required technology to accomplish this, with the goal of increasing the number of devices in the plant for efficient big-data deployment and collection.

Respondent 11 stated: "*Regarding execution, we also design, develop, and build our own technology to execute our strategy. For example, we want big data in the organisation, so our strategy is to have more devices in the plant to collect the data. How do we do that? We design our own equipment or source the correct equipment and deploy it in the plant."*

- **Advisory and consultation**

Some respondents are informed about new developments in technology, and they also offer their opinions on potential applications of these advancements in manufacturing, sales and marketing. They try to understand how these technologies will fit into the organization's future, and meetings with IT are used to match organisational requirements with technological solutions.

Respondent 1 commented: "*Well, we hear what the technology and the IT solutions are going to be, and then we comment on them, whether it's for sales and marketing or for manufacturing."* Respondent 1 further elaborated: *"We try and understand how it's going to fit into the organization going forward. So, the meetings with IT and people like that is just to basically give them a need, like a needs analysis."*

Sub-theme 1.4: Significance placed on Digital Innovation

The significance of Digital Innovation was determined in terms of respondents' perceptions.

❖ **Quality and improvement**

Quality and improvement was found to be one of the high ranking factors in terms of significance. This was informed by the following:

- **Error prevention and quality control**

Respondents spoke of a fail-safe system as error prevention for data storage and recording when it comes to manufacturing. The fail-safe system uses lights to signal conditions. The green light means that conditions are suitable, while the red light indicates errors. Such digitisation enhances equipment reliability and traceability across different departments.

Respondent 7 stated: "*We are using it purely from a fail-safe point of view in terms of data recording and storage. The next stage we have started is that we are now doing the system together with a supplier where we now digitally analysing the data for parts variations within a tolerance band and do trend analysis. And so, basically, the fail-safe system flashes a green light, and it goes right, no problem."* Respondent 9 added: *"But I think from a more kind of operational perspective, if different departments have got traceability around equipment or around machinery, we'll be able to improve the reliability of the equipment."*

- **Production and logistics**

One respondent felt that digital technology was making it easier to facilitate production. In order to ensure that production is in line with the logistics supply schedule, the use of digital information transfer becomes important.

Respondent 7 informed:" *We're using the digital transfer of information to produce in line with the logistics supply timeline. For example. we are currently using it to drive production based on what the internal customer is ordering whether front axle or rear axle (4x4, 4x2)."*

❖ **Competitiveness and growth**

Digital Innovation played a significant role in competitiveness and growth.

- **Business continuity and minimal risk**

Digitisation could lead to added business continuity whilst keeping risks to a minimal.

Respondent 6 stated: "*For me, it could be for business continuity, business risk down. Yeah, because two hours stop in Company X alone is a lot of money and this impact on the profitability as well. "*

- **Competitiveness**

Digital Innovation can lead to improved processes and systems, which can enhance competitiveness. The sdded operational quality and reliability of vehicles can improve the company's reputation.

Respondent 9 mentioned that: *"I think if we're able to get processes and systems into the digital space, it will allow us to be more competitive. The reason for that is that traceability will increase, for example, data related to a vehicle and data related to a machine. If you're able to access that from a digital space, it's a game changer."*

- **Scalability**

Digitising operations is very important in maintaining effective control over processes. Hence, there is an ongoing need for scalable and sustainable systems, especially with Company X being a global organisation.This was stated by Respondent 10: "*So, for me it's very important because we need that, we are a global organization, so our systems need to be scalable, we need to be sustainable and we need to know exactly what we're doing and the only way to do it is if we digitize."*

❖ **Strategic and future**

Digital Innovation was pivotal for maintaining strategic advantages and for embracing the future.

- **Artificial Intelligence and IoT**

Respondents expressed optimism towards the use of AI-type technology and expanding it to various areas such as the weld shop as there is considerable potential benefits in using AI technology in quality control, for example gap identification and detecting scratches and dents.

Respondent 2 mentioned: "*The ones we trying to do right now in quality and there might be some others that are out there, but there's gaps you can do with, you can get, gap control on, on bodies. You can do lights, light detection, you can do dents and scratches. You can do inspection line you know. There's so much work we can do with this AI technology and cameras. And I think we just on the tip, we've got to get stuck into it and then if you go into weld shop, you've got huge opportunities, it's something massive." And Respondent 3 added to this by:"I think it's the way of the future as far as IT, AI, IOT, and all these systems that can be implemented. At the end of the day, Company X operations can definitely benefit if we implement them throughout the plant."*

- **Decision-making enhancement**

Accurate information through digital innovation will improve decision-making, especially in relation to understanding and addressing customer needs. It can also create more awareness about existing problems that may hinder the improvement of operations in the evolving business environment.

This was expressed by Respondent 5: *"Well, I think the significant impact will obviously be better quality, so better throughput, better SDR, better feedback into the plant, and obviously, at the end of the day, better for the other customers (internal or external). And we can make decisions based on what we see, not what people tell us."* And Respondent 10 added:" *So if we do not understand, unpack and actually mine the data and analyse the data, we're gonna lose our customer because we wouldn't even know what problems are we finding or actually understand and synthesize what the data means for us and what*

decisions that we need to make from a shop floor level as well. If we do not innovate and digitize, we wouldn't know because this is about making everything better. The world is moving."

- **Future-factories alignment**

Digital technology has a direct impact on the 'smart factory', which focuses on the use of innovative technologies to improve productivity, efficiency and the overall quality of vehicle production. Hence, technology has a transformative influence in all aspects of the business, including sales, vehicle production, purchases and future product development.

Respondent 1 stated: "*this is where I think, towards our smart factory I think it's going to have a significant impact. I think if you look at where the technology is going, and the smart factories are going and how they're transforming, and the impact that digital technology is having on it is significant".* Added: "*It's transforming the industry in all areas of the business, whether it's sales, vehicle manufacture, purchasing, future product, I think it's a huge impact".* And further explained:" *Well, smart factory is adopting the newest and the most innovative technologies in producing vehicles. Obviously there's technologies that are used from automation, digital systems and recording systems. That's all about productivity, efficiency, better quality, how to be more efficient, and how to build vehicles safely. And those new technologies, whether it's in the logistics operation or vehicle manufacturing operation, they are advancing at a rapid rate and if you look over the last five years, how it's changed, it's quite significant."*

3.14.2 *Theme 2: The Readiness Factor Versus Digital Innovation*

This primary theme determined the readiness of the organisation for Digital Innovation. It addresses Objective 1 which sought to identify factors that influence

organizational readiness for Digital Innovation within the automotive manufacturing company in South Africa by focusing on Company X.

The following is an analysis of its sub-themes:

Sub-theme 2.1: Level of readiness and factors for Digital Innovation

This primary sub-theme established the level of readiness and the factors influencing readiness, which was found to be low.

❖ **Low readiness**

A majority of the respondent indicate low readiness, which was informed by the following:

- **Culture**

Culture was seen to be the highest ranked factor impacting on low readiness. This included the following factors:

✓ **Hesitance**

There was overall hesitance to adopt technologies by employees who feared job loss. They felt that technologies such as AI may replace them and their jobs. Therefore, education and awareness was crucial to alleviate this hesitance. Staff needed to know that technology is there to assist them and not to replace them.

Respondent 8 highlighted the following*: "I think there is a gap of level of understanding, because the moment you speak digital, you speak artificial intelligence, somebody feels like they are going to lose their job."*

Moreover, Respondent 8 added: *"Um so as a matter of fact, we are educating as we go along, to say that we are not saying we need to remove man and replace with machine. We are looking at how we can put man and machine to work together. You know, we do, let the machine do the mundane day to day tasks."*

Respondent 3 supported this by stating: "*From some people, as much as from a management point of view we are embracing it and we are saying we need to do it. I think if we look at an operational level there may be some hesitation to embrace it."*

- ✓ **Lack of communication**

There is an evident lack of communication regarding Digital Innovation within the company as there are no open conversations and/or meetings on Digital Innovation and how it will impact the business. Respondents therefore feel that clear communication and providing understandable information to staff will foster an environment where questions can be asked without people feeling belittled.

This was highlighted by Respondent 12: *"Digital Innovation is not being spoken about, it is not being communicated, it is not being socialised, there is no conversations on Digital Innovation and how it will impact our business in the future. There are no meetings to talk as a company about digital transformation. I can tell you that no SM will have anything to do with digital technology in their department's strategic direction/plans. Everyone is talking about how it is a good idea, but we not socialising it. Those are the barriers."*

Respondent 6 stated:*"Clarity is important as well, I think that communication and making sure that you can communicate and give as much information and understandable information to your seniors, but also the seniors can just ask relevant questions without demeaning the other person. It's that cross-link and at the moment, I feel that people give us a long presentation and you also wait until the end to ask questions".*

Respondent 6 added: *"You just need to deal with that communication aspect, the training, the practicalities, the explanation. We need to go through that and explain to everybody what the capability of what we're trying to do, our angle in which we want to be this capable, we need to explain why we want to be this capable. We need to explain why we need to do this, from an organizational point*

of view, from a personal point of view, meaning within your own job exactly how that's going to help you to be a bit more productive, a bit more agile and so many things."

✓ **Slow Adoption Due to a Traditional Business Culture**

Current adoption is slow due to traditional manual and paper-based business practices. Hence, there is a need for a mind-set and mentality shift towards a more modern approach in the long-term.

Respondent 8 stated: *"but our adoption of it need to change. The adoption rate is too slow and it's because Company X is a traditional business which is old school".*

Respondent 9 added: "*But I think the other element is from a people perspective, I think a large part of our organization is used to seeing things in a more traditional way and changing the mindset or the mentality of the broader organization is a way that is required and perhaps that's a more long-term approach that we need to take."*

Respondent 9 elaborated: "*Uh, and if the culture is predominantly used to kind of non-digital paper-based environment. A lot of that stems from our guidance and support from mother plant colleagues where we create meeting rooms in which papers are visualized and used for the management of several different processes, of which this is one well-established area at Company X. I think when we speak about culture, perhaps in, our mother plant, there is greater discipline, and their paper systems Is relatively Robust."*

- **Leadership and Management**

Leadership and Management was perceived as an added contributing factor to low readiness in the following ways:

✓ **Leadership Comfort versus Proactive Vision**

Leadership, inclusive of General Managers, seem to be comfortable with the current culture and are not envisioning the future of Digital Innovation, such as AI and related technologies. Hence, the organisation has only scratched the surface in harnessing AI. Moreover, there appears to be an absence of strong executive directives for incorporating a 'Smart Factory'.

Respondent 8 highlighted the following: "*I think at this point in time, the GMs are really comfortable where they are sitting, you know. Nobody has given that task to the GM to map out how they see their own business unit in two years' time, given AI. It's not just an IT problem. It is a business-wide problem. So it is fully aware of what's happening with AI, and the business is lagging behind because they're not tech savvy and they are almost scared to talk about it, and this makes sense."*

Respondent 7 shared the same sentiment by stating: *"On my performance management measurement, is there anything on the introduction of smart factory or for developing people towards 'smart factory' or to introduce a specific technology? No, It's not there as an executive specific detail for me to follow."*

Respondent 2 commented that: *"Opportunities are immense, so I think we've only just touched the tip of the iceberg."*

Respondent 2 added*: "We need to expand it, we need to have a holistic view on management, so management needs to drive this thing. I think at each of plant there should be a job from the VPs and general managers of that plant saying this is what we want to do; we've got issues in here, then get the innovation team inside that space to solve those issues and this innovation team is self-funding; basically, that's the way it should be."*

- ✓ **Management drive and cascading**

Leadership and management do not disseminate knowledge on Digital Innovation to the broader organisation. Digital Innovation must be driven from the top, with regular reinforcement and active discussion by management to instil a

culture of Digital Innovation throughout the organisation, as articulated by Respondent 12: *“I feel very strongly that Digital Innovation need to be led from the top. There needs to be daily reinforcement from the top, management need to talk about Digital Innovation and practice it.”*

In addition, Respondent 3 highlighted that: “*There's a couple of senior management, executive management that get to see the system in operation and how it's being tracked, etcetera but I don't think that that has been shared or rolled out to the rest of the organization at the different levels.”*

✓ **Management understanding**

There seems to be a readiness gap in management understanding of the Digital Innovation requirements for the organisation. Hence, Management may not understand technology themselves which leads to uninformed adoption of technology that is not beneficial for the company.

This is noted by Respondent 2: “ *It's lack of understanding what's out there, we just doing the same old, same old*.”

This was supported by Respondent 11: “*However, there is a lot of learning that one needs to do but the assumptions is that its like managing any other project and the problem with this is that if you get just anybody, the supplier will supply you with technology that is suitable for them to money with and we will be stuck with technology in the plant that is not even getting used. We are not ready in terms of management understanding of what is actually required in order to digitally innovate (Skills etc etc).”*

✓ **Management support**

There appears to be a lack of overall management support for Digital Innovation. Management views it more as a task rather than something of value and impact. Consequently, the right skills are not assigned, which results in a lack of clear-cut support for Digital Innovation, as described by Respondent 11: “*people in management do not fully understand the value in which Digital Innovation will*

bring into the organisation in terms of cost and quality. They are seeing it more as something they have on their list of things to do which they need to do. So when we go to the plant and we want to install an AI system and ask who the best person is to support us, they offer a person with mech background and most of time with no interest in digital technologies. This becomes just a warm body that they offer just to tick a box to say they have supported us. The reality is that at general manager level there is a false understanding that in order to digitally innovate, you can get anybody from the plant to do it ."

- **Organisational Limitations**

Organisational limitations resulting from structures in place and resource availability for digital innovation did contribute to low readiness.

- ✓ **Structure needed**

Organisational structure plays an important role in promoting Digital Innovation. Currently, a more structured approach is needed in order to fully realise the potential of Digital Innovation, especially when it comes to AI. This is due to variations in approaches across different departments, sub-groups and/or sub-divisions dedicated to innovation. Hence, more work needs to be done to be able to make progress due to the limiting structure currently in place.

Respondent 3 shared: *"I think following that, the organization and the leadership and the technical skills, etcetera will follow. But I think it's still got a way to go. We've got a limited structure in place."*

Respondent 2 added: "*They've just got to grab it by the horns, but you're not going to do it unless you put your structure in place."*

Respondent 9 elaborated: "*So I think that's a very important element, the other one I think that's perhaps important is around organizational structures and I think right now the approach that we're taking is that there's different kind of subgroups or subdivisions that are pulling together innovation but perhaps in other*

organizations, It is one kind of unit that is being consolidated approach to Digital Innovation. I'm not sure which is the better approach and I think there are benefits and, or advantages and disadvantages to both types of strategies."

- ✓ **Strong driving team**

There must be a strong and innovative team to drive Digital Innovation success. However, this was currently absent, and respondents felt that each section should have a dedicated team to drive Digital Innovation.

Respondent 2 advised: "*you must have a return, an ROI on it, and then you will start to see the benefit of it. But you need a very strong team in there. That's as simple as it gets, without a strong team, you're not going to succeed as an innovative team."*
In addition, Respondent 3 mentioned: "*So, I think each plant should have a team that supports those implementations of ideas."*

- ✓ **Funding and investment**

There is a current challenge in balancing funding with benefits, especially in terms of deriving benefits. Some technologies required high investments, yet the return on investment was not practical or easily realised.

This was described by Respondent 1: "*Look, at the end of the day all of it is going to come down to finance. I hate to say that, but what concerns me and what I've seen is that technology is changing quite quickly."*
Respondent 1 further explained:" *For example, the camera technology was extremely expensive when we first started putting in. The return on investment was just not viable. But you do it as a test to understand and see what's available if you look at it now, even five years down the road, it's a huge difference. So, it's a case of getting the timing right to make it economically viable, but still being*

able to progress, advance and get the benefit from it. That's the challenge we have, especially in our environment."

- **Generational**

The generational impact on low readiness was a notable factor. This is resulting from how different generational groups working in Company X feel and react towards technology

- ✓ **Older generation resistance**

The older generation tends to resist change, primarily due to their lengthy experience of using traditional methods. In addition, adapting to technology due to their age becomes challenging. They also have fears related to technology taking over the workforce. The generational challenge has been highlighted by the following respondents:

Respondent 8: "*the older generation, they are underweight at the time, they don't change, that's why they become an obstacle. But um maybe one generation below them, they take the same boat, I'm doing this job for 10 years. Why do you want to change it now? I'm happy with it"*

Respondent 1: "*they're quite afraid of it and they, I think there's a lot of reluctance, I don't want to say reluctance but nervousness around the effect that it has and how they can fit into it. I think my image; my view is in the next cycle of 10 to 15 years, it's going to be something that everyone automatically deals with."*

Respondent 5:"*So we have a very aging middle workforce, I know there's some youngsters coming through but generally if you want to talk about manufacturing from manager down to group supervisor to operator is very aging from a digital perspective, they're not really interested in anything else."*

- ✓ **Younger generation's inability to speak out**

Whilst the younger generation is more welcoming and adaptive to technology, they do have certain limitations. They are hesitant to push ideas, speak out or make bold statements in favour of Digital Innovation as they may fear negative perceptions from their managers as their managers are part of the older and traditional work culture.

Respondent 8 stated: "*The other two, they're there for that, they are into change, however they are in terms of taking order and the level of skills of the employment are not in the position to make these bold statements because they scared the manager is going to think, I want to get rid of my manager."*

Respondent 8 added: *"Unfortunately, the new generation Z, they report into those old cultures and are sometimes impacted by the decision making of this culture and too scared to speak up, that I picked up when I did my study for AI, not long ago. "*

In addition, Respondent 12 stated: *"The second camp is the younger generation which is inquisitive and has an enquiring mind around Digital Innovation, but they are not responsible for executing the strategy. So, if I was the president, I would say, let's get this younger generation to make the strategy. Because that is what excites them."*

- **Resources and Infrastructure**

Resources and infrastructure remain a historic and current limitation to readiness.

- ✓ **Infrastructure**

There are challenges with the network infrastructure at Company X, particularly when it comes to Wi-Fi. While office areas have good Wi-Fi, other critical sections such as the plant still require better IT infrastructure to accommodate Digital Innovation.

This was described by Respondent 9: "*so, in order to move into a digital space or to be ready to innovate digitally you need to have a really robust IT infrastructure whether it's a hardwired or a WiFi infrastructure. I'm of the current understanding that at Company X we've got some struggles with our network infrastructure and we're still trying to develop a more robust WiFi kind of operation*." In addition to that , added *: "Especially in the production region in the offices that somehow believe the WiFi is well established but in other areas like in the plant there's still some work that needs to be done to the IT infrastructure. I think Digital Innovation also goes beyond just network capability."*

- ✓ **Limited systems**

The current systems are limited in Company X. For example, even barcode scanners which are seen as relatively old technology have not been fully implemented across the organisation. Some critical areas still lack automation and rely heavily on manual processes. Hence, the organisation has much catching up to do, as highlighted by the following respondents:

Respondent 3:" *it's one thing to drive it and to try and make it happen but if the organization doesn't accept digitization or AI, etcetera then we're gonna really struggle to implement successfully and to maintain those systems."*

Respondent 11: "*This could be an old, mature technology like a barcode scanner, which was invented in 1959. In some places in Company X, we still have not yet implemented a barcode scanner. So, if we are talking Digital Innovation, I do not know how innovative that is. However, Company X has a lot of catching up to do."*

Respondent 5: *some plants have got no automation in there. They've got no cameras in there to say, what's got a dent, what's not got a dent, and to do the quality check, we rely on people.*

- **Resources**

Resources are currently limited as they are not prioritised for Digital Innovation. Moreover, resources are mainly used reactively rather than proactively. Therefore, to effectively allocate resources, it must be in alignment with the organisational direction for Digital Innovation. This was described in a narrative as follows:

Respondent 5: "*For me, it's all about the resources. I don't think we geared up anywhere in Company X for the digital explosion."*

Respondent 7: *"In terms of resources, I'll be frank and fair to the point that currently our resources are spending their time on either reactive activity or project activity however, moving our resources to spending a lot more of their time on futuristic, 'smart factory' item is very, very limited based on the limited structural resources that we have"*

Respondent 6: "*I think prioritization of resources is number one, and then prioritization also comes with that whole realignment with the organization in terms of where we're headed because if you realign and your organization is going a certain direction, and you prioritize work accordingly, you then put the resources accordingly."*

- **Skills and experience**

Staff skills and experience were not at the point of readiness, according to the data analysis.

- ✓ **Review of HR skillsets and talent recruitment**

Respondents felt that there needs to be a complete review of talent development within HR department to align with the skillsets required for Digital Innovation.

Hence, outdated criteria must be updated to be more current so that the right skills can be recruited to meet the demands of digital transformation.

Respondent 8 stated*: "I advised the change of the criteria of those resources that we traditionally used to get. We used to get like the BSC type person, you know, with programming. Now we want the data analytics person, the person who has coding skills, a person with mobile skills and that has been communicated to them. Therefore, I say the talent development within HR or the HR services needs to be reviewed completely to the skillset of the people they want to bring on board. Because if they gonna go 10 years back and appoint people traditionally they are anti-digitalization; we're going to have a problem."*

- ✓ **Skills alignment**

Respondents argued that the right people should be placed in the right positions to make the best use of their expertise. This was complemented by the analogy of 'placing the right people on the right bus and at the right seats'. Two main aspects were asserted. Firstly, there was a need for more technical skills for digital development. Secondly, a clear needs analysis had to be conducted for identifying areas where Digital Innovation can enhance performance.

Respondent 10 commented: "*We have highly skilled engineers. If you're looking at shop floor members, I think that right now from an HR point of view, they've got shop floor members that are highly educated and in a technical field as well. So from a talent and pipeline point of view, we do have people and that intellectual capital within the organization. But it's a matter of us actually realigning the people into the right areas for them to tap into that space because you can have all the people; everything else is the same as making sure that we have the right people in the right bus, in the right seat."*

Furthermore, Respondent 10 stated: "*So if you have the people but they're in the wrong bus and not in the right seat, we won't be able to harness what we want to*

get out of the people. So the people are here but it's a matter of us managing and making sure that the structure is in line with what we want to see in the future. And we actually encourage the exploration portion of it instead of creating rigidity, because remember, innovation and continuous improvement is part of our philosophy as Company X as well. So for us, it's actually us going back within ourselves and sticking to our philosophy of failing forward and continuously improving and optimizing the talent and the skills that we have internally instead of creating more red tape in order to get what we need to do."

Respondent 9 added: *"The first one is around the technical skills to develop digital systems or to innovate, and the second one is around the business needs analysis. And that's the people who are working in operations to be able to identify potential areas where Digital Innovation can uh lead to better performance. "*

- ✓ **Technical skills**

Technical skills were currently lacking and there is a critical need for further development to effectively support Digital Innovation. Moreover, there appears to be a lack of training for certain teams over the last three years, which in turn presents a challenge when it comes to exposure to new technologies. This can hinder advancements and best-practices in the sector. The concept of best-practice sharing is highlighted as it relates to the importance of sharing best-practices across the whole organisation as per the organisational philosophy.

Respondent 3 expressed: "*I think there's still a lot of development that's required. More around the technical skill perspective in order to support these solutions. It's, it's no meaning to put in a, a system and there's no technical capability to not only implement but to maintain that system. So, I think there's still a way to go as far as some development is required."*

Respondent 7 added:" *But over time and I'm only talking for my three years now in manufacturing, over time, my people have not been sent for any local or global*

training on the new technology that's available out there. My people have not been given opportunity to familiarize themselves with new technology, they would never know what they don't know without being exposed to the operations either globally. I'm sure you're familiar with the Company X best practice sharing concept."

- ✓ **Limited experience**

There was also a lack of or limited experience. Consequently, as business complexities increased, skills and experience levels were insufficient to embrace such complexities and capitalise on available innovations.

Respondent 2 stated: "*there's limited experience. I think we are a small dedicated team."* Respondent 7 added: "*we've inherited those systems and it was adequate at the time of what it was expected to do. However, as the business complexity increased, meaning the variations, meaning the number of components, meaning the skill level, meaning our partners that are doing work on it. I would say that we have not adequately prepared our people for the innovation that's out there."*

- **Strategy**

There were also limitation from a strategic perspective. This entailed the following:

- ✓ **Alignment of HR and Digital Innovation strategy**

HR needs to align and with the Digital Innovation strategy, as some activities may require HR to re-allocate and place staff accordingly in alternative work. They have to also manage the impact of technology on employees and support the business need/ requirement by sourcing the right skills on time. This has been highlighted by the following respondents:

Respondent 8:" *if I go into plant tomorrow and put a robot there, it probably won't be accepted very well. I feel we still have a long way to go and when I say a long way to go, maybe from a human resource of management. Because as we introduce technology, HR should find alternative work for those individuals that will be impacted by technology. I don't think, this is not just an IT strategy, this should be a global company strategy including HR because they can understand what the other people want and also, when they employ people, they need to employ people with the knowledge of AI, so their strategy will have to change and complement that strategy."*

Respondent 11:" *Has there been enough focus on human resources for this Digital Innovation? I would say no, we have not been engaging enough with academia, in close contact with academia to supply relevant skills for Digital Innovation. We do have enough skills to support business core function, however, our HR is not being able to source enough talent to be able to support this. I think what is already available within Company X, these are people who have studied this kind of thing years ago and are not coming in with knowledge of latest technology and it will have to be a learning curve for them."*

- ✓ **Strategic foresight**

At a strategic level, there is a lack of strategic foresight, which is not conducive to driving innovation. Leadership must have the ability to predict future requirements and align innovative initiatives for business sustainability.

The following comment was made by Respondent 10: *"But from a strategic level, we have gaps that we need to sort out, because I'm going to go out on a limb and say we cannot have analog leadership driving innovation, if I can put it like that because you need that strategic foresight in order for you to see the need. "*

- ✓ **Lack of an end-goal**

There is no ‘end-goal’ relating to the desired outcome. Management must determine and understand the desired outcome before assessing the company’s readiness for Digital Innovation. This can then inform planning and prioritisation.

This was mentioned by Respondent 6: “*I think we still have a long way to go with regards to the path, what do we require out of that path, or should I say, what's the end goal? Have we defined it? No, we haven't. We need to define an end goal, then we can clearly understand what our gap is, that readiness of zero to ten, but the infrastructure is not an issue. It's really available everywhere, systems integration, and that's easy. Just having clearly defined the end goal.”*

- **Business needs first**

Currently, business needs were being put first, before innovation as the main focus of individuals is on business continuity and meeting daily KPIs.

- ✓ **Balancing business continuity with innovation**

Whilst business operations and continuityn are important, these should not totally overshadow innovation. One respondent felt that there should be a more ambidextrous approach, which translated to balancing the imperative of keeping the business afloat whilst also exploring innovation.

Respondent 10: *“but it's a matter of us having a better balancing act on our trade-offs and managing the paradox of keeping the business afloat now and actually exploring, I'm going to go back to what I said, being more ambidextrous. It's not a matter of capacity but it's a matter of us having a better balance of the two paradoxes with regards to exploiting the current capabilities that we have for obviously making sure the business is afloat, versus to changing it to something.”*

- ✓ **Backburner**

Technology does get placed on the backburner at times. Whilst there is initial enthusiasm around new technology with many staff wanting to be involved, it eventually loses momentum and participation dwindles as staff become drawn into their daily roles and responsibilities.

This was described by Respondent 10:*"So when it's there, everybody wants to be part of it. Everybody is excited when they see new technology being implemented in their areas. Everybody thinks it's good, everybody whatever it is but when it comes to them actually doing it and them actually fully supporting it at the expense of the core function and all the other things, then it's something that takes a backseat very quickly."*

- ✓ **Short-term priorities**

Short-term priorities such as deadlines, immediate gains and current operational needs overtake long-term considerations of Digital Innovation. Hence, KPIs are usually defined based on core functions and areas of importance, and digital initiatives do not get the attention they deserve.

As stated by Respondent 10: *"Short-term priorities, the deadlines, the short-term gains, the making sure there's stability right now, making sure it's right now, making sure we got production right now. There's a whole lot of issues, and I think it's the different paradoxes. Then, automatically default position everybody looks into is today and what we can do in the short term and the future. It just takes the backseat.*

I could set up KPIs and just focus on core. So again, it goes back to priorities. If the management thinks it's not important, they could actually go and make the KPIs whatever the core function is, and not make that as an issue. "

- ❖ **Mediocre readiness**

Some respondents felt that the organisation was at a mediocre level of readiness, and this was based on the following:

- **Infrastructure**

The organisation seemed to be focusing on attaining the necessary infrastructure, indicating that it was a relatively straightforward task. Therefore, it was felt that they were at a readiness level of 5 or 6.

Respondent 6 informed the researcher: "*I would say infrastructure we can get in place as soon as possible readiness would probably be up between 5 and 6, we know that's, that's an easy item. But then the questionable items here is, are people training and understanding of what we really need to do from an organization point of view."*

- **Leadership**

Another respondent felt that Leadership was creating a path towards digitisation of the organization.

Respondent 6 commented: *"I'm talking about leadership literally putting the path towards digitization of the organization."*

- **Varied Interests**

There was a varied group of interest from people, whereby 25% were enthusiastic, 50% were fairly willing and another 25% were hesitant about new technologies

Respondent 6 stated: "*You'll have people that, let's see, let's make it 50, 25, 25. So there are people who are willing, wanting, and waiting, you know, 50%. And that's 25 % who are basically ready and hungry people; they just really want to do it. Then you'll have the 25 5 who are living in fear."*

- **Operational readiness only**

One respondent felt that the operational readiness per se was very good and a strong population of the staff did want to use the technology.

Respondent 12 shared: "*Our level of readiness from an operational point of view is very good because we have a very good population of inquiring people that want to use the technology."*

❖ **High readiness**

However, some respondents did feel that the readiness levels were high, for the following reasons:

- **Environmental**

Some teams are well-informed with current global environmental developments and are aligning efforts accordingly.

Respondent 1 commented: *"I touched on carbon neutrality and some of the ever-changing environmental elements, you know. We've got a diverse team that's up to date with everything that's happening globally, and we're in line with that."*

- **Innovations per department**

Respondent 9 lacks complete oversight of production and quality operations organization-wide, but based on interactions with relevant departments, they note the emergence of innovative ideas in the digital space. New graduates within the organization are exploring technologies like Power BI and Power Apps, indicating a growing interest in lower-level digital technologies.

Respondent 9: "*I don't have full sight over the production and quality operations across the organization to make to make kind of a general comment, from my interactions with both production and quality related departments, I know there's some innovative ideas in the digital space that's coming out. And I've seen it in presentations from new graduates that have been employed in the organization*

and it's starting to play around with things like Power BI and Power Apps and those type of things perhaps lower level technologies in the digital space."

- **IT Team and Collaboration**

There is active collaboration between the IT Team and leaders in the field to stay abreast of technological advancements.

Respondent 1 stated: "*So, our IT system is the same and our IT team is exactly the same. They're at the forefront with a lot of the global leaders to try and make sure that we're ready for that. So, I think our level of readiness and our preparation for the continuous change is ongoing. The only gap we have is, I'd say, primarily at the production operator level."*

- **Systems**

A robust technological approach and respective systems are in place within the organisation. The business strategy revolves around 'ABC' strategy and the smart-factory concept, which is well-established within the company.

This was described by Respondent 9 as follows: " *I think from the perspective of the technology, I think we've got a relatively robust type of approach and systems for the influence. I think the business strategy is clear and as a part of the ABC strategy, smart factory is something that's kind of well-known throughout the organization. I think there's a lot of different departments that are bringing in innovative digital technologies."*

- **Testing**

Teams are given the budget and flexibility to conduct systems testing and the successful implementations are thereafter extended across the organisation.

Respondent 1 stated: *"And the testing and the understanding and how to apply it, like some of the vision systems and some of the park management systems that we're putting in with technology. They're doing, they're testing it, they have the free will and the budget to go and try these things. Once it works, then it's rolled out to the rest of the company."*

Sub-theme 2.2: Exploring and exploiting versus Digital Innovation

The crucial sub-theme established Digital Innovation from the exploration and exploitation perspectives.

❖ **Balancing exploration and exploitation activities**

The results imply that the organisation engages in both exploration and exploitation, but it was leaning more towards exploitation.

- **Exploitation**

Current high levels of exploitation were informed by the following:

✓ **Slow and small**

The organisation's approach to exploration has been slow, as reported by four respondents. This is mainly due to limited support from management. Resources were lacking and some resources were only recently allocated to this endeavour. In order to keep pace with technological progress, the organisation must be able to increase its exploration capabilities on a larger scale.

Respondent 11: "*I think Company X's approach is very slow and mother plant has initiated exploration of new technologies in 2020. It was just the two of us. Management did not support with additional resources. This activity was never given attention. It is only now that we are getting additional resources."*

Respondent 7: “*We are not exploiting and the reason I'm saying this to you is because that my staff in part of our exploring has been to the supplier base out of town, and they have found that our supplier base Technology has rapidly moved quite forward into the future.”*

Respondent 6:” *I don't think we've been very explorative enough, I don't think we explore a lot of opportunities enough.”*

Respondent 9: “*I believe Company X is doing it at a very small scale and perhaps we need to consider how we'd be able to boost or bolster the exploration capabilities. So whether there's a balance or not I, I don't know, but there's definitely elements of co-patterning.”*

✓ **Manufacturing**

There does seem to be a strategic effort made towards the future of manufacturing through sending people abroad so they can learn more and grow on their skills , which indicates a proactive approach in this area.

Respondent 8 commented: “*What is the future of manufacturing? If you look at the investment management made by sending so many people abroad, the answer is that they are serious about changing the future of manufacturing.”*

- **Exploration**

Some respondents, however, felt that exploration was currently happening.

✓ **Overseas developments**

In order to provide exposure and learning opportunities, the company currently sends the teams abroad. This has been a positive step in breaking the fear of

exploration and has triggered a re-assessment of the company's approach to exploring new opportunities.

This was informed by the following respondents:
Respondent 8:”*Um and if you look at the amount of how many people of going overseas to mother plant , there's definitely an appetite for it.”*

Respondent 1:”*Well, because we're at the beginning, our teams are exposed overseas. We do send them overseas to our mother plant.Some of our IT and sales and marketing people go to America on these type of conferences where they get to understand what's going on, so I think exploring and understanding, we do that.”*

Respondent 11:”*The company is, however, providing opportunities for us to learn. We were able to go to AI expo event. However, there are no opportunities for us to go to our affiliates and learn from them in terms of Digital Innovation. I think Company X needs to prioritise existing development programs for the purpose of Digital Innovation.”*

Respondent 6:” *The reason why we're questioning ourselves is because we kept on exploiting the same level, and that level was what is the fear of breaking through certain items. Now you're sending people overseas, we're breaking through that fear issue. Now we're breaking through and exploring call it relief of fear, if I may put it. Meaning, can we explore more by ourselves? “*

- ✓ **Exploration not prioritised**

Exploration is not prioritised as the organisation focuses on short-term gains instead. Hence, this is done more through exploiting existing resources rather than exploring new opportunities.

Respondent 10 stated:*" And all in most of the time, the short term wins and we are more on exploiting and not so much on exploring. We do explore, but not as much as I think we should. I think it does because like what I said, because we busy on firefighting mode and we busy on exploiting what we currently have and what we need to get right now. Nobody has got time to look up and actually start looking at what the alternative ways of doing things that are new technologies that are out there that's going to help us do whatever it is that we currently are doing better."*

✓ **Replication**

The organisation focuses more on the replication of existing knowledge, as well as learning from others that may have similar systems. This allows for the replication of such methods. Whilst this can also be seen as exploration, it comes down to the replication of existing solutions rather than the exploration of something completely new.

This was described by Respondent 2: "*both methods because when we started out we didn't know what we didn't know. So we copied, and exploited quite a bit of information around that we had, initially, we went out and got companies that did this work…..Found out the way they did it and then copied it basically, and did it ourselves. So I think if you get it right you can exploit and then you can also innovate."*

✓ **Lack of understanding of benefits**

The lack of understanding of the benefits of Digital Innovation limits the efforts of the exploration thereof.

This was described by Respondent 3:" *As far as trying to understand what's out there and what's available out there, what are the benefits but it's very limited at this point and I think we it's a development area that as Company X we need to push a little stronger."*

✓ **Lack of direction and time-frame**

The organisation seems to lack clear direction or time-frames for exploring Digital Innovation because management and leadership are currently focused more on production than innovation.

This was stated by Respondent 11 as: "*One of the factors working against us is that we are a car manufacturer, we do not design vehicles. Because we manufacture, we get plans, drawings and we manufacture and build a car. As for Digital Innovation exploration, this doesn't have a set direction or time frame. And currently, management is very much used to a production mindset and exploration requires a different mindset and different kind of leadership style.*"

✓ **Exploitation linked to exploration**

Exploitation and exploration are interlinked. Once exploration is successful, exploitation can become more effective and attainable. Therefore, more exploration is needed before exploitation. However, this is currently absent.

Respondent 6 highlighted this: *"So if you explore more, you can exploit more situations because you have literally started something and you're now exploiting it. If you get what I'm trying to say. So, you start digging a gold mine, you end up with a hundred ounce of gold. Is that where you start? Remember there was explorations. Like, let me see if there's gold around. Some explorers. And then after you exploit, you're dead., for the max. to maximize. Because you haven't explored, you're not going to exploit. You need to explore. I mean, to explore first before you can exploit. You can't just exploit it. What are you exploiting if you haven't explored it?"*

- **Reactive**

Exploration was more reactive than proactive. Hence, it was only done when there was an issue to address, and searching for possible solutions led to the discovery of another advanced solutions which are out there. However, there seemed to be a lack of both exploitation and exploration, to some degree due to the exorbitantly high costs associated with both.

Respondent 7 stated: "*So, exploration is only based on reactive, where we went for something else and we found something else. Exploitation means it's out there, the supply base, it's out there globally, it's out there. We're not exploiting or sharing best practice back into operation. The technologies are there. It's just coming at a huge cost and the payback is a challenge."*

- **Management and new ideas**

Management does seem to support Digital Innovation, and they do recognise its future benefits and potential.

Respondent 3 shared: "*I think in general as I said from a management point of view, we welcome innovation because we understand future benefits, and that involves technologies, and we try to stay abreast with those technologies "*

- **Senior management training and knowledge**

There are programmes in place for senior management, to make them 'future-ready', which requires substantial investment by the organisation in this regard. Hence, the company's willingness to invest in such development initiatives demonstrated a strong approach towards exploration for future opportunities.

This was highlighted by Respondent 8:"*senior managers and GM's to go on this executive leadership program and everything that we've done was non-functional. It was related to how does the future leader think? You know it was not necessarily about finance or HR, it's all around, what are the future fitness of the future leader. Again, a huge business advisor for Stellenbosch University, probably about R100, 000 per person. Now, a company like COMPANY X throw away money, like that, if they weren't serious about the future fit ready and ensuring that the leadership are future fit ready. That brings me to, they are exploring other opportunities, and they're definitely serious about it. "*

Sub-theme 2.3: Resource allocation between exploring and exploiting

This primary sub-theme examined the resource allocation between the exploration and exploitation components. Results do imply resource allocation with certain limitations.

❖ **Staff development and performance**

There was evidence of staff development initiatives and performance measures, as indicated by the results below.

- **Engineer Development Programme**

Various development programmes were available. Hence, significant time, money and effort is invested in developing people through these programmes.

Respondent 3 stated: "*as you know, we've got multiple programs that we use for people development. So, I think the programs are there and we spend a lot of effort and time on developing people."*

- **Future growth and development**

People are sent for needs assessments in line with future growth. This allows for the development for long-term sustainability, and resources are allocated for this.

Respondents mentioned the following on this sub-theme:

Respondent 8: "*I would say we'll spend on getting those individuals with the knowledge here and sending the whole issue of needs and seeds out to individuals there to start acquiring the needs in order for us to plant the seeds this side. So yeah, a long-winded answer, but I think it's definitely evident; I can see it moving in that direction."*

Respondent 3: "*especially for future growth because you know without developing people, there's no sustainability going forward as far as the company is concerned. So, I think the prioritization is definitely there."*

❖ **Dedicated teams and resources**

Some departments did create a dedicated team with appropriate dedicated resources.

Respondent 1 stated: "*I think we're doing pretty well, the fact that we've created a dedicated team with dedicated resources shows our intention."*

- **Divisional**

Whilst resources may not be provided across the organisation, some Divisions take the initiative to prioritises resource allocation, and there was an allocation of resources for a four-month period to support employees for overseas learning opportunities.

Respondent 5 described: "*Yeah, so I think Company X as a general doesn't do prioritization or allocation of resources, but each division does. So for example we've created, we've allowed people to go overseas to learn more, to come back and do. So we're putting up resources for four months at a time."*

- **Resource limitations**

However, there were limitations in the allocation of resources which revolved around the following:

✓ **Reactive allocation**

Resources are reactively allocated when a crisis arises, rather than having a long-term strategy.

This was described by Respondent 12: *"We prioritise and allocate our resources according to the current crisis, and we need to change that. This goes back to the fact that we need a long-term strategy that is clearly communicated and understood. A strategy that defines our priorities around digital technology and innovation."*

✓ **Short-term focussed vs long-term**

There is an absence of a long-term strategic planning for innovation. Furthermore, there is a tendency to prioritise short-term gains over a long-term reward. This compromises resource allocation, as stated by Respondent 10: *"And there's a whole department that is set up to do such, then the fact that we do not have that, for me, it shows me that as much as we have the capacity and the capability, but it's not a future, it is not a priority. That goes back to us not having a good balance in that ambidexterity portion of things and how we prioritize short term gains and not so much long term innovative approach."*

✓ **Workload priority based**

Due to differences in priorities, workloads and projects amongst the departments, resource collaboration challenges are encountered within the organisation.

Respondent 7 shared: *"With the challenge and collaborations issues that we have amongst other departments in our organization based on priority, on workload, based on resources, based on projects, I have found that my strategic priority is not necessarily a strategic priority for my partner departments."*

Sub-theme 2.4:Encourage a culture to support exploratory and exploitation activities

This sub-theme determined if there was a culture to support exploratory and exploitation activities.

- **Training Laboratories Concept**

In order to encourage exploration and experimentation with technologies, the organisation has established Training Laboratories. This is a controlled environment and has considerable artificial intelligence, which mirrors the various processes and enables parallel exploration without interrupting production. The initial phase was dedicated to internal training and the exploitation of new technologies, followed by a subsequent phase involving overseas exposure in order to address concerns and encourage further technology research. This was described by the following respondents:

Respondent 8 stated: *"Well, they've created the, I'm not sure if you're familiar with the training space aspect of behaviour where labs have been created for us to play with... We now have drones and the company has set up a complete AI lab and it almost mimics most of our processes that we do with a single car. So, we are looking at ways to simulate that active mind without breaking a production line by almost building parallel, can I call it play areas, for members to then explore new technology."*

Respondent 6 added: *“So, I think we've exploited that first phase of internal training, whether it's training laboratory to manufacturing line….We've exploited it. Now we're exploring the next line of, what do I call that? Maybe it's better with, this is where the fear part comes in. So, we are now getting rid of fear through the second lane, or should I say through the next exploration lane of sending people overseas. We're getting rid of fear.”*

- **Emphasis on Continuous Improvement**

Continuous Improvement is a priority for the organisation as Company X focusses on continuous improvements. Hence, there is a plan to integrate technology exploration into Performance Management so that performance can be linked to technology adoption. This can support Continuous Improvement within Digital Innovation.

Respondent 7 shared: *“Our word is continuous improvement , not innovation, we do continuous improvement . Company X’s word is continuous improvement which means improving for the better, right. So we have to specifically write it down into the performance management system or what we call success factors to say that your performance will be measured 5 percent or 10 percent on either exploration of technology and exploitation of technology and the payback of technology implementation.”*

Respondent 6 added: *“But I think that forecast will assist in terms of explaining where we stand. At the moment, I think the lot sizes are getting better; we're exploiting our current levels of quality manufacturing but still not there on a zero-defect kind of situation. So now it's what more can we do? What more do we need to innovate? What more do we need to explore? Then afterwards explore it , to milk the cow, the term in milking the cow, meaning milking everything that's possible. Just that simple matrix, I think, will basically just give you a direction in terms of where to go afterwards***.”**

❖ **Research and Development**

To explore faster and more efficient manufacturing methods, the R & D Department has continued to collaborate with outside entities. For example, visits from other vehicle companies involved the dissection of their vehicles to understand the costing process of the parts. Staff are also sent overseas to learn more and bring back the knowledge for added innovation.

Respondent 8 stated: *"R& D opened up the offices to bigger and private tools and looking at what they can do to manufacture cars faster. The other day we had other car make, they strip it apart to find out the costing structure. You know, so they are, they can just be put in a play area place and give people opportunities to play and explore and maybe what the people learn in this period can be monopolized on or capitalized on ."*
Respondent 1 added : "*We do not hesitate to allow our people to go overseas to see, to explore, to investigate and to grow their mind. A lot of these things you can't do through a computer , you have to go and see for yourselves. I think by allowing, by investing in, in that allowing people to understand what's out there not necessarily be feasible or possible to implement in COMPANY X, but our people need to understand what the possibilities are."*

❖ **Types of projects drive culture**

At times, it is the types of projects that will drive the choice of either exploiting existing resources or exploring new possibilities. Factors such as knowledge, expertise, background and budget usually determine the choice of either exploitation or exploration.

Respondent 2 explained: "*There's gonna be different projects that gonna drive that behavior. You're gonna have the opportunity sometimes to exploit on a project, and you're gonna have some opportunities to explore. And I think it's*

gonna be driven on the knowledge that you have, the expertise you have, the background you have, the budget you have.

Sometimes you gotta exploit what we've got and copy and mess around. And sometimes you gotta go out there and find the state of the art equipment and go explore and go bring that in. So I think it's just a matter of what project you work on,what the scope of that project is and then you go for it from there."

- **Out-of-the-box thinking**

Some departments did encourage a more out-of-the-box thinking and approach.

Respondent 3 stated : "*And encourage the culture of thinking out of the box…Coming up with new ideas and trying to implement so that we can see the benefits of thinking laterally."*

Sub-theme 2.5: External influences or factors that affect the adoption of Digital Innovation

A few external factors that affect the adoption of Digital Innovation were identified. This included the following:

- **Global trends**

There are global industry trends such as IoT, AI and vision systems that create a need for cooperation with the global Company X in order to learn from other plants that have already implemented advanced technology by about six years. The organisation's strategy, which has focused on the ' smart-factory' element and the ABC strategy initiative, demonstrates the influence of industry trends, in particular the hype around the Fourth Industrial Revolution and Artificial Intelligence.This was described by the respondents as follows:

Respondent 3:"*Uh not that I'm really aware of but I know know that if we look at the OEMs ,industry trends as far as IOT, AI and vision systems are accelerating quite fast."*

Respondent 10: "*I think we live in a global organization where our parent company brings in a lot of technology….They are doing a lot with regard to technology for us to remain competitive and for us to remain in the business in the global space. Our global affiliate as well as a competitor for us to be able to get more volume we need forces us from an image point of view, from a cost point of view to be competitive. So, I think all of those factors do influence the adoption."*

Respondent 9: "*I think industrial trends is something that definitely has some influence of Digital Innovation. I think all the hype around the fourth industrial revolution and the buzzwords of AI and IOT has impacted our strategy. And if I'm not mistaken, I'd like to believe that the reason we've got part of the smart factory element in ABC strategy is because of the trends that are happening in the industry"*

- **Influence from the mother plant**

The 'mother plant, which provides statistics and is the starting point of AI, has a strong influence on an organisation. There is usually a mutual exchange of information and IT is tasked to assist based on observations from both sides. Therefore, the mother plant is seen as an influencer for Digital Innovation. This was described by the following respondents:

Respondent 8: "*there's definitely influence from the mother plant because we do have a lot of the statistics. They come here, a lot of us just go there and we come back and say, hey, have you seen what they've done? You know so that IT get pulled in and we get tasked to assist.That's the one way of doing it."*

Respondent 11:" *I just want to note that it was MOTHER PLANT who initiated the AI aspect."*

Respondent 9: *"I think from the perspective of parent companies and other affiliates there is opportunity of para benchmarking quite extensively and other Company X affiliates. I think specifically our mother company tends to be slightly antiquated from a Digital Innovation perspective, although I believe they really in the last couple of years are, are starting to change that. If I have to look at some potential reason as to why they are integrated, I think the discipline and the culture in, in country mother plant is based is much different from that in South Africa."*

Respondent 1 echoed: "*Of course you know, we're a developing country, and primarily a follow-on type of plant. We take a lot of the initiatives from some of the first world countries in the advancement of their factories."*

- **Regulation and restrictions**

There is also the influence of regulations and restrictions with which the organisation must comply, including legal aspects related to hardware and software. European regulations in particular do play a role since the organisation exports to Europe. This was informed by the following respondents:

Respondent 7:"*Secondly, regulation has not restricted us,I would say maybe finance as has quite a role in terms of restriction. I would think the biggest major restriction for us is not knowing what's out there."*

Respondent 10: *“It's got the latest equipment because from a European regulations since we export into Europe, it is mandatory for us to keep to that. So industry from a regulation point of view, we have to adopt that,”*

Respondent 6:” *And I do see sometimes you've got hardware, software, but there's also the legal part of it. So from a legal point of view, I've never really dealt with the software and hardware part. But from a legal point of view, I read so much in terms of what's happening like with cyber security. Every single day there's this and that, there's phishing, there's whatever. You know the terms that we use all the time. We tend to build fear.”*

- **Security**

The external factors, which are potential inhibitors of the organisation in the current digital landscape, include security risks such as phishing and hackers. It is therefore important to be able to navigate the challenges related to black-box technology and safety systems. There are incidents around the world related to cyber-attacks. Fortunately, to date, the organisation has not yet been a victim. This was highlighted by the following respondents:

Respondent 1: *“And I think that's something that we have to navigate. Again, we're very early on in our journey but the black box technology and the security systems associated with technology is something that I think is a big concern for us. Already there have been incidents, not at Company X. But in some of the areas around the world where there've, there've been attacks, I don’t know if it's through these type of systems or introduction of new technologies, but I think that is an avenue that I think is going to be an inhibitor going forward.”*

Respondent 6: *“So the external factor in terms of Company X is basically the current digital space. There's just too much happening and I think that's what*

everybody's trying to close off. People you know the phishing and hacking information. Business literally stops to the IT security."

- **Service providers**

External influences may also be from a Service Provider. For example, a service provider did suggest using technology for parts picking, rather than the traditional manual methods. However, the feasibility and cost-effectiveness of these suggestions must be considered.

This was described by Respondent 8:"*The other way of doing it is when we have service providers come on board and try and sell us certain things. Like for example, a service provider came the other day and said, you know what you guys are doing, manual picking for your parts. Why don't you use our technology? You know a fairly good idea, will it work, maybe not as feasible as what we thought, and what is its benefits? So that's one of the influences, but whether it materializes that is debatable."*

- **Customers**

Lastly, the customer also forms part of the external influence. Customer needs and requirements can inform areas for improvement as they are the end-users of the organisation's products. Therefore, it is important to have a dedicated team that listens to the customers' voice and understands customer perspectives and needs.

Respondent 10 iterated: *"So regulatory yes, of course. Customer, yes, of course. We have to, like I told you that out of the group that deals with customer voice the reason why we have that team. Is that we're looking at the customer voice and our customers."*

3.14.3 *Theme 3: Challenges and Barriers that hinder Digital Innovation*

This primary theme determined the readiness of the organisation for Digital Innovation. It addresses Objective 1 which sought to identify factors that influence organizational readiness for Digital Innovation within the automotive manufacturing company in South Africa by focusing on Company X.

It examined the key challenges that hindered the implementation and adoption of Digital Innovation in the organisation, namely:

Sub-theme 3.1: Culture

Organisational culture was the highest ranked challenge. This was informed by the following:

- **Exposure and experience**

There appears to be a lack of exposure to facilities, infrastructure or companies involved in innovation. There is also little experience or learning from experienced people, as well as a lack of specific knowledge at the Continuous improvement level. Hence, it becomes hard to present complex ideas to employees, especially if they are unfamiliar with the technology and terminology involved.

This was highlighted by Respondent 7:" *the exposure, meaning exposed to a facility or an infrastructure or a company that's doing this thing, and the third thing is the pure having experienced this or having this from an experienced person. Those are the barriers, and the fourth barrier I would think is that, I talk for my division, is the expert level, expert at a Continuous improvement level. Those are the four barriers I would say uh that is restricting us from rapidly moving innovation into the future education exposure."*

Respondent 6 added: "*Because something is coming to an end, right? Then there's also a culture of, remember that's the news, that's the information that you've been given and provided. But there's also a culture of where do we come from? If somebody's never been exposed to your computer, now you're telling them about these big words. What do you think they're going to do? "*

- **Fear and hesitance to contribute**

There is much fear and hesitance amongst staff to adopt Digital Innovation. Such a culture of fear hinders idea-sharing and problem-solving. Hence, there is a need to address such cultural barriers and promote improvement. In addition, there is a need to train people to reach desired levels of understanding. The goal is to create an environment and culture where everyone feels secure.

Respondent 6 highlighted:"*And practice or should I say the learnings from the practices in terms of that 25% of fear. To break through those, we have to give the bad and the good and we also have to say from the information point of view, those are the bad items that do happen. How are we going to counter that? This is what we're doing to counter all these items. So now everybody feels safe around this space and with regards to the uh the other, within that 25% of fear, the other half is, you need to train people to get to that level….The reason was that people were willing to just talk but nobody was willing to present off a piece of paper if you asked what the problem was. So I mean, no idea sharing, no whatever sharing, you know, it was actually a culture of, I know I'm going to be shouted at I don't care anymore, I'll just go there and stand there and leave. So, you become numb after a while. I'm not sure if you know the theory about beating up your kid every single day, if you beat them up you become numb to a point where it doesn't matter whether he does good or bad, he knows he's going to get hit, so he doesn't do anything at all."*

- **Lack of understanding and being dismissive of ideas**

The crux of current culture-related issues is the lack of understanding amongst staff at various levels, including both operational and management. The challenge herein lies in the explaining of complex ideas and processes to those who may not entirely grasp them, which leads to dismissive behaviours toward innovative ideas.

Respondent 3 commented: "*And I think it stems back to the lack of understanding as to why we are doing it, or why we want to do it and what those benefits will be and how will it improve conditions going forward. I think that's the key. "*
Respondent 6 added: " *And I believe that's where the culture issues are. Certain individuals don't understand. A lot of us, whether you're on the plant side or you're on the VP side or management side, we don't really understand our own processes, and now you want to explain to somebody who doesn't understand. When you explain something to somebody who doesn't understand, and especially at a senior level, they can be a bit dismissive. So, you need not to draw his attention the best way to draw his attention is make sure that you understand what you're explaining to him. That's it, the side of the, the guy who's communicating right now. You need to break through that encoding, that barrier for information and communication. And also from the other side of management. "*

❖ **Lack of proactive efforts and prioritisation**

There is a lack of proactive efforts to embrace Digital Innovation. This is informed by the following:

- **Resources**

Innovations in technology involve time and resources. In addition, developing human capital and acquiring the necessary resources is a time-consuming process that involves costs and personnel. Moreover, the economic aspect must be considered as technological upgrades can be expensive.

Respondent 1 noted:" *You've got to have the resources, not only from the, from a cost point of view but also from a human capital point of view, you've got to develop those resources. And that takes time to do that."*

Respondent 5 added: *"But the other is obviously the finances around all this. It's not cheap to continually upgrade technology."*

- **Lack of a dedicated department**

The organisation is hindering its progress by not having a dedicated department or processes for iigital innnovation. There needs to be a dedicated space to explore and test new materials. Hence, currently, staff have limited access to tools such as 3D printers. Such a lack is not enough to promote innovation.

Respondent 10 highlights the following: " *I think we're doing ourselves a dis-service and that's why we cannot even adopt such things. Because we should have a whole room where we have a lab looking at latest materials and playing around with them. Some areas have got 3D printers and everything else in their little corners, with only one or two people knowing how to use them. But, having a proper R&D infrastructure in which we are playing around with technologies and then implementing it onto the shop floor after we've done our research, after we've gone to these workshops, after we've benchmarked and everything else."*

- **Time vs processes**

Current priorities are more focussed on maintaining production levels, leaving little time to plan and implement new ideas and Digital Innovation. Innovations are often overlooked and only considered during shutdowns or known downtimes. This presents challenges in integrating new approaches amidst the continuous push for production efficiency.

Respondent 8 echoed: "*because, in order to introduce something new, right, you need to go into planning, you need to go through a few rounds of doing it the big*

way, and you must put it into production. Now we are so obsessed with making target and making volume and that we don't have the time to start to introduce new innovation. So everything get put on the back burner, so do this when it's shut down. "

❖ **Skills and education**

Skills and education remain a key challenge. Without the right skills to complement innovation, it can dwindle and become a tiresome endeavour.

- **Skills**

The organisation struggles to acquire the skills needed to solve complex problems amidst increasing competition in the global environment. Whilst staff are sent abroad to acquire skills, they become bogged down with operational issues when they return. It is necessary and crucial to ensure that the right skills are developed and retained in order for Company X to position itself for the future, inclusive of the 'smart factory' and its commitment to Digital Innovation.

Respondent 11 highlighted this: "*Company X is competing with its global affiliates and from the skills level that we have in Company X, we are battling to get the right skills to solve these complex problems and I believe with the introduction of Digital Innovation technologies ,these technologies will handle the finer details of manufacturing so that the load on operators be relieved and also allow management to manage effectively, be able to control quality and cost."* Respondent 7 added: "*We are not sending people at the operational level to the courses out there that talks about digitization. We do it as a event and, and, and that's as far as it goes and the real reason behind that is that those people that go and see some innovation stuff, when they come back, they are so caught up with operations that this continuous improvement and innovation is the maybe third priority for them. It's not a main priority for them,"*

- **Education, exposure and experience**

One respondent mentioned the three-fold factor of education, exposure and experience as crucial elements. The current lack of exposure to digital technologies and a deficiency in digital literacy amongst certain staff causes a hindrance to progress. Hence, the organisation cannot be overly ambitious in implementing advanced technologies such as AI without first addressing digital literacy skills and education across the organisation.

Respondent 7:"*The second barrier, I would say, is the people. It's very unfair for me to expect my engineers to present innovation, digitization, and this kind of technology if they have not been given exposure to it. I always call it the three E's. First, there is the education side of it. It's a barrier. We have engineers who are 8 years, 10 years, even 3 years out of campus—they don't have the exposure.* "

Respondent 9 added: *"if we try to get people to, for example, propose things like IOT or AI, they are not able to even propose ideas. If we try to get people to work with systems that use AI or IOT, yet they haven't even worked on a computer or don't know how to navigate a mouse and keyboard, I think that's being perhaps over-ambitious and that's what we need to first do for a large portion of the organization, to improve the digital literacy first before we can attempt to innovate."*

❖ **Information-sharing and silos**

There are also challenges related to Information-sharing and silo-based working.

- **Silos**

Various departments are working in silos, without a common understanding when it comes to Digital Innovation. The current approach of each plant independently managing its digital transformation leads to fragmentation due to varied

interpretations of Digital Innovation across different teams. Hence, there is a need to bring teams together to share learnings and avoid duplications in efforts, as well as to ensure a cohesive digital transformation. In addition, it becomes important for everyone to align efforts with customer expectations. This was described by the following participants:

Respondent 11:" *I think the organisation is not working together. We are working in Silos. There are departments doing innovations and I do not understand why management hasn't brough us together. as bringing us together will benefit the company in terms of us not duplicating work as we will be sharing our learnings".*

Respondent 10: *"So, what does the next process want from me? The people that I'm servicing with, if we, if I'm working with a shop for example, internally and that's my customer. What is my customer expectation? What do they need? So I think we need to, instead of working in silos and trying to make sure that I'm okay, and in a make shift environment and encounter we must prioritize our customer voice. Not just external customers but internally as well."*

Respondent 6:"*Currently we're running it separately and each plant has to look at its own digital transformation. Yeah, you can't be doing that because, for example, you end up with Lexburg. Somebody ends up with Linux, somebody ends up with IOS, somebody ends up with Microsoft Word, somebody ends up with alphabet or chrome, whatever it is in their corner. But when we meet around the table, we're like, but we should have all gone with mother plant's organizational communications or operating systems. We've all gone in different directions."*

- **Lack of an information-sharing platform**

There is a lack of platforms to share technological developments across the organisation, as well as with the global subsidiaries. There used to be

collaboration platforms, but since the advent of the COVID-19 virus, this has decreased and there is no dedicated platform for managers, including senior managers, to participate and share technology with global partners.

Respondent 7 shared: "*There is currently no platform to share technology enhancements within Company X as one, secondly within South Africa, and thirdly within our global affiliates, whereby we can maybe once a year share how we are advancing business or doing continuous improvement in business, whereby we create a platform of sharing information without compromising proprietary information….was in the previous department, there used to be a yearly and a monthly collaborative platform. But since COVID, there has been none, to my knowledge, general manager, senior manager platform for the engagement and sharing of technology used in global affiliates or in our partners. However, I am aware that our production engineering and planning department have been prior to COVID I would say, engaging with their window departments in mother plant in terms of innovation and activity. I am aware that they did set up an innovation department to look at global innovations and local innovations for our business."*

- **Geographical challenges**

There are geographical challenges in sharing information, and this relates to resources. For instance, main regions such as China, Asia, Europe and America have sufficient resources to establish dedicated operations. However, in the South African Region, there is difficulty in attaining resources, which then impacts on collaborative efforts.

Respondent 1 echoed: "*And our location makes it very difficult to share. If you look at the main regions around the world, whether it's China, Asia, Europe and America they have resources, vast amounts of resources and a vast amount of*

capital that they are able to use to set up areas to focus purely on this as a one plant, one region operation. It's quite difficult and those are constraints."

Sub-theme 3.2: Challenges- Balance between exploration and exploitation

There were also challenges in reaching a balance between exploration and exploitation, which revolved around the following:

- **Budget**

According to one respondent, there are challenges in implementing Digital Innovations and balancing between exploration and exploitation activities. Company X is seen to have taken a conservative approach due to the return-on-investment on many Digital Innovations such as AI, which are not realised soon enough and then discourages management from implementing them. Respondent 9 stated: "*I think it's a more cautious type approach because a lot of Digital Innovation, I believe that for a lot of them, the return on investment and the tangible benefits are not really known. For example, a lot of companies are piloting AI, but very good research shows that 70 percent of organizations that have used AI haven't seen any kind of return on investment*

- **Management direction**

The opportunity to explore and exploit are there. However, management must provide direction to staff. If such direction and willingness is absent, both exploration and exploitation will not take place effectively.

Respondent 2 stated: " *it's a management control and it's a direction that you've got to take. If you get the opportunity of taking the exploitation route, you have to take it. You get the opportunity of, of exploration, you take it. I think it's just a management initiative. You've got to switch between the two. When I say management, I'm talking about the whole team."*

Respondent 10 added: "*Um again, I think it's going to go with the willingness, the people, it goes with the, I won't say management in a way…. Because if you do not give people the time to explore. Then you won't get the exploration. …But if the person is not willing to do and the management is not conducive to allow people to do, then the combination of the two does not lead to proper exploration. So, it's a responsibility for both people, but opportunities to do it are there, because at any given time, if somebody wants to go to Respondent 9 and find that stuff, they can go. If somebody wants to go across the road to R and D, they can go."*

- **Infrastructure**

There are infrastructural constraints to supporting the demands of exploration and exploitation. New technologies are dependent on having the right and compatible infrastructure.

As stated by Respondent 1: *"Infrastructures have to be able to support a lot of those changes…We know that we have challenging times with infrastructure, so those type of things also have to be taken into consideration when you start introducing new technologies and big changes to companies."*

Respondent 9 added:" *So I think the demands on exploitation even from a digital perspective, if we consider things like our SAP or subsystem and the existing IT infrastructure that we have."*

- **Structure**

Organisational structure can sometimes hinder exploration and exploitation because the current business structure dictates that any modifications to existing technology requires approval from certain structures. This can be limiting.

Respondent 7 described this as: *“So currently based on the business structure and based on the way roles of responsibility in life, any exploring and any exploitation of future technology has to be done in agreement with our production engineering and planning department. We cannot go and just modify current technology equipment without their buy-off.”*

- **KPI alignment**

There is a lack of alignment between staff KPIs / roles and the exploration and exploitation of technology. Hence, staff do not see the exploration and exploitation of technologies as part of their KPIs. This leads to a disconnect in achieving the same.

Respondent 7 shared: “*And then the second is that our people do not see it as their mission or their departmental direction or the KPI /KPA to go and explore and exploit. The KPI is realizing current strategic intention so it's not written down in my people's management that you will explore camera technology, or you will explore traceability systems, or you will explore it's basic, it's by the way.”*

- **Capacity**

Capacity is limited with only about 20 staff being involved in primary exploration and IT innovation. To expand exploration capabilities, a larger workforce is needed to be dedicated to relevant initiatives, as advised by Respondent 9:
“And in IT innovation, it's also just a handful, so you've got roughly let's say, let’s say 20 individuals across the organization who are working in the primary exploration space to transform company as big as this. Perhaps our approach will take much longer unless we're able to also start building exploration capabilities within the larger workforce or if we kind of centralize and scale up exploration activities for user innovation and things like that.”

CHAPTER 4. DISCUSSION OF FINDINGS

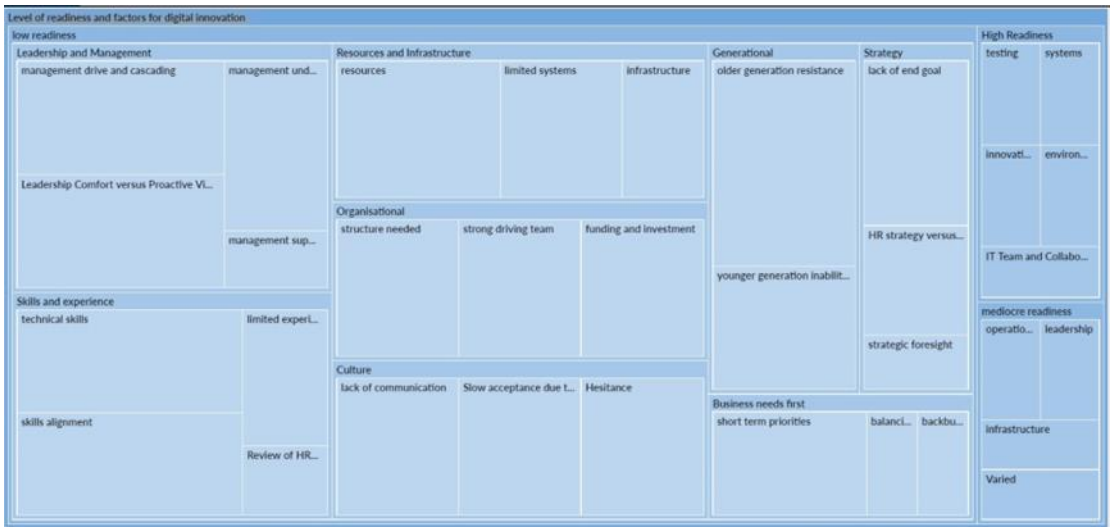
4.1 Introduction

This chapter focuses on the discussion of the key findings presented in the previous chapter concerning the three research objective of the study, namely:

i. To identify factors that influence organizational readiness for Digital Innovation within an Automotive Manufacturing company in South Africa (Company X);
ii. To explore the perceived meaning of Digital Innovation and the extent to which Digital Innovation is adopted by Company X; and
iii. To explore how the factors impact on the readiness for Digital Innovation and provide recommendations / practical insights for improvement.

4.2 Research Objectives 1: Factors that influence organizational readiness for Digital Innovation

Figure 6: Level of Readiness and and Factors



After a detailed analysis of the interview content supported by the above hierarchy chart, it was shown that the level of readiness of Company X was low. However, it had a few pockets of excellence.

The factors that influenced the readiness for Digital Innovation in Company X were found to be:

Figure 7: Identified Factors

Source: Author (2024)

I. Resources

There is no flexibility regarding moving human resources from core functions to focusing on Digital Innovation.

Although financial resources to innovate and improve are available, there are reservations when it comes to releasing these finances due to the initiatives not being economically viable, where ROI and payback are difficult to justify. The rate at which technology is changing and being commercialised poses a challenge to how to get the timing right in order to make the implementation of digital technologies economically viable in a way that the organization is able to gain benefits; still progresses; and is not being left behind.

II. Culture

Martins and Terblanche (2003) argued that organizational culture seems to be a critical factor in the success of any organization, lying at the heart of organizational innovation (Tushman, 1997).

For Company X, continuous improvement and best-practice sharing are embedded in its DNA. This facilitates Digital Innovation, and is heavily influenced by the mother company. However, this research highlighted an additional layer: the culture of the people. This is different from the company culture and sometimes clashes with the culture of the company.

III. Influence from the mother plant

This research highlighted one of the factors being an influence from the mother plant company. The mother plant company had a very positive impact on the initiation and growth of Company X's innovation capabilities and its level of autonomy. Many respondents referred to the Mother Plant as having given Company X a mandate to initiate Digital Innovation learning and implementation.

IV. Strategy

For Company X, the strategy is there to guide the organisation towards Digital Innovation. It is not a fixed/ rigid strategy, and it is clear. However, there is an issue regarding communication and cascading this strategy ot the rest of the

organisation; seamless integration of Digital Innovation to the core functions; implementation and conflict of priorities.

V. Leadership and Management

There is a willingness from senior leaders to transform, but the tactics on how to do this and drive it lacks. On the positive side, there is buy-in from some people of power and influence, which is important for digital transformation.

VI. Research and Development

Teams focusing on Innovation have been created, which is positive. However, the challenge is integrating it into all levels within the organisation and obtaining leadership buy-in in other areas.

VII. IT Readiness

In terms of informing the organisation about new technologies, IT has been one of the groups in the fore-front. However, in terms of facilities and security, there is room for improvement.

VIII. Cognitive

There are the skills within the organisation. However, clearly lacking is coordination and proper talent management, as well as the alignment of these skills with the strategic intent of the organisation. Furthermore, a majority of the workforce is ageing and lacks digital literacy.

IX. Partnership

In this research, it was highlighted that Company X built and is working on partnerships with universities and vendors in terms of innovative ideas and bringing in the required skills.

X. Time

Insufficient attention and time is given to Digital Innovation related activities(lack of human resources, lack of awareness and lack of unified effort).

XI. Geographical Position

There are challenges due to the geographical location of Company X when it comes to information sharing, and this relates to resources. For instance, main regions such as China, Asia, Europe and America have sufficient resources to establish dedicated operations. However, in the South African Region, there is difficulty in attaining resources, which then impacts on collaborative efforts.

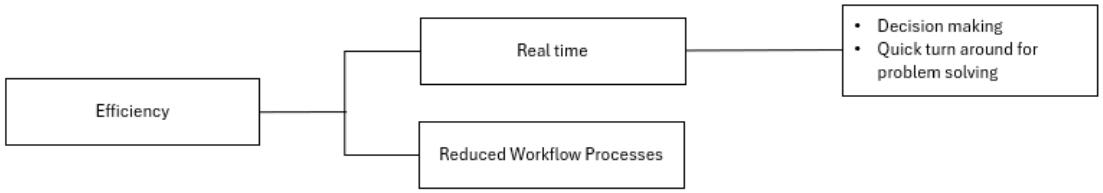
4.3 Research Objective 2: To explore the perceived meaning of Digital Innovation and the extent to which it is adopted by Company X

I. Perceived meaning of Digital Innovation

The second research objective sought to explore the perceived meaning of Digital Innovation and the extent to which Digital Innovation in adopted within Company X. One theme developed in the study, which was the understanding and involvement in Digital Innovation.

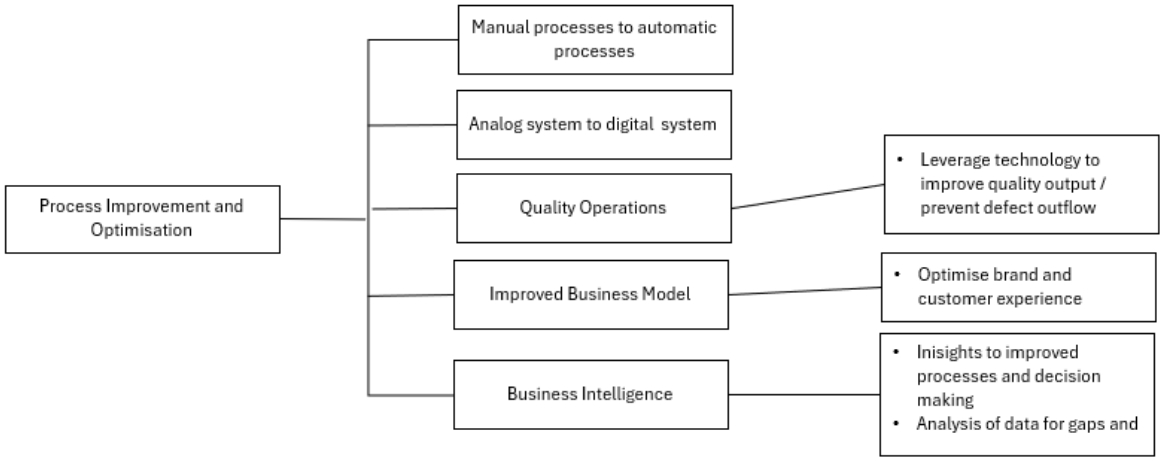
During the interview, it was observed that most respondents perceived Digital Innovation in terms of the benefits it would create, and some of the benefits from projects already done. The results pointed to three different aspects, namely (a) efficiency; (b) digital information and data; and (c) process improvements and optimisation.

Figure 8: Efficiency



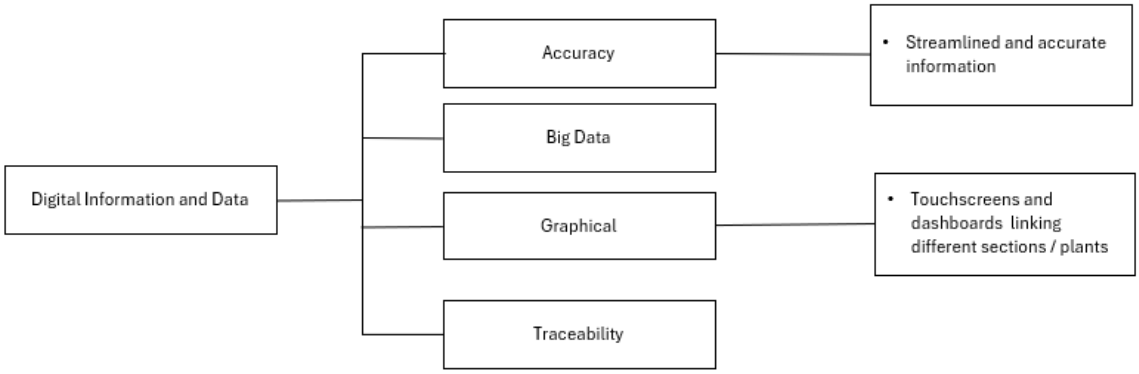
Source: Author (2024)

Figure 9:Process Improvement and Optimisation



Source: Author(2024)

Figure 10: Digital Information and Data



Source: Author (2024)

The definition of Digital Innovation derived is as follows:

Digital Innovation alludes to using different types of technology for improved efficiency; digital information and data, as well as process improvement and process optimization. It involves improving existing systems in line with the manufacturing KPIs (Safety,Quality,Productivity,Cost) by leveraging Digital Innovation technologies to support them, and revolves around the concepts of planning and technological changes.

This definition of Digital Innovation is in line with Nambisan, Lyytinen, Majchrzak & Song (2017), who defined Digital Innovation as using digital technologies for the innovation of processes and generating an innovative digital outcome whilst considering the complex and dynamic dependencies between both.

There was a diverging view where Digital Innovation for the manufacturing environment is perceived as something driven by workplace innovation. This view suggests that in order for engineers to come up with innovative ideas for shop floor / production environment, they need to first experience it and see its value from their day-to-day office environment activities.

II. Extent to which Digital Innovation is adopted

Li (2018) stated that digital technologies have three main roles in Digital Innovation, namely: automation, extension and transformation (AET).

This research highted that Digital Innovation initiatives have been undertaken in terms of monitoring, control, enhancing quality and enhancing operational efficiency. These innovations have been implemented as part of the company's attempt to identify, test and explore different use cases in order to identify which are suitable for the business requirements /manufacting environment. As a result, these are sporadic as the company is still in it early stages of adoptions. Company X is using digital technology to enable new operational methods that enhance rather than replace existing activities and procedures (extension), as well as to automate or enhance its existing operations and procedures (automation).

Table 2: Digital Innovation Technologies Deployed

No.	Category	Technology Used	Role
1	Monitoring	Sensors , IOT	Extension
2	Quality Control	Vision systems , AI	Extension & Automation
3	Operational Efficiency	Power BI, Maximo, Co-botics	Automation

Source: Author(2024)

4.4 Research Objective 3: To explore the impact of the factors on the readiness for Digital Innovation

The third research objective explored the impact of the factors on the readiness for Digital Innovation. The table below shows a summary of how the factors impact on readiness for digital innovation within Company X.

Table 3: Impact of the factors on the readiness

No	Factor	Element	Why	Impact on Readiness
1	Resources	Human resources and financial resources	Multiple generations within organisation which leads to challenges regarding adapting to technology for older and younger fearing to push innovative ideas	Slows down adoption
		Financial Resources	Budget is available, however to access , one must justify ROI and for some of digital initiatives it is difficult to justify	
2	Intellectual property	Skills	digital literacy lacks , lack of skills alignment , limited exposure to technology.	Slows down adoption
3	Culture	Fear, hesitance, traditional business culture	lack of awaness , lack of communications around digital innovation, business is matured	Hinders idea sharing and problem-solving, slows down adoption, support and acceptance rate
4	IT Readiness	Infrastructure, Cyber Security , support role	Infrastructure and systems require some improvements, concern around cyber security, IT support on projects and advisory roles	Slows down adoption
5	External Influence	Mother plant , affiliate , global trends, regulations and restrictions	High influence from mother plant and affliates	Pressure to accelerate
6	Strategy	End goal	Road map ok but no clear end goal	Slows down adoption
7	Organisational Structure	Digital structure ,	different groups focusing on different aspects	Leads to variation in approaches across different sub-groups and to Silos
8	Time	Time for exporation	focus is on meeting existing production KPIs. Digital innovation perceived as additional work and not a means to which KPI's can be improved	Slows down adoption
9	Leadership and management	Low drive, lack of overall management support	May not fully understand technology ,comfortable with current culture , lack of regular reinforcement	Slows down adoption
10	Geographical Position	Difficulty in attaining resources.	Low collaborative efforts	Slows down adoption

Source : Author(2024)

Exploration and Exploitation Activites

The organization engages in both exploration and exploitation but leans more towards exploitation as the organization replicates existing knowledge and lacks clear direction or time frames for exploration. This impacts on the low readiness for digital innovation.

There's a strategic focus on future manufacturing, indicated by investments in sending personnel abroad for skill development. However, exploration is not prioritized due to a focus on existing production requirements and a lack of understanding of its benefits. And also because the interconnection between Exploration and Exploitation is lacking as they are perceived as different entities.

Although the organization engages in both exploration and exploitation, there's a need for greater emphasis on exploration, clearer direction, and proactive efforts to capitalize on digital innovation opportunities.

4.5 Conclusion

Company X faces multifaceted challenges in achieving readiness for digital innovation. Addressing these challenges will require a comprehensive approach that encompasses resource allocation, cultural and skills alignment, improved ways of cascading strategic communication, overall leadership commitment, improved talent management, and collaboration with external partners. By addressing these factors, Company X can enhance its readiness and capitalize on the opportunities presented by digital innovation

This study proved that the perceived meaning of digital innovation within Company X and the adoption of Digital Innovation are related.

CHAPTER 5. RECOMMENDATIONS AND CONCLUSIONS

5.1 Introduction

This chapter presents key recommendations and suggestions for further research on the study conducted.

This study set out to explore organizational readiness for Digital Innovation within automotive manufacturing by conducting a case study on Company X. It focused on senior managers, general managers and executives of the different shops/divisions within the manufacturing group of Company X. The choice of participants was based on the role they played within the organization's operational activities and the influence they have on the strategy of the organization. These participants provided insights based on their experiences of the Digital Innovation journey within the organization.

Firstly, in order to understand organizational readiness for Digital Innovation, the study looked at the organization as a whole in terms of its strategy. Secondly, it investigated how Digital Innovation is perceived within the organization and the extent to which Digital Innovation is adopted within the organization. Lastly, the study explored the factors influencing organizational readiness for Digital Innovation and how these factors are impacting on the readiness thereof.

5.2 Conclusion

As with many other businesses, automotive manufacturing is also compelled to respond to the challenge posed by technological advancements. For Company X, leadership and management were the most highly ranked factors influencing

organizational readiness. The perceived meaning of Digital Innovation revolved around improving processes and adding value to both internal and external customers, making use of technology to improve decision-making. The use of technology such as AI, IoT and Power BI has gained momentum as well.

5.3 Recommendations

Having established the challenges and factors above, the following are recommendations for the implementation of Digital Innovation:

I. Culture change

This study highlighted flaws within Company X's culture as one of the factors hindering Digital Innovation. To effect the culture change, the following would need to be done:

- **Change Management programme**

The study highlighted that Company X is currently catching up to its international affiliates. Therefore, this research proposes that Company X considers adapting Mckinsey's 7-S Change Model, which addresses both soft (shared values, skills, staff and style) and hard (strategy, structure and systems) facets of change simultaneously, as Change Management programmes can assist in facilitating understanding and allow for concerns to be addressed.

Change management programmes can facilitate understanding through clearly communicating the details, impact and the benefits of the change, which can lead to employee understating and buy-in. It can also mitigate resistance to change. The change management intervention must consist of a diverse team composition, inclusive of management, IT, HR, finance and operations/production. This can ensure that people of different fields are on the

same page with regard to innovation, and contribute the appointment of the right people in various roles.

The programme must be interactive and not a traditional class-room approach. Moreover, it must be engaging and allow for people to ask questions and see how they can benefit from Digital Innovation. It is better to have an external facilitator who is neutral and objectives as this can foster more trust in the process from employees.

- **Communication**

Communication can never be underestimated as it can ensure transparency. There must be effective communication that provides understandable information in simple terms. This can alleviate the current challenge with the use of technical jargon which often confuses staff at lower levels. Clear and simple communication can ensure that people remain engaged and comprehend the information.

- **Conducive space**

The organisation must create a conducive space for staff to embrace Digital Iinnovation. One respondent described it as creating a ‘sexy space’ that appeals to people to want to be involved. It must be an exciting, stimulating and aspiring space to help staff to reach the end-goal.

- **Reverse culture needed**

There should also be a reverse-culture for Digital Innovation. This means that the organisation should consider having a balance allowing the culture to be driven from the bottom-up as well as a top-down approach to bring in both perspectives.

- **Visual benefits**

Due to humans being visual in nature, it is important that visual or tangible benefits be demonstrated so that people can physically see how Digital Innovation can/will benefit them.

II. Organisational

Organisationally-driven recommendations can entail the following:

- **Funding**

The report recommends that Company X should consider starting with identifying the low hanging fruits which shall yield them maximum results. This can be done through implementing digital technologies in solving a problem, which can be quantified into monetary value, and this will be self-funding.

- **Vision**

The organisation must develop a long-term vision and hence all Divisions and departments can align to it. Staff and resources can be aligned accordingly. Company X need to clarify what its end-goal is or else their Digital Innovation efforts with be wasted.

- **Innovation mobilisation plan**

Innovative initiatives are implemented. However, the activities to promote and highlight these innovative successes are lacking. Furthermore, the innovations are few and far between, thus everyone refers to just the one thing. This report proposes that Company X needs to rethink how it will bring the whole organisation with it on this journey, as well as how it will build up momentum and maintain it since digital transformation is no longer a ‘nice to have’ but something the company must do in order to survive.

- **Organisational Structure : Universal team needed**

A universal team must be formed as this can provide a comprehensive approach and ensure buy-in from various divisions and stakeholders before initiating Digital Innovation projects. This approach will also ensure alignment with the necessary compliance requirements and prevent systems from becoming ‘black boxes’.

This universal team can be responsible for curating relevant topics to promote awareness, organizing workshops, and providing learning opportunities for the overall organisation - be it upskilling, process optimization, or embracing digital transformation. It can be responsible for ensuring that all departments collaborate and align their efforts in synergy.

III. Performance and alignment

Performance recommendations are important and can be driven by proper alignment.

- **Alignment with departmental strategic intent**

Digital Innovation must be integrated into all of the organisation’s departmental strategic intents in order to align departmental functions and activities with the organisation’s strategic objectives. This will promote the use of digital tools and innovation towards achieving the objectives.

- **Innovation into Performance Management**

Similarly, Digital Innovation must be factored into staff performance management as it can then be seen as a performance requirement and not a secondary role.

IV. Skills and Education

The aspect of skills and education cannot be over-emphasised as it remains a crucial factor for Digital Innovation.

- **Empowerment and Education**

A lack of digital literacy can hinder Digital Innovation. Therefore, in order to inform the broader business and dispel concerns about new technologies, there should be empowerment and educational programmes on certain technologies such as AI. This can serve to obtain employee support.

This report recommends that Company X creates a Best-Practice Forum which shall be used to share information about the different Digital Innovation projects within the organisations, as well as about the benefits being realised from adopting such technology.

Company X has a robust employee training programme, hence the researcher recommends that it incorporates innovation into some of its programmes, namely quality circles, etc.

- **Right skills**

The right skills must be brought and/or developed into the respective teams to drive innovation. This research proposes that Company X should consider cultivating the different layers of skills to enable the organisation to use technology effectively and efficiently. This includes the operational skills which are related to technical competency and digital literacy; formal skills, which is the ability to navigate and use technology; informal skills, which are content-related; and strategic skills, which are about the ability to utilise Digital Innovation to reach goals.

V. More exploration

Some respondents recommended that there should be more exploration on Digital Innovation.

- **Benchmarking**

Benchmarking was seen as important in gaining knowledge from global innovation practices, and to better understand what needs to be done for Digital

Innovation. An example was made regarding mother plant success in their innovation, even though they are still exploring and not being exploited because of the reduced number of continuous improvements.

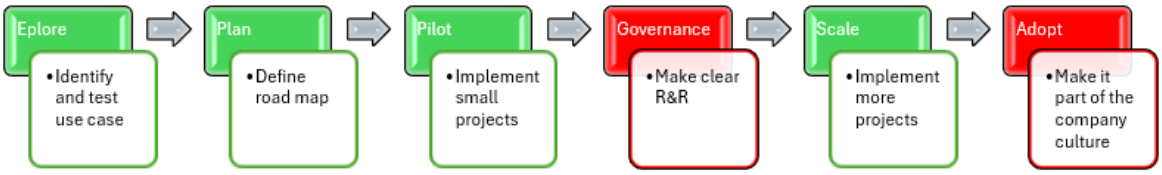
- **Promote mistakes for learning**

One respondent made a very interesting point about allowing people to make mistakes in order to learn. Such a culture can encourage innovation by allowing people to make mistakes, thus failure becomes a part of the learning through trial and error. Consequently, the organisation must foster Digital Innovation by changing their mindset towards accepting failures as opportunities for growth.

VI. Transformation journey

In terms of the transformation journey, this study highlighted that Company X is exploring, as it has defined its roadmap and piloted a few projects where AI was deployed within the organisation. There are talks to now scale up and implement more projects. However, governance regarding Digital Innovation is still a grey area. This research suggests that before scaling up, Company X should look into governance. For example, the roles and responsibilities in terms of maintenance and upgradiing these new systems need to be made clear.

Figure 10: Transformation Journey of Company X



Source: Author (2024)

VII. Cybersecurity

This report recommends that Company X develop a robust cybersecurity strategy and implement it. This strategy should not be a dynamic strategy as the rate of cyber attacks evolves as technology is evolving

5.4 Considerations for future research

The researcher recommends the following areas for future study projects:

Possible Future study 1

When, in the life-cycle of technology, is the best time to implement and get benefits from it? (In literature, most organisations implement digital technology and do not see its benefits).

Possible future study 2

Organizational structure strategies for Digital Innovation: advantages and disadvantages of having different kinds of sub-groups or sub-divisions that are pulling together innovation and having one kind of division that is focused on innovation, which is more of a consolidated approach to Digital Innovation.

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APPENDIX A - Participant Information Sheet

Good day

My name is Mendy Konanani Mufamadi , I am a Masters student in Digital Business at the University of the Witwatersrand, Johannesburg. My supervisor is Dr Pius Oba and I am conducting a research study about Organizational Readiness for Digital Innovation. The study title is Factors Influencing Organizational Readiness for Digital Innovation Within Automotive Manufacturing Sector.

I am inviting you to take part in an interview for me to gather the data I require. Should you decide to take part, your participation in this research study will last about 45min and the interview will take place at the place and time that is most convenient to you,

With your permission, I would like to audio record the interview for the purpose of cross referencing in case I miss something when taking notes. This data will be stored in my computer which is bit locked, and password protected for the period of the study and shall be deleted after receiving my final mark (hopefully in June 2024). Please be informed that I am the only person who will have access to the data.

During the research activity, I will need to ask for some personal information about you (your name and position within the company).The interview will be confidential and anonymous. When I share the results of the research study, I will not include your name or anything else that could identify you. With your permission, other researchers may use the data collected from this research study, but your name and any personal information will not be used or passed on.

Taking part of the interview is voluntary and you will not get any direct benefits if you choose to join the research study. Should you participate in this study, please note that you do not have to answer any questions that you are uncomfortable with answering or do not want to answer and that you can stop participating at any time you wish to. There are no direct benefits if you choose to join the research study.

This research study does not impose any risk to your job or position within the organisation. This research study will be written up as a research report. The report will be available on the university library website. If you would like to receive a summary of this report, I will be happy to send it to you.

If you have any questions during or afterwards about this research study, feel free to contact me or my supervisor on the details listed below. If you have any concerns or complaints about the ethical procedures of this research study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email hrecnon-medical@wits.ac.za.

Yours sincerely,

Researcher:

Mendy Konanani Mufamadi, 2389322@students.wits.ac.za, 068 318 6853

Supervisor:

Pius Oba, Pius.Oba@wits.ac.za, 011 717 3976

APPENDIX (B) – Participant Agreement Form

Research Topic: Factors Influencing Organizational Readiness for Digital Innovation Within Automotive Sector

Name of researcher: Mendy Konanani Mufamadi

I, ……..., agree to participate in this research project.

I agree to the following:

(Please circle the relevant options below)

The research study was explained to me, and I understand what this study is about.	YES	NO
I understand that my participation is voluntary.	YES	NO
I agree that the interview will be audio recorded.	YES	NO
I agree that direct quotations from my interview may be used by the researcher in their research report.	YES	NO
I agree that my participation will remain anonymous (my name or other identifying data will not be used by the researcher in their research report.	YES	NO
I agree that other researchers may use the information I provide in my interview (depending on their own ethics clearance being obtained) but my name and any personal information will not be used or passed on	YES	NO

…… (signature) …… (signature)

…… (name of participant) …… (name of researcher)

…… (date) …… (date)

APPENDIX (C) - Instrument (Interview Guide)

Interview Guide:

****Definitions and research objectives

Please refer to the attached PowerPoint document named Research Objectives.

Introduction:

Do you have any involvement in digital innovation at COMPANY X?

Is it from a strategic or execution perspective?

Interview Questions:

1. What does digital innovation mean to you personally?

2. How do you see its significance and potential impact within COMPANY X?

3. How would you describe the level of readiness for digital innovation within COMPANY X?

4. What factors or elements contribute to the readiness or lack of readiness for digital innovation? Can you identify any contextual factors within COMPANY X that affect the adoption of digital innovation?

5. How would you describe the importance placed on digital innovation within the organization? Has there been any change in the importance placed on digital innovation within COMPANY X over time? If yes, what

caused these changes. How do they affect the implementation of digital technologies?

6. Are there any specific challenges or barriers that hinder the implementation of digital innovation?

7. In your opinion, how is the perceptions and attitudes toward digital innovation within the organization? How is that impacting the willingness of individuals and teams to embrace and implement new technologies?

8. Are there any strategies or initiatives implemented to promote digital innovation within COMPANY X? And How would you rate their effectiveness?

9. Have there been any external influences or factors that have affected the adoption of digital innovation within COMPANY X?

10. How would you describe COMPANY X's approach to balancing exploration and exploitation activities in its operations? What are the challenges or barriers and how does it impact on its ability to implement new technologies?

   Note: exploration refers to finding and developing new knowledge and capabilities and exploitation refers to refining and optimizing existing knowledge and capabilities

   Have you observed any challenges or barriers in maintaining a balance between exploration and exploitation within COMPANY X's digital innovation efforts?

11. In your opinion, how does COMPANY X prioritize and allocate resources between exploring new knowledge and capabilities, and refining existing ones?

12. How does Company X encourage a culture that supports both exploratory and exploitative activities in the context of digital innovation?

Thank you

APPENDIX (D) – Gatekeepers Letter

June 27, 2023

To Whom It May Concern:

PERMISSION TO CONDUCT RESEARCH AS PART OF THE MASTERS COURSEWORK QUALIFICATION

Mendy Konanani Mufamadi, a student enrolled Master of Management ; Digital Business at WITS Business School has chosen to do a research project entitled: **Factors Influencing Organizational Readiness for Digital Innovation ~~with~~ within Automotive Manufacturing Sector.**

We are permitting access to our organization for purposes of this research. Please ensure that all information gained from the research will be treated with the utmost circumspection. The student should strictly adhere to confidentiality and anonymity.

Thank you for your assistance in this regard.

Yours sincerely

[redacted]

[redacted]

02/2022

Gatekeeper's Consent

I [redacted].. in my capacity as ...Senior Vice President, Manufacturing Group ... hereby give permission to conduct research in my organization.

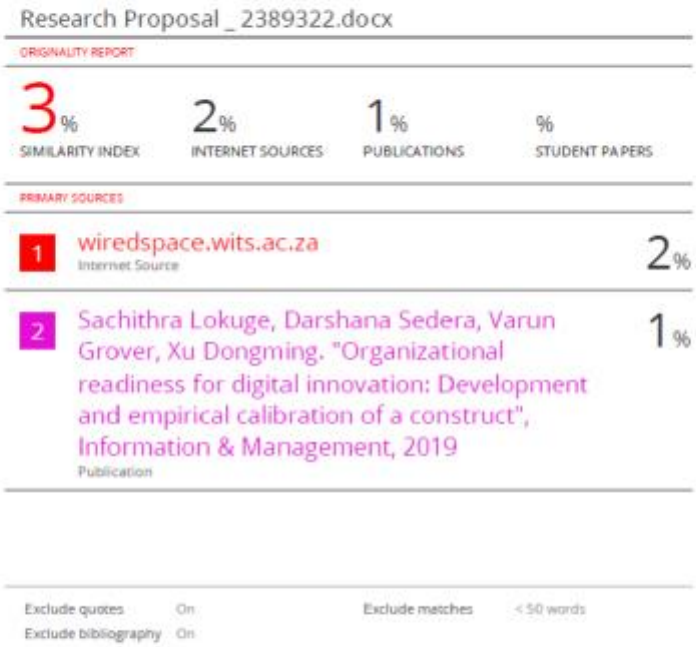
The student **MAY NOT** use the name of the organization in the research report.

Signature of Manager/Owner/Gatekeeper: .....

Date: 27.06.2023

APPENDIX (D) – TurnIt In Report

APPENDIX (D) – TurnIt In Report



Research Proposal _ 2389322.docx

ORIGINALITY REPORT

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SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	wiredspace.wits.ac.za Internet Source	2%
2	Sachithra Lokuge, Darshana Sedera, Varun Grover, Xu Dongming. "Organizational readiness for digital innovation: Development and empirical calibration of a construct", Information & Management, 2019 Publication	1%

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