

**The influence of leadership on the successful implementation of digital  
transformation in the Zimbabwean platinum mining industry**

Student number 20820012

A research project submitted to the Gordon Institute of Business Science,  
University of Pretoria, in partial fulfilment of the requirements for the degree of  
Master of Philosophy (Corporate Strategy)

29 November 2021

## **ABSTRACT**

Organisations are embarking on digital transformations to remain competitive and sustain themselves. Leaders need effective digital leadership to successfully lead digital transformations and transition organisations to their future states. This research seeks to understand the required leader capabilities to successfully deliver digital transformations, as well as to understand the role of leadership in successful digital transformations. This study drew upon transformational leadership theory, and the leadership skills and trait approaches to understand the leader capabilities that are required for successful digital transformation.

The study adopted a qualitative exploratory research approach that drew on 16 semi-structured in-depth interviews with leaders in the Platinum Group Metals (PGM) mining industry in Zimbabwe.

The outcomes of the study confirmed that successful digital transformation requires effective leadership. It is also critical for leaders to be visionary, adaptable, agile, collaborative, innovative and open minded if they are to successfully lead digital transformations. In addition, the study identified other factors that include the need for leaders to cultivate the right culture, show commitment, allocate resources, have strong people skills and acquire new skills. These leadership capabilities and factors culminated in the conception of the Digital Leadership Conceptual Framework. In addition, although somewhat inconclusive, the study does suggest the possible occurrence of a technology reverse spill over in the PGM mining industry. The study has contributed to the emergent discourse on digital leadership.

## **KEYWORDS**

Digital transformation, digital leadership, leadership, leadership capabilities, transformational leadership

## DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Philosophy in Corporate Strategy at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Nqaba Mkwanzani

\_\_\_\_\_  
Name & Surname

\_\_\_\_\_  
Signature

## TABLE OF CONTENTS

<b>ABSTRACT .....</b>	<b>I</b>
<b>DECLARATION.....</b>	<b>II</b>
<b>LIST OF TABLES.....</b>	<b>VII</b>
<b>LIST OF FIGURES .....</b>	<b>VIII</b>
<b>LIST OF ACRONYMS AND ABBREVIATIONS.....</b>	<b>IX</b>
<b>CHAPTER 1: PROBLEM DEFINITION AND PURPOSE .....</b>	<b>1</b>
<b>1.1 Introduction.....</b>	<b>1</b>
<b>1.2 Business Relevance to the Research Problem.....</b>	<b>1</b>
<b>1.3 Research Problem Statement .....</b>	<b>2</b>
<b>1.4 Research Aim .....</b>	<b>3</b>
<b>1.5 Research Context .....</b>	<b>4</b>
1.5.1 State of the global mining industry .....	4
1.5.2 Zimbabwe and the state of its mining industry.....	6
1.5.3 The platinum mining industry in Zimbabwe and digital transformation applicability..	6
<b>1.6 Scope of the research.....</b>	<b>7</b>
<b>1.7 Research Report Structure .....</b>	<b>7</b>
<b>CHAPTER 2: LITERATURE REVIEW .....</b>	<b>10</b>
<b>2.1 Introduction.....</b>	<b>10</b>
<b>2.2 Background.....</b>	<b>11</b>
<b>2.3 Digital Transformation.....</b>	<b>11</b>
2.3.1 What is digital transformation? .....	11
2.3.2 The Importance of digital transformation in mining .....	13
2.3.3 The benefits of digital transformation in mining .....	14
<b>2.4 Leadership.....</b>	<b>16</b>
2.4.1 Leadership Context.....	16
2.4.2 Theory on Leadership .....	16
2.4.3 Transformational Leadership Theory .....	17
2.4.4 Alignment of Transformational Leadership Theory and Digital Transformation.....	17
2.4.5 Digital Leadership.....	21
2.4.6 Leadership capabilities .....	23
2.4.7 Capabilities and characteristics of the best digital leaders.....	25

2.4.8 Upskilling Leaders.....	27
2.4.9 Digital Governance .....	28
<b>2.5 Spill over perspective.....</b>	<b>29</b>
<b>2.6 Conclusion .....</b>	<b>30</b>
<b>CHAPTER 3: RESEARCH QUESTIONS .....</b>	<b>32</b>
<b>3.1 Introduction.....</b>	<b>32</b>
<b>3.2 Research sub questions.....</b>	<b>32</b>
<b>CHAPTER 4: RESEARCH METHODOLOGY .....</b>	<b>34</b>
<b>4.1 Introduction.....</b>	<b>34</b>
<b>4.2 Choice of Methodology .....</b>	<b>34</b>
4.2.1 Philosophy .....	34
4.2.2 Approach .....	35
<b>4.3 Research design .....</b>	<b>35</b>
4.3.1 Population/Research Setting.....	35
4.3.2 Unit of analysis .....	36
4.3.3 Sampling method and size.....	37
4.3.4 Data saturation analysis .....	38
4.3.5 Data gathering process .....	38
4.3.6 Data analysis approach .....	41
4.3.7 Research quality and rigour .....	41
<b>4.4 Research Limitations.....</b>	<b>42</b>
<b>CHAPTER 5: RESULTS .....</b>	<b>44</b>
<b>5.1 Introduction.....</b>	<b>44</b>
<b>5.2 Sample Description .....</b>	<b>44</b>
<b>5.3 Data Saturation .....</b>	<b>45</b>
<b>5.4 Suitability of interview participants.....</b>	<b>45</b>
<b>5.5 Presentation of Results .....</b>	<b>47</b>
<b>5.6 Results for Research Question 1 .....</b>	<b>47</b>
5.6.1 Question 1a: What do you understand the term digital leadership to mean? .....	48
<b>5.7 Question 1b: What in your view is the current leadership style in the platinum mining industry?.....</b>	<b>49</b>
<b>5.8 Question 1c: How important in your view is digital transformation for the PGM mining industry?.....</b>	<b>53</b>

<b>5.9 Results for Research Question 2: How essential is the role of leadership in ensuring a successful digital transformation? .....</b>	<b>59</b>
5.9.1 Question 2a: How essential is the role of leadership in ensuring a successful digital transformation in PGM mining? .....	60
5.9.2 Question 2b: What organisational vision do leaders have regarding the digital transformation of their mining organization? .....	65
<b>5.10 Question 3: What capabilities or characteristics does a leader require to lead a successful digital transformation? .....</b>	<b>69</b>
5.10.1 Question 3a: What capabilities or characteristics does a leader require to lead a successful digital transformation? From your perspective, please rank the top five capabilities or characteristics in terms of importance. ....	70
5.10.2 Question 3b: How is your organization equipping leaders with skills to lead digital transformation? .....	78
<b>5.11 Results for Research Question 4: What role do multinational corporations play in their subsidiaries undergoing digital transformation? .....</b>	<b>81</b>
<b>5.12 Other themes that emerged from the findings.....</b>	<b>85</b>
<b>5.13 Overall chapter conclusion .....</b>	<b>87</b>
<b>CHAPTER 6: DISCUSSION OF RESULTS .....</b>	<b>89</b>
<b>6.1 Introduction.....</b>	<b>89</b>
<b>6.2 Discussion of Results for Research Question 1 .....</b>	<b>89</b>
6.2.1 Question 1a: What do you understand the term digital leadership to mean? .....	89
6.2.2 Question 1b: What in your view is the current leadership style in the platinum mining industry?.....	88
6.2.3 Question 1c: How important in your view is digital transformation for the PGM mining industry? .....	94
6.2.4 Conclusive findings for RQ1.....	98
<b>6.3 Discussion of Results for Research Question 2.....</b>	<b>99</b>
6.3.1 Question 2a: How essential is the role of leadership in ensuring a successful digital transformation in PGM mining? .....	99
6.3.2 Question 2b: What organisational vision do leaders have regarding the digital transformation of their mining organisation? .....	102
6.3.3 Conclusive findings for RQ2.....	103
<b>6.4 Discussion of Results for Research Question 3.....</b>	<b>103</b>
6.4.1 Question 3a: What capabilities or characteristics does a leader require to lead a successful digital transformation? From your perspective, please rank the top five capabilities or characteristics in terms of importance. ....	103
6.4.2 Question 3b: How is your organization equipping leaders with skills to lead digital transformation? .....	115
6.4.3 Conclusive findings for RQ3.....	117
<b>6.5 Discussion of Results for Research Question 4.....</b>	<b>118</b>

6.5.1 Results for Research Question 4: What role do multinational corporations play in their subsidiaries undergoing digital transformation? .....	118
6.5.2 Conclusive findings for RQ4.....	121
<b>6.6 Other themes that emerged from the findings.....</b>	<b>121</b>
<b>6.7 Overall chapter conclusion .....</b>	<b>122</b>
6.7.1 Research question 1 overall conclusive findings .....	124
6.7.2 Research question 2 overall conclusive findings .....	124
6.7.3 Research question 3 overall conclusive findings .....	124
6.7.4 Research question 4 overall conclusive findings .....	126
<b>CHAPTER 7: CONCLUSION AND RECOMMENDATIONS.....</b>	<b>127</b>
<b>7.1 Introduction.....</b>	<b>127</b>
<b>7.2 Conclusions on research questions.....</b>	<b>127</b>
7.2.1 Conclusions on research question 1 .....	127
7.2.2 Conclusions on research question 2 .....	128
7.2.3 Conclusions on research question 3 .....	128
7.2.4 Conclusions on research question 4 .....	130
7.2.5 Conclusions on conceptual framework.....	131
<b>7.3 Research contribution.....</b>	<b>134</b>
<b>7.4 Implications for managers and other stakeholders.....</b>	<b>135</b>
<b>7.5 Limitations of the research .....</b>	<b>136</b>
<b>7.6 Suggestions for further research .....</b>	<b>136</b>
<b>7.7 Conclusion .....</b>	<b>137</b>
<b>REFERENCE LIST .....</b>	<b>138</b>
<b>APPENDIX 1: INVITATION LETTER.....</b>	<b>147</b>
<b>APPENDIX 2: INTERVIEW GUIDE.....</b>	<b>148</b>
<b>APPENDIX 3: CONSISTENCY MATRIX .....</b>	<b>150</b>
<b>APPENDIX 4: CODE BOOK FROM ATLAS.TI .....</b>	<b>151</b>

## LIST OF TABLES

Table 1: Research sub-questions.....	3
Table 2: Comparative analysis of digital transformation definitions.....	11
Table 3: Alignment of the Transformational Leadership Theory and Digital Transformation.....	19
Table 4: Comparative analysis of digital leadership definitions.....	21
Table 5: Criteria for unit of analysis applied.....	36
Table 6: Participant list and categorisation.....	39
Table 7: Key benefits of digital transformation.....	55
Table 9: Rankings in order of importance: Capabilities and characteristics .....	71
Table 8: Leader capabilities or characteristics required to lead digital transformation.....	70
Table 10: Leader capabilities or characteristics: Overall frequency of mention.....	75
Table 11: Leader capabilities or characteristics mentions: Operations and support function groups .....	76
Table 12: Driver of digital transformation mentions: MNE's and local subsidiaries .....	82
Table 13: Capability ranking in order of importance: Visionary .....	104
Table 14: Capability ranking in order of importance: Collaborative .....	105
Table 15: Capability ranking in order of importance: Innovative .....	106
Table 16: Capability ranking in order of importance: Agile.....	107
Table 17: Capability ranking in order of importance: Inspirational .....	108
Table 18: Capability ranking in order of importance: Open minded .....	109
Table 19: Comparison between findings and literature: Leader capabilities or characteristics .....	110
Table 20: Comparison between findings and literature: Leader capabilities or characteristics .....	111
Table 21: Cross group and intra group comparison between findings and literature: Executives, top managers and senior managers.....	112
Table 22: Overall conclusive findings .....	122

## LIST OF FIGURES

Figure 1: Research report structure.....	8
Figure 2: Structural outline of literature review .....	10
Figure 3: Leadership continuum.....	17
Figure 4: Mumford’s skill-based model.....	24
Figure 5: Proposed conceptual framework derived from the literature review.....	31
Figure 6: Major components of research study.....	33
Figure 7: New codes generated per interview .....	38
Figure 8: Evidence of data saturation.....	45
Figure 9: Leadership capabilities or characteristics required to lead digital transformation..	70
Figure 10: Proposed conceptual framework derived from the literature review.....	131
Figure 11: Updated Digital Leadership conceptual framework.....	133

## LIST OF ACRONYMS AND ABBREVIATIONS

CCTV	Closed Circuit Television
CEO	Chief Executive Officer
CO <sub>2</sub>	Carbon Dioxide
Covid-19	Corona Virus Disease 2019
EPC	Engineering, Procurement and Contracting
ESG	Environmental Social & Governance
FDM	Fleet Data Management
GDP	Gross Domestic Product
HR	Human Resources
IT	Information Technology
IoT	Internet of Things
KPI	Key Performance Indicator
LHD	Load Haul Dump mining vehicle
LTE	Long Term Evolution
MIT	Massachusetts Institute of Technology
MNE	Multinational Corporation
OEM	Original Equipment Manufacturer
PGM	Platinum Group Metals
PwC	PricewaterhouseCoopers
R&D	Research and Development
ROI	Return On Investment
RQ	Research Question
WEF	World Economic Forum

**“A leader takes people where they want to go. A great leader takes people where they don’t necessarily want to go, but ought to be.” – Rosalynn Carter**

## **CHAPTER 1: PROBLEM DEFINITION AND PURPOSE**

### **1.1 Introduction**

The rapid progression of technology has made the business context more complex by shifting global trends and market conditions which organisations have to adapt to, for them to survive (O'Reilly & Chatman, 2020; Lynch & Mors, 2018). To avoid extinction, it is key that "organisations embrace digital transformation now" (World Economic Forum, 2020, p. 13). To meet the evolving client demands, organisations must embrace digital transformation to enable them to change the; way they create value, engage the market and the way they reengineer internal systems and processes (O'Reilly & Chatman, 2020). Digital transformation is defined as the adoption of new technologies as part of a multi-faceted organisational change that reinvents value chains and business models (Vial, 2019; Warner & Wagner, 2019; Hanelt, Bohnsack, Marz & Marante, 2020). In the mining sector, digital transformation is anticipated to be a force of transformational change as it presents an opportunity to increase revenue, increase safety and reduce its carbon footprint (World Economic Forum, 2017). Despite the increased focus and discussion of digital transformation, the majority of entities still struggle to realise the full potential from the technologies they deploy (Deloitte, 2019b; PricewaterhouseCoopers (PwC), 2020a).

### **1.2 Business Relevance to the Research Problem**

Technology shifts are redefining societies, markets, and customer expectations (World Economic Forum, 2016). The dynamism within the environment has brought additional competition and increased pressure on organisations to innovate and grow (Deloitte, 2019a), while creating more sustainable and inclusive business models (World Economic Forum, 2020). This has led to digital transformation being at the top of the organisations' strategic agendas (PwC, 2020a). Despite the increased focus and discussion of digital transformation at strategic level, many organisations are not confident of their ability to execute their digital transformation agendas (Deloitte, 2019b). Many organisations' digital transformation efforts are met with challenges that include but are not limited to a lack of focus, a lack of leadership attention and a lack of funding (Deloitte, 2019b). In a 2019 survey conducted by Deloitte and the Massachusetts Institute of Technology (MIT), organisations cited the ambiguity created by constant change, risk aversion and identifying the appropriate technologies as some of the significant obstacles they face in making headway in digital transformation (Deloitte, 2019b).

The World Economic Forum (2020) argues that it may be possible that within a few years, the term 'digital transformation' will no longer be heard of as it would have become irrelevant

because “non-digital businesses will simply not exist” (World Economic Forum, 2020, p.13) by then. While digital transformation offers unparalleled opportunities for significant cross-industry business models that generate greater value creation (World Economic Forum, 2020), many organisations fail to realise the tangible impact from their digital transformation investments (Deloitte, 2019b). PwC (2020a) argues that most organisations struggle to earn a significant Return On Investment (ROI) from their large-scale digital investments and estimate that only approximately five percent are obtaining a significant return from their digital investments across numerous areas such as profits, growth, innovation, customer experience, brand lift, cost management and combatting competition. This highlights that despite being described as bringing significant opportunity for greater value creation, digital transformation’s path to realising value creation remains largely misunderstood (World Economic Forum, 2016). Unless changes are made to behaviours, attitudes, and actions (Deloitte, 2019a) there is a significant risk that a significant proportion of organisations will not realise the promise of digital transformation (World Economic Forum, 2016). To bridge the gap and realise the full value of digital transformation, organisations must invest in new leadership capabilities and their organisational culture (World Economic Forum, 2020). Their existing business knowledge therefore needs enhancement to improve the success rate of digital transformations and to better understand how to realise better returns on organisations’ digital investments.

### **1.3 Research Problem Statement**

Even though research has been done on the various aspects of digital transformation, little is understood on the specific succinct capabilities required for its successful implementation (Andriole, 2017). Digital transformation studies are characterised by a lack of a clear definition in academic literature (Vial, 2019) and related implications on leadership theory and practice (Bolden & O’Regan, 2016). In view of the lack of conceptual clarity and maturity of the digital transformation concept and its application (Andriole, 2017; Vial, 2019), it is important to understand how its successful implementation is influenced by an organisation’s leadership.

While digital transformation has lately become very topical for most organisations, it is important to look beyond the headlines and understand whether its documented internal capabilities are founded in sound academic research (Andriole, 2017; Bolden & O’Regan, 2016; Morakanyane, Grace, & O’Reilly, 2017). It is important to explore if digital transformation is a genuine answer to the emergent organisational challenges that arise from increased availability and application of digital technology. As complexity and sophistication within the business environment increases, it is important to comprehend leadership capabilities which

are key to achieving a differentiated competitive positioning that will enable future success for organisations (Porfirio, Carrilho, Felicio, & Jardim, 2021; Vial, 2019).

Furthermore, it is noteworthy that countless organisations embark on digital transformations with no clear sense of where they are headed and how they will get there (Weill & Woerner, 2017). This is supported by Ready, Cohen, Kiron & Pring (2020) who posit that, “executives around the world are out of touch with what it will take to win, and to lead, in the digital economy” (p. 2). Doan (2021) further builds on this by highlighting that with the global spend on digital transformation expected to be US\$6.8 trillion by 2023, organisational leaders need to find ways to reduce the seventy percent failure rate. Obwegeser, Yokoi, Wade & Voskes (2020) support the assertion that despite significant investments in digital transformation, the majority of these have failed to meet expectations. With failure coming at a significant cost, this necessitates research into understanding the leadership capabilities that influence digital transformation success especially within a low-income developing country.

The central research question in this research therefore asks, “**What influence do leadership capabilities have in facilitating successful digital transformation of the PGM mining industry in Zimbabwe?**”. In particular, the central research question is broken into sub-questions as shown in Table 1 below:

**Table 1: Research sub-questions**

Index	Sub-questions to the main RQ
RQ1	What do leaders understand by digital leadership as well as its importance in the digital transformation of the PGM mining industry?
RQ2	How essential is the role of leadership in successful digital transformation?
RQ3	What capabilities or characteristics does a leader require to lead a successful digital transformation?
RQ4	What role do Multinational Corporations (MNE's) play in their subsidiaries that are undergoing digital transformation?

Source: Author’s own compilation

#### 1.4 Research Aim

The aim of this research is to explore the link between successful digital transformation and leadership capabilities. Specific organisational capabilities are key in making digital transformation a success and delivering on its intended benefits that result in a differentiated competitive advantage (Vial, 2019; Porfirio et al., 2021).

The value that this research could possibly add to academia is that it could contribute to providing further conceptual clarity and maturity and build on the existing academic literature (Bolden & O'Regan, 2016; Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian, & Haenlein, 2019; Vial, 2019). This could lead to greater consensus within academia on the leadership capabilities required for successful digital transformation. These are currently not fully explored and understood due to digital transformation's highly fragmented research landscape (Appio, Frattini, Petruzzelli, & Neirrotti, 2021).

From a practice perspective, this research study may provide leaders, managers, and organisations a clearer leadership blueprint on the understanding and execution of digital transformation. This could help to reduce perceived complexity and improve the success rate of digital transformations, thereby ensuring that they better deliver the desired competitive advantages as a result of their implementation. With this research, organisations and their leaders can direct their resources and efforts to those specific areas that they know will deliver "digital congruence" (Kane, Palmer, Phillips, Kiron, & Buckley, 2016, p. 4) and increase the likelihood of success in leading the implementation of digital transformations. Digital congruence is achieved when there is an alignment between an organisation's culture, its structure, the right people, and clarity in task execution (Kane et al., 2016).

## **1.5 Research Context**

### ***1.5.1 State of the global mining industry***

The global mining industry is still adjusting to the headwinds faced in the recent past (World Economic Forum, 2017) thus keeping it under pressure as a result of an uncertain geopolitical landscape, increased demand for commodities, community and investor activism and resource nationalism from governments (Deloitte, 2020). The commodity prices that were previously suppressed due to China's growth decline have, however, substantially recovered (Deloitte, 2020).

Despite the recovery in commodity prices, the mining industry is still faced with challenges that include but are not limited to declining grades of ore bodies which lie at much deeper levels than before, the need to manage safety, health and environmental concerns from regulators and communities (World Economic Forum, 2017). Furthermore, Covid19 has also impacted the global mining industry by exposing its brittle supply chains (PwC, 2020b) and it has increased pressure on mining companies to localise their supply chains and develop local suppliers. These challenges have seen margins reduce as a result of increased production costs, lower efficiencies, and increased capital expenditure costs. This has put the spotlight

on mining companies to reduce their mining cost, reduce capital expenditure, increase safety records, and provide shareholders with an appropriate return. These trends are not anticipated to reverse in the near future (World Economic Forum, 2017).

As a result, mining companies have had to; review their investments in innovation, digitalise their future workforce (Deloitte, 2018), better manage their relationships with communities and governments as well as ultimately transform in the context of disruption (Deloitte, 2020). To thrive amidst the context of disruption, mining companies have had to; rethink their traditional mining models, grab the opportunities presented by digital technology and embrace change in the form of digital transformation that is expected to allow greater agility in the sector, higher profitability, better decision making and better employee engagement (World Economic Forum, 2017).

Despite the opportunities to embrace digital transformation, the mining industry has historically been slower to adopt digital technologies (World Economic Forum, 2017; PwC, 2020b). Although some mining companies have implemented initial digitalisation programmes, they have largely been focused on increasing operational efficiency, monitoring mining fleets, and protecting workers (World Economic Forum, 2017). However, most mining companies are yet to implement the digital technologies that are driven by a well-thought-out strategy that considers the entire mining value chain and is supported by a clear vision (Deloitte, 2018).

A value at stake study by the World Economic Forum (2017) sought to quantify the impact that digital transformation will have on the mining and metals industry between 2016-2025. The study estimated that US\$320 billion in economic benefit could be created by the digitalisation of the industry in the decade to 2025. The economic benefit was set to be realised in areas such as autonomous mining operations, smart sensors, connected workforce, remote operations centres, asset cyber security, advanced analytics, and integrated platforms. By accessing relevant data across the value chain quicker, mining companies will have greater visibility of their geological models, financial models and they will also shorten their organisational planning cycles (Deloitte, 2018). The economic benefit of US\$320 billion represents approximately 3% of global mining and metals revenues and a 9% increase in profitability during the decade (World Economic Forum, 2017). In addition, the World Economic Forum (2017) study estimated; a 237 million tonne reduction in Carbon Dioxide (CO<sub>2</sub>) emissions, 275 fatalities that would be prevented and 13 000 fewer injuries. To realise this, mining organisations must; revisit their strategies and operations, enhance their digital capabilities, as well as build capabilities to better analyse and interpret their data (World Economic Forum, 2017; PwC, 2020b). This demonstrates the significant opportunity that

digital transformation presents across the various components of the global mining industry value chain.

### ***1.5.2 Zimbabwe and the state of its mining industry***

Zimbabwe is a low-income developing country with extremely difficult market conditions which have negatively impacted its capital markets, product markets, labour markets and government regulation (Chindondondo, 2020). Zimbabwe's economy has been declining since 1999. In 2019 and 2020, Zimbabwe's Gross Domestic Product (GDP) contracted by 6% and 4% respectively (Government of Zimbabwe, 2020).

The Zimbabwean mining industry contributed approximately 60% to the country's total exports and 15% of the country's (GDP) in 2020 (Government of Zimbabwe, 2020) thus making the sector a key contributor to Zimbabwe's economy. Mining's 60% share of total exports makes the country largely dependent on mining for foreign currency earnings. Zimbabwe has over 40 types of mineral occurrences that include platinum, gold, coal, diamonds, nickel, copper, and rare earths (Government of Zimbabwe, 2020). This demonstrates the vast potential that the mining sector has to contribute to the national fiscus.

Despite the vast mineral resources at Zimbabwe's disposal, the mining sector's contribution to socio-economic development has been limited (Government of Zimbabwe, 2020) and the sector is under growing resource nationalism pressure (Chamber of Mines, 2021). As a result, the Zimbabwean government is targeting to enhance mineral beneficiation and value addition in five key minerals that include gold, PGMs, diamonds, coal and chrome as part of its 2021-2025 National Development Strategy resulting in an anticipated 11% growth rate for the industry (Government of Zimbabwe, 2020). As part of its beneficiation and value addition thrust, the Government of Zimbabwe expects a higher realisation of export proceeds, increased tax revenues and more local jobs (Government of Zimbabwe, 2018). Some of the targets it has put in place include the completion of at least one base metal refinery by 2025 for the PGM mining entities (Government of Zimbabwe, 2020). This shows the extensive pressure that the mining companies are under within Zimbabwe and the increased expectations from the government for them to contribute more to the fiscus and play a bigger role in socio-economic development.

### ***1.5.3 The platinum mining industry in Zimbabwe and digital transformation applicability***

The PGM mining industry in Zimbabwe is currently the largest foreign currency earner with a 40% contribution of all mineral exports by value (Government of Zimbabwe, 2020). This makes this segment of the mining industry a key player in the socio-economic contribution and in the

future growth of the mining industry. Overall, PGM production increased by 0.7% to 14.4 tonnes per annum in 2018 (Government of Zimbabwe, 2018) and it is projected to increase to 24 tonnes per annum by 2025 (Chamber of Mines, 2021) mainly as a result of new PGM producing entities as well as expansion by current players.

The Zimbabwe PGM mining industry currently comprises of three PGM mining entities (Chamber of Mines, 2021). Other players in the sector are at various stages of exploration or mine development and are expected to only start producing PGMs from 2023 onwards (Government of Zimbabwe, 2020). Although the three PGM producers operate in Zimbabwe, they are largely owned and controlled by South African companies. This study was carried out based on a sample of PGM mining companies that make up 77.5% of the total of PGM production in Zimbabwe. This research sought to identify the leadership capabilities that the PGM mining companies need to develop to successfully implement digital transformation.

The Zimbabwean PGM mining industry, however, still faces challenges as it seeks to achieve operational excellence and zero harm safety targets. Historically, mining companies have been slower to adopt to digital technologies (World Economic Forum, 2017) and the Zimbabwean platinum industry has been no exception. Challenges in productivity, safety, availability of foreign currency and access to secure power supply remain (Chamber of Mines, 2021). This has forced PGM mining companies to enhance operational efficiency by reducing their cost of mining, increasing their safety record and providing shareholders an appropriate return (World Economic Forum, 2017). Digital transformation within a mining environment requires a strong digital technology spine (Westerman, Bonnet & McAfee, 2014) as a foundation for transforming their operating models, making timely quality decisions, and using data visibility to invest in the correct competencies (Deloitte, 2020). Steering through these challenges will require strong leadership from mining company leaders to navigate the uncertainty, technology led disruption (Deloitte, 2020) and to result in more agile and lucrative mining businesses in the future (World Economic Forum, 2017).

## **1.6 Scope of the research**

Bonnet and Westerman (2020) assert that digital and leadership capabilities are two key factors that enable organisations to turn digital transformation into a business advantage. As such, this study focused on understanding one of these aspects of leadership, leader capabilities that are necessary to deliver successful digital transformation. It is not focused on specific technological aspects or requirements of a digital transformation. The leader capabilities are explored in a context where digital transformation happens within the PGM mining industry.

The study's objective is to bring to the fore how leaders can identify and develop capabilities that will help them successfully implement digital transformations within their mining organisations. For purposes of this study and throughout this document, the term leader capabilities will refer to leader characteristics or traits and leader competencies or skills as defined in Section 2.4.7 of Chapter 2.

### Research Definitions

The following definitions apply for the purposes of this study:

**Digital transformation** is the adoption of new digital technology (Vial, 2019; Warner & Wagner, 2019) through multi-faceted organisation change (Hanelt et al., 2020: Bharadwaj, El Sawy, Pavlou, & Venkatraman., 2013) that has various social impacts especially for customers (Vial, 2019) and reinvents value chains and business models (Warner & Wagner, 2019).

**Leadership** is defined “a process whereby an individual influences a group of individuals to achieve a common goal.” (Northouse, 2016, p. 6).

**Digital leadership** describes leading in a digital environment and leveraging digital technology to achieve a collective digital vision (Kane, Philips, Copulsky & Andrus, 2019: Westerman, Bonnet & McAfee, 2014).

**Capabilities** are the knowledge and skill that are required to execute certain actions (Northouse, 2016).

**Competencies** are the characteristics or traits needed to be displayed to carry out a task or role (Zaccaro, Kemp & Bader, 2004: Yukl, 2013).

## 1.7 Research Report Structure

The rest of this research report is presented as shown in Figure 1 below:

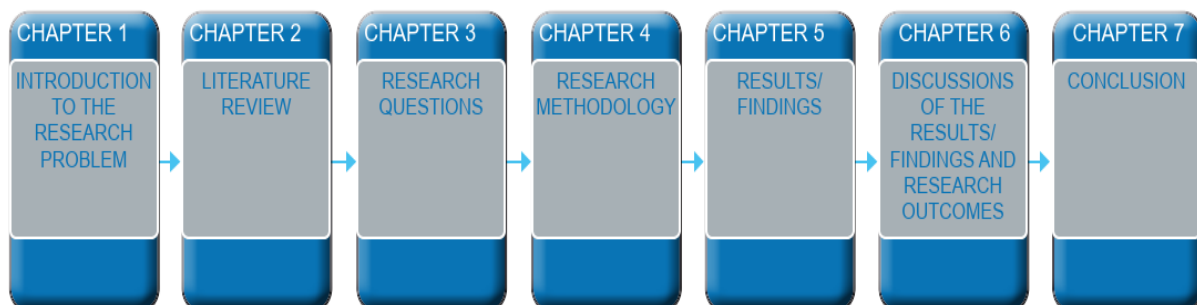


Figure 1: Research report structure

Source: Author's own compilation

Figure 1 shows the overall structure of this research and how it is presented. This chapter introduced the research problem and outlining its significance in the process. In Chapter 2, a review of extant literature is presented laying out the theoretical elements from which the research questions were derived. The main research question is outlined in Chapter 3 together with an exploration of how they emerged from extant literature. The research design and methodology applied during this study are outlined in Chapter 4 while Chapter Five presents the findings from the study. The findings are discussed and analysed in Chapter 6 and they are contrasted against extant literature. The final chapter, which is Chapter 7, draws upon the research report as a whole and ties up the theoretical elements and the research outcomes. Finally, the research report concludes on the findings and recommends areas to be considered for further exploration.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 Introduction

This section carries out a literature review of extant literature on digital transformation, the leadership capabilities required for its successful implementation and transformational leadership theory. The concept of digital transformation is firstly examined to understand its academic foundations and its importance within organisational change contexts.

Secondly, a review of existing leadership literature is carried out. This includes an examination of the role that leaders play in successful digital transformations. The next section of the literature review includes a discussion of leadership capabilities, upskilling leaders and digital governance. Finally, the spillover perspective is covered. From this, a research gap and research questions are derived.

Figure 2 below presents a structural outline of this chapter.



**Figure 2: Structural outline of literature review**

Source: Author's own compilation

## 2.2 Background

Technology is transforming the way that organisations are conducting business due to the rapidly changing environment that they find themselves operating in (Bharadwaj et al., 2013). As such, they need to continuously adapt their strategies to satisfy changing client demands (Lynch & Mors, 2018). As a result of shifting global trends, market conditions have shifted quite considerably and, in the process, have accelerated the disruption and the blurring of industry boundaries. As such, a new kind of organisational transformation that is technology enabled and leverages on digital technologies, is happening. This has made the business context more sophisticated and complex as digital transformation shifts how organisations create value, engage customers, as well as manage internal systems and processes (O’Reilly & Chatman, 2020). This transformation forces organisations into important business adaptations to remain competitive (Porfirio et al., 2020) in fast shifting conditions.

## 2.3 Digital Transformation

### 2.3.1 What is digital transformation?

A review of literature on digital transformation shows varied definitions and a lack of commonality amongst them (Warner & Wager, 2019; Bharadwaj et al., 2013; Hanelt et al., 2020). The review of extant literature on digital transformation shows how digital transformation is defined as being one of or a combination of the following four themes that are shown in Table 2 below.

**Table 2: Comparative analysis of digital transformation definitions**

Concept	Key themes of digital transformation definition	Authors
Digital transformation	Use of digital technologies	Vial (2019) Warner & Wagner (2019) Bharadwaj et al. (2013)
	An organisational strategy	Bharadwaj et al. (2013); Li (2020)
	An organisational change	Hanelt et al. (2020) Bharadwaj et al. (2013) Baiyere, Salmela, & Tapanainen (2020)
	A process within organisations	Vial (2019) Young & Rogers (2019)

Source: Author’s own compilation

Bharadwaj et al. (2013) allude to digital transformation embodying both business strategy as well as IT strategy and they define it as “an organisational strategy formulated and executed by leveraging digital resources to create differential value” (p. 472). This definition centres digital transformation as an organisational strategy which is executed using digital resources. In this definition, digital resources are explained to be the tools through which the organisational strategy is implemented. However, Vial (2019) centres their definition of digital transformation on, “the use of new digital technologies” (p. 120) as a means to enable significant business process improvement. The definitions by Hanelt et al. (2020) and Bharadwaj et al. (2013) position digital transformation as an organisational change that is shaped by and integrates digital technologies into an organisation thus positioning it for success in the marketplace. In this case, the emphasis is on the continuous change whether through episodic bursts (Hanelt et al., 2020) or longer change interventions. Baiyere et al., (2020) support this view in their description of digital transformation as characterised by, “a constant flux of change” (p. 3). On the other hand, Vial (2019) argues that digital transformation is process driven, by defining digital transformation as, “a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies” (p.118). This view is supported by Young & Rogers (2019) who affirm that digital transformation is a process by which organisations adapt to functioning in an ever more digital world.

These definitions highlight digital transformation’s intricacy in the adoption of new digital technology (Vial, 2019; Warner & Wagner, 2019) through multi-faceted organisation change (Hanelt et al., 2020; Bhadrardwaj et al., 2013) that has various social impacts especially for customers (Vial, 2019) and reinvents value chains and business models (Warner & Wagner, 2019). However, what is common among some of the definitions is that digital transformation is key to both maintaining and growing the market share in either traditional business environments or digital business environments thus ensuring their sustainability.

Digital transformation pushes organisations to revisit their value creation paths due to the technology induced adaptations to their value chain (Vial, 2019; Kane, Palmer, Phillips, Kiron, & Buckley, 2017). As a result, changes to their organisational structure must be made to enable the transformation process (Vial, 2019; Verhoef et al., 2019) and in doing so drive the new value generating business models (Kane et al., 2017). This is supported by Baiyere et al. (2020) who posit that digital transformation is characterised by, “a deep structure change” (p. 12) that facilitates the metamorphosis of an organisation and in the process, reshaping its value propositions (Bhadwaraj et al., 2013). Baiyere et al. (2020) further argue that the outcome of a digital transformation is “a qualitatively different organisation” (p. 12) and therefore the need to position it as a significant transformation of the organisation instead of a

slow piecemeal approach. This demonstrates that digital transformation goes beyond the mere adoption of technologies and changing processes but importantly it potentially results in significant changes to an organisation's structure and business model.

For an organization to succeed in their digital transformation endeavour, a clear digital strategy and a risk-taking culture are required to navigate the process (Kane, Palmer, Phillips, Kiron, & Buckley, 2015). This will inevitably include managing the transition from its present state to the organisation's future state (Li, 2020). Therefore, the mere possession or reliance on digital technologies alone is inadequate to enable impactful digital transformation. Kane et al., (2015) argue that digital capabilities, strategy, culture, and talent development are required to drive digital transformation. This is supported by Bonnet & Westerman (2020) who highlight digital capability and leadership capability as two key capabilities that allow an organisation to turn digital transformation into business advantage.

Many change initiatives within organisations have enjoyed limited success and it is important to understand why these fail. To provide further context, Andriole (2017) and Kotter (2007) posit that organisational change initiatives have been an on-going, iterative process and even highly capable managers make critical mistakes along the way largely due to a lack of understanding of the phases of organisational change. During the continuous change process, episodic bursts will occur, serving to trigger and accelerate further continuous change (Hanelt et al., 2020). As a result, victory is sometimes declared too soon, based on the outcome of episodic bursts, thereby resulting in the loss of momentum and reversal of the wins leading to derailment of the entire organisational change initiative (Kane et al., 2015; Kotter, 2007).

### ***2.3.2 The Importance of digital transformation in mining***

Mining has historically been a dangerous and labour-intensive industry (Westerman et al., 2014). Despite technological advances in other industries in line with the fourth industrial revolution, many mining companies still face challenges with digital transformation (Young & Rogers, 2019). Historically, the mining sector has had challenges in mining productivity, the safety of employees and environmental protection (Westerman et al., 2014). In comparison to other sectors, Young and Rogers (2019) posit that the mining industry is considered to be behind and is largely struggling to digitise its processes, labour, and assets. Other sectors such as banking and insurance, media, information technology, oil and gas, real estate and utilities are more digitised than mining (Young & Rogers, 2019). In these sectors, digital transformation ordinarily creates value for organisations through the use of customer facing technologies and platforms that ultimately enhance customer experience (Bonnet & Westerman, 2020; O'Reilly & Chatman, 2020). However, most mining entities have one or two customers and as such there is little incentive to focus on improving customer experience as

the focus of their digital transformation (Westerman et al., 2014; Young & Rogers, 2019). Mining companies therefore mostly focus their digital transformation effort on improving operational efficiency (Westerman et al., 2014). What follows is an outline of the benefits of digital transformation in mining.

### ***2.3.3 The benefits of digital transformation in mining***

Despite the mining industry tracking behind other sectors, digital transformation has the ability to bring various benefits to the mining industry. These benefits will result in the mining sector being more sustainable and are outlined below.

#### Safety

Digital transformation helps mining companies to produce safer working environments by reducing the number of personnel in dangerous or high-risk work areas such as underground operations or processing plants (Westerman et al., 2014). The automation of mining equipment will gradually see the removal of humans from underground operations with the introduction of driverless mining fleets controlled from remote operations centres (Young & Rogers, 2019).

#### Operational efficiency

Digitally transforming operations increases operational efficiency (Bonnet & Westerman, 2020). This is largely due to the use of technology such as remote operations centres that allow one operator to control several pieces of equipment resulting in considerable increases in productivity (Westerman et al., 2014). Through the introduction of automated mining equipment, wearables, sensors, and smart devices, the mining organisation is able to monitor underground conditions, machine health and maintenance, and track human centered data (Young & Rogers, 2019). The digitisation of operations brings a competitive advantage in the mining industry because operational efficiency impacts the unit cost of production from which margin is derived (Westerman et al., 2014).

#### Cost efficiency

The operational efficiency that digital transformation brings results in lower organisational costs (Young & Rogers, 2019). This is largely due to the reduced headcount that automation brings, and the reduced unit cost per tonne mined. A combination of the aforementioned factors results in a reduction in costs.

### Business intelligence

The ability to leverage real time data from connected devices and human wearables allows more data informed decisions to be made (Bonnet & Westerman, 2020; Westerman et al., 2014). As a result, decisions are no longer made based on historical data (Bonnet & Westerman, 2020) but on real time data and in some instances, are based on data that is driven by predictive analytics tools (Westerman et al., 2014; Young & Rogers, 2019). Predictive analytics tools utilise historical data to predict or anticipate the future (Young & Rogers, 2019). This enables leaders within mining organizations to be armed with a depth data driven information which they can use to make better and quicker business decisions (Frey & Osborne, 2017).

### Reduced environmental impact

Digital transformation allows mining organisations to reduce environmental impact through the leveraging of autonomous mining equipment, connected devices and intelligent mining methods (Westerman et al., 2014). The use of such equipment, some of which runs on battery power, helps to reduce mining organisations' carbon footprint (Young & Rogers, 2019). In addition, the use of intelligent mining methods allows mining organisations to mine only those parts of ore bodies that contain valuable minerals thus reducing the amounts of mining waste material (Young & Rogers, 2019).

### Reduction in headcount

The impact of digital transformation varies across sectors and type of jobs (Dengler & Matthes, 2018). Digital transformation, through sophisticated technologies that include machine learning, artificial intelligence, data analytics and robotics, has made some jobs susceptible to substitution (Frey & Osborne, 2017). Dengler and Matthes (2018) argue that the risk of job substitution depends on type of occupation or job. These scholars posit that unskilled and semi-skilled jobs are at the highest risk of substitution due to digital transformation while complex specialist and highly complex jobs have a lower chance of being replaced. The advancement of sensing technologies has exponentially increased the availability of data which is now being used for condition monitoring purposes and predictive analytics (Frey & Osborne, 2017). These technologies reduce the need, for example, to have unskilled or semi-skilled jobs such as equipment inspectors or Closed-Circuit Television (CCTV) operators. According to a study done by Dengler & Matthes (2018), the "average substitution potential for occupations related with production technology" (p. 307) is 65%. This implies that 65% of jobs in a sector such as mining, which uses production technology, are susceptible to substitution as a result of digital transformation. The resultant lower headcount will result in a lower labour cost.

## **2.4 Leadership**

This part of the literature focuses on leadership. It begins by reviewing leadership context and theory on leadership. It then examines transformational leadership theory which has been chosen as the underpinning theory for this study. This is followed by a review of digital leadership and leader capabilities. The section concludes by examining how leaders are upskilled and the role that digital governance plays in a digital transformation.

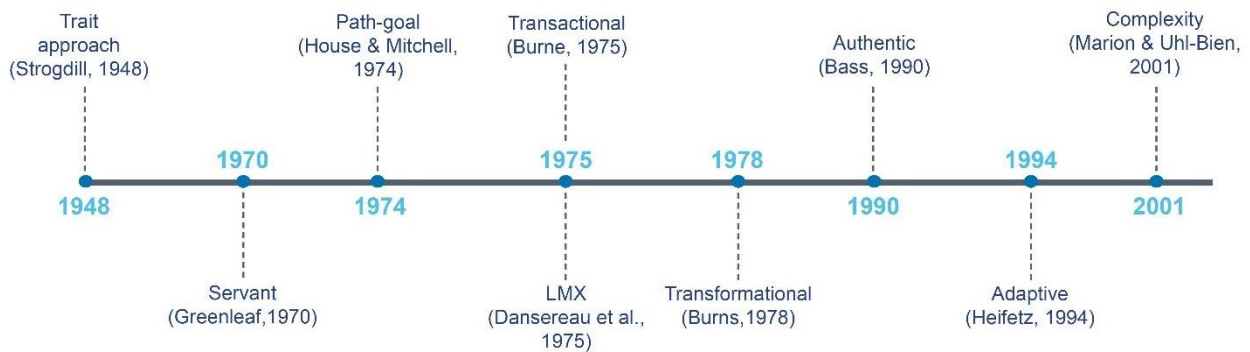
### ***2.4.1 Leadership Context***

Context has largely been treated as a simple independent variable in leadership studies often ignoring the sitting of digital disruption and how that fundamentally requires a different leadership approach (Bolden & O'Regan, 2016). Adapting to the fast moving and highly dynamic market environment are important goals for the leaders in order for them to stay abreast of the competitive landscape (Kane, Palmer, Phillips, Kiron & Buckley, 2018). Leadership plays a key role in digital transformation by determining the path to be followed and the pace at which to move the digital transformation process (Weill & Woerner, 2017). The aspect of getting leaders commitment is important in ensuring successful digital transformation (Kane, Palmer, Phillips, Kiron & Buckley, 2016). This affirms the importance of at each stage of carrying out digital transformation.

### ***2.4.2 Theory on Leadership***

Leadership is critical in aligning employees to work towards delivering an organisation's mission (Li, 2020; Antonakis & House, 2014;). However, such leadership needs to be effective. Effective leadership is impacted directly by the leader expertise and fosters specific actions that advance organisational transformation and, in the process, ensures that an organisation is able to adapt to meet its objectives (Antonakis & House, 2014). Therefore, where leadership is effective, the organisation stands a better chance to improve its organisational capability and deliver relevant business adaptations.

Figure 3 below provides an outline of the development of leadership theory over the years.



**Figure 3: Leadership continuum**

Source: Author's own, adapted from Northouse (2016) and Yukl (2013).

Leadership theory has evolved over the last century and it boasts a rich body of literature (Northouse, 2016). Leadership theory began with the trait approach and has continuously evolved to behaviour-based approaches. Later on, transformational leadership emerged while more recently complexity leadership has emerged. Within the context of understanding digital transformation, transformational leadership theory is considered relevant due to its ability to, “inspire and motivate followers to innovate and change” (O’Reilly & Chatman, 2020 p.7-8). It is discussed further in the next paragraph.

### ***2.4.3 Transformational Leadership Theory***

Transformational leadership involves influencing people in a manner that drives them to perform at higher levels than what is normally anticipated from them (Northouse, 2016). Due to transformational leadership’s ability to inspire and increase employee performance, it plays a key role in accelerating change (Yukl, 2013). Transformational leadership definitions encompass the elements of leaders convincing subordinates to transcend their self-interests (Ng, 2017; Koh, Kyootai & Joshi, 2019) through the following four multi-dimensional constructs; (1) Idealised influence, (2) inspiration, (3) intellectual stimulation or (4) individualised consideration (Bass, 1999; Bednall, Rafetty, Shipton, Sanders & Jackson, 2018). These scholars’ definitions highlight how leaders can use transformational leadership to drive better performance and for followers to derive meaning from them thus working towards a perceived greater good.

The successful implementation of digital transformation mostly starts with a clear vision (Kane et al., 2015) that results in the significant transformation of the organisation (Baiyere et al., 2020) that is delivered by the leader’s ability to manage the transition from their current state

to the organisation's future state (Li, 2020). Transformational leaders facilitate an environment that cultivates creativity (Koh et al., 2019) and through sharing of the importance of the organisation's goals persuade the employees to work towards achieving the goal or an organisation's overall vision of the future (Ng, 2017; Zhang, Ullrich & van Dick, 2015). Such leaders are therefore able to get buy-in from their employees and get them to work towards the organisation's mission.

In academic literature, transformational leadership is usually compared to transactional leadership which is described as being quid-pro-quo in nature (Antonakis & House, 2014) and it is focused more on exchange transactions between the leader and the follower to achieve certain goals (Bednall et al., 2018; Bass, 1999). Transactional leadership usually takes the form of contingent rewards with the follower getting something from the leader in exchange for their effort (Bass, 1999). The transactional leaders predominantly maintain the status quo (O'Reilly & Chatman, 2020) and often their actions are not sufficient to drive transformative behaviour (Bednall et al., 2018). In view of this, transformational leadership is considered a better leadership theory for digital transformation as compared to transactional leadership due to the fact that it results in above par performance (Northouse, 2016).

The theory on transformational leadership has evolved over the years with various authors exploring and adding to its existing body of knowledge thus making it one of the most widely researched subjects over the last few decades (Ng, 2017). Transformational leadership is split into five key dimensions: Vision, inspirational communication, supportive leadership, intellectual stimulation and personal recognition (Ng, 2017; Rafferty & Griffin, 2004). These dimensions as explained below.

#### **2.4.3.1 Vision**

Being clear on the future state of your organisation is one of the focal points of transformational leadership (Northouse, 2016). This allows both the leader and the followers to understand exactly where the organisation is headed, what its identify is and its specific organisational purpose. In essence, transformational leadership strengthens or reinforces the organisational vision (Yukl, 2013). Rafferty & Griffin (2004) sum this up by describing the vision as, "the expression of an idealized picture of the future based around organizational values" (p.332).

#### **2.4.3.2 Inspirational communication**

Inspirational communication is concerned with how leaders communicate with followers in a way that inspires them to commit to the organisation and become a part of its shared vision (Northouse, 2016). The communication is done using positive and emboldening messages that create motivation and confidence (Rafferty & Griffin, 2004).

### 2.4.3.3 Supportive leadership

Supportive leadership is described as the leader's being empathetic towards the followers needs and welfare (Rafferty & Griffin, 2004). This allows a leader to cultivate a climate in which they can get to know the specific needs of their followers and provide them the necessary support (Northouse, 2016).

### 2.4.3.4 Intellectual stimulation

Intellectual stimulation is described as a leaders' behaviour that allows the followers to think and analyse problems in new ways (Rafferty & Griffin, 2004). As such, the followers have room to be creative and innovative, thus allowing them to experiment with new ways of solving existing problems (Northouse, 2016).

### 2.4.3.5 Personal recognition

Personal recognition is described as the awarding or allotment of rewards in reciprocating the followers' efforts and their meeting of set goals (Rafferty & Griffin, 2004). As a result, a leader is able to reward a performance that is in line with the organisational vision.

## 2.4.4 Alignment of Transformational Leadership Theory and Digital Transformation

Having discussed both digital transformation and transformational leadership theory, the purpose of this section is to demonstrate alignment of transformational leadership theory and digital transformation. The section evidences why transformational leadership theory is an appropriate theory to apply in exploring digital transformation. Table 3 shows a comparison of the main constructs between transformational leadership and digital transformation.

**Table 3: Alignment of the Transformational Leadership Theory and Digital Transformation**

Element	Digital Transformation	Transformational Leadership Theory
Organisational change	Focused on organisational change shaped by digital technology (Hanelt et al., 2020; Bhadwaraj et al., 2013)	Focused on how leaders initiate, nurture and drive significant organisational change (O'Reilly & Chatman, 2020; Northouse, 2016)
Innovation	There are multifaceted interconnections between	Fosters an environment where innovation can happen (Koh et al., 2019)

	digital transformation and innovation (Appio et al., 2021)	
Vision	Having a transformative vision is one of the critical elements of digital transformation (Kane et al., 2016)	Having a vision is the focal point of Transformational Leadership (Rafferty & Griffin, 2004; Ng, 2017; Northouse, 2016; Zhang et al., 2015)
Culture	Culture is one of the elements that increases the likelihood of success in implementing successful digital transformations (Kane et al., 2016)	Advocates for leaders to effectively work with people and build trust among them (Northouse, 2016)
Organizational Performance	If successfully implemented, it drives higher levels of performance, productivity, and profit (Westerman et al., 2014).	Drives and motivates followers to perform at levels higher than what they originally do thus achieving higher performances (Yukl, 2013; Northouse, 2016)

Source: Author's own compilation

Table 3 demonstrates how the main constructs between transformational leadership and digital transformation are aligned. The key reasons why transformational leadership is an appropriate theory to support an organisation's wide digital transformation are as follows:

- Transformational leadership theory is effective in promoting technology acceptance (Carreiro & Oliviera, 2019). Digital transformation also involves the deployment of new digital technologies.
- Transformational leadership theory has a vision as its focal point (Rafferty & Griffin, 2004). The successful implementation of digital transformation mostly starts with a clear vision (Kane et al., 2015) that results in significant transformation of the organisation (Baiyere et al., 2020).
- Transformational leadership theory is focused on driving significant organisational change and digital transformation is focused on organisational change that is shaped by digital technology.

- Transformational leadership theory is often compared to the transactional leadership theory, but it emerges as a better theory due to its ability to deliver organisational transformations unlike transactional leadership which maintains the status quo.
- Transformational leadership theory fosters an environment where innovation can happen, and this aligns well with the requirements of digital transformation.

The transformational leadership theory, therefore, can be argued to be an appropriate leadership theory to understand digital transformation and the leader capabilities that are required for its successful implementation. Effective leadership is key for organisational transformations and especially due to the shift in competitive advantage that is brought about by the new technologies that digital transformation brings. Therefore, establishing the importance of leadership in leading successful digital transformation is also a key imperative.

#### **2.4.5 Digital Leadership**

Digital transformation requires digital leadership (Schrage, Pring, Kiron & Dickerson, 2021) in response to the new demands that the digital world imposes on leaders. Table 4 below explores the various definitions of digital leadership in literature and highlights the common themes through them.

**Table 4: Comparative analysis of digital leadership definitions**

Concept	Key themes of digital leadership definition	Authors
Digital Leadership	Leading in a digital environment	Kane et al. (2020)
	Driving strategic success of digitalisation in an organisational and its wider ecosystem	El Sawy, Amsinck, Kræmmergaard, and Vinther (2016)
	Use of digital resources in a coordinated manner across an organization to achieve a shared digital vision	Westerman et al. (2014)

Source: Author's own compilation

Digital leadership is defined by El Sawy et al. (2016) as doing that which is right for strategic success of digitalisation not just for the organisation itself but for its wider commercial ecosystem. This definition emphasises the strategic success of digitisation and goes wider

than the organisation itself to include a wider ecosystem. On the other hand, Kane et al. (2019) define digital leadership as leading in a digital environment. This definition highlights the digital environment and how digital leadership is about leading within such an environment. Westerman et al. (2014), in their definition, highlight the achievement of a shared digital vision through the leaders, applying resources in a coordinated manner.

Digital leadership therefore implies that the leaders must be mindful of the effect that digital transformation will have on its context, its business and staff. Digital transformation often brings with it significant change and when that change happens, people desire to be visibly led (Ancona, 2019). They desire to feel confident about how they will be led during the change.

Successful digital transformation agendas are led from the top (Kane et al., 2015) and require strong leadership and executive sponsorship (Andriole, 2017). This is supported by Porfirio et al., (2020) who argue that while digital transformation is technology enabled, it is always led by managers who have to determine what technologies to implement, the timing of such implementation, the pace of change and which business processes to change. While Kane et al., (2017) argue about the need to have a digital strategy, it is leadership that provides that direction. Westerman, Soule, and Eswaran (2019) support this by highlighting that the leaders must lead and live the changes they desire to see. Some organisations readily invest in the latest technologies but somewhat struggle to derive the intended benefits mainly because of a lack of strong digital leadership within them (Westerman et al., 2014).

Despite a greater level awareness of the potential benefits that digital transformation can bring to create competitive advantage, acting on that awareness remains a key challenge for many leaders (Bonnet & Westerman, 2020). Some leaders in successful companies, especially quoted ones, that are not facing market pressure are justifiably cautious about embracing digital transformation (Andriole, 2017). Despite this, Covid-19 has accelerated the rate of digital transformation (Hanelt et al., 2020) thus increasing pressure for leaders to transform themselves (Schrage et al., 2021). There are concerns about incumbent leaders feeling apprehensive and threatened by the structural change, the loss of power and decision-making ability that digital transformation may bring (Warner & Wager, 2019). While these concerns may be true, the measures to lead digital transformations may be rendered ineffective without the leader's own personal transformation (Schrage et al., 2021) often exacerbated by a limited comprehension of digital trends and absence strategic cohesion (Kane et al., 2017). This is because digital transformation requires leaders to be more self-aware, transparent, agile, and vulnerable (Schrage et al., 2021). This shows that leaders need to focus on taking an inventory of their own skills shortcomings and being aware of how to improve them. In advancing this

further, mutual mentorship has been identified as one initiative that can help close some of the leaders' shortcomings.

Schrage et al. (2021) posit that mutual mentorship is key to allowing leaders to learn and at the same time making them more authentic and respected. The concept of mutual mentorship is one where younger employees mentor older leaders to help them develop their digital skills (Schrage et al., 2021). This allows cross-generational skills development (Schrage et al., 2021) and allows cross-functional teams to thrive (Kane et al., 2017). Cross-functional teams are key to breaking down functional silos and promoting integration and collaboration (Kane et al., 2017). As a result, leaders can increase the likelihood of succeeding in their digital transformation endeavour and enhancing employee engagement simultaneously.

Based on the above literature, it is imperative to understand what leaders within the Zimbabwe PGM mining industry understand by 'digital leadership' and the extent to which the digital transformation phenomenon is important to their organisations.

#### ***2.4.6 Leadership capabilities***

To appreciate leadership, it is important to unpack what leaders actually do to deliver success within their organizations and to meet strategic objectives. Certain leadership capabilities are required for leaders to successfully deliver in the 21<sup>st</sup> century (Ireland & Hitt, 1999). This is reinforced by Westerman et al. (2014) who posit that to realize successful digital transformation, leadership capabilities are critical. The 21<sup>st</sup> century has brought with it new technologies and exponentially increased data availability all of which have created challenges for leaders to continue leading their organisations whilst adapting to the shifting context that they are operating in (Hitt, Haynes & Serpa, 2010). As a result, it is key to understand the capabilities that leaders require to drive successful digital transformation.

Leadership has historically been viewed by other scholars from a skills perspective and from a leadership trait perspective (Northouse, 2016; Yukl, 2013). These perspectives are expanded upon below:

##### ***2.4.6.1 Trait approach***

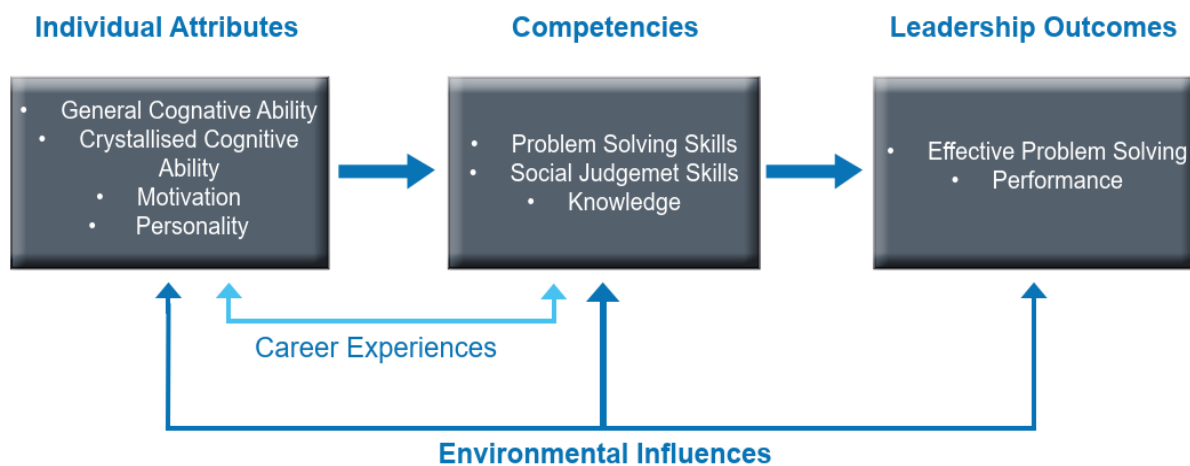
The trait approach involves understanding specific traits or characteristics exhibited by leaders and used in influencing subordinates to accomplish certain tasks (Northouse, 2016). Yukl (2013) and Zaccaro, Kemp, and Bader (2004) describe these traits as individual attributes or characteristics that are relevant in the execution of leaders' leadership responsibilities. Northouse (2016) argues that for a leader, the possession of specific traits is vital to being effective as a leader. The possession of those traits increases the possibility of a leader being effective in a certain context (Zaccaro et al., 2004) although the mere possession of those

traits in itself is no guarantee of leader effectiveness (Yukl, 2013). In essence, both the leader and the leadership traits are important to leader effectiveness.

The trait approach asserts that organisations can function better if they have the right people and if those people have the correct characteristics or traits (Northouse, 2016). The organizations must then ensure that the leaders they select exhibit the characteristics or traits they require for each position. The trait approach provides key insights regarding leadership and it is backed by a rich body of research in excess of a hundred years (Northouse, 2016). As such, it is useful in showcasing the characteristics for leadership positions.

#### 2.4.6.2 Skills approach

The skills approach asserts that certain skills are required for the effectiveness of leaders (Northouse, 2016; Yukl, 2013). These skills include both knowledge and abilities. Unlike the trait approach which focuses on the leader personally, the skills approach focuses on the job itself (Mumford, Campion & Morgeson, 2007). The skill-based model of leadership was developed by Mumford, Zaccaro, Harding, Jacobs and Fleishman (2000) and it explored the link between a leader capabilities and performance. Leadership capabilities “can be developed over time through education and experience” (Northouse, 2016, p.47). The skill-based model asserts that leader capabilities enhance the likelihood of a leader being effective (Mumford et al., 2000). The skill-based model is shown in Figure 4 below:



**Figure 4: Mumford’s skill-based model**

Source: Author’s own, adapted from Mumford et al. (2000)

The above model identifies competencies as key influences that affect effective leader performance. Skills are a key constituent of competencies (Yukl, 2013). Individual attributes influence the skills and knowledge that leaders have. They include personal intelligence, intellectual ability gained over time, motivation, and the type of personality that they have

(Northouse, 2016). The leader's aptitude to find solutions to novel challenges, the willingness to collaborate with other people and the ability to leverage knowledge form the basis upon which a leader builds competencies that are relevant to positively impact leadership performance (Northouse, 2016). Leadership outcomes are influenced by leader competencies which impact overall leader performance (Northouse, 2016). Career experiences gained over the course of a leader's career affect both their competencies and characteristics (Northouse, 2016) thus positively impacting their ability to deal with complex challenges. External influences are those elements that are beyond a leader's competencies, characteristics and experience (Northouse, 2016). They can affect a leader's performance and are normally outside the control of the leader. Mumford et al. (2000) argue that the skills-based approach is not incompatible with the trait approach and that both approaches can be used in a manner that complements each other.

Mumford et al. (2007) argue that leadership skill requirements are stratified and vary across different organisational levels that include junior, mid, and senior levels of management. They argue that leadership skill requirements differ between line supervisors, departmental managers, general managers, leaders of small firms and senior managers of large corporations. Based on the above literature, this research explored leader perspectives on what the capabilities are, which of them are necessary for successful digital transformation.

#### ***2.4.7 Capabilities and characteristics of the best digital leaders***

Digital transformation brings with it a variety of novel challenges that leaders need to solve (Kane et al., 2019; Li, 2020). If leaders are unable to adapt and solve these challenges, they put their jobs in jeopardy (Mukherjee, 2020). The challenges they face require the development of leadership characteristics and capabilities which are essential to delivering digital transformation (Porfirio et al., 2021; Westerman et al., 2014; El Sawy et al., 2016). These characteristics and capabilities help organisations to realise the benefits of their digital transformations including the creation of a competitive advantage (Westerman et al., 2014). Below is an exploration of the key capabilities and characteristics found in literature.

##### Vision and purpose

The cornerstone of a successful digital transformation is an inspiring vision (Westerman et al., 2014) which is highlighted as a key skill to have in making digital transformation a reality (Kane et al., 2019). Kane et al. (2018) assert that having a vision and a purpose is the most desirable capability in digital leaders. Leaders who can articulate a clear vision of the future are more likely to get followers to buy into their vision (Kane et al., 2018; El Sawy et al., 2016) and establish a clear sense of purpose (Carton, Murphy & Clark, 2014). Merely communicating a vision is not enough and it is important to communicate the vision using more imagery

alongside a few organisational values (Carton et al., 2014). Communicating a vision in this manner helps to create a shared sense of the company's goal.

### Collaborative

Digital transformation requires collaboration across functions some of which may be geographically dispersed (Mukherjee, 2020; Westerman et al., 2014). Leaders have to therefore embrace the challenge of bringing multi-disciplinary and multi-geographical teams together, to help them build trust not just amongst themselves but with the leaders (Mukherjee, 2020; Westerman et al., 2014). The dispersement of teams, some of which work remotely, adds to the challenge that leaders face as they seek to achieve collaborative success through sharing knowledge, breaking down silos and building multi-disciplinary teams (Mukherjee, 2020; Westerman et al., 2014). Kane et al. (2018) argue that the complexity that digital transformation brings demands that leaders look beyond intra-organisational collaboration and collaborate with external organisations as well. Through being collaborative, leaders can leverage capabilities of external organisations and use them to generate competitive advantage for mutual benefit (Kane, Nanda, Phillips, & Copulsky, 2021).

### Innovative

Innovation originates from the fusing of the old and the new to reinvent products or experiences (Westerman et al., 2014). Ancona (2019) argues that "leaders are the engine of innovation" (p.4). Within the context of digital transformation, leaders need to cultivate an environment that allows innovation to occur at all levels throughout an organisation (Kane et al., 2018) by "allowing people to explore possibilities and make decisions autonomously" (Ancona, 2019 p.4). Leaders therefore must create an environment that is conducive for experimentation but at the same time they must balance experimentation with effective exploitation of established practices and competencies (Kane et al., 2018). When leaders are innovative, they ideally position their businesses to exploit digital innovations and bring about strategic changes that recalibrate the direction and destination of their organisations (Li, 2020).

### Agile

Agility lies at the heart of fully harnessing the power of digital (Doan, 2021). Agile leaders easily adapt to a fluid environment and alter their direction in response to changes either in the marketplace or in specific technologies (Kane et al., 2019). Agility is therefore a mindset that leaders need to have to acquire new skills, mentor or reverse mentor, and take up on-line training courses. Leaders who have an agile mindset are able to adapt and can pivot should the situation demand that (Kane et al., 2021).

### Influential

Leaders are well placed to influence followers in their quest to achieve common goals. Being able to influence and stimulate change in follower's lives carries an ethical burden and responsibility (Northouse, 2016). The ability to persuade and influence followers and other stakeholders is important for leaders to have (Kane et al., 2018). Leaders who are good communicators are able to inspire people and are highly influential within an organisation (Northouse, 2016).

### Inspirational

To get followers to follow them, leaders need to be inspirational (Kane et al., 2018). Leaders do this by communicating in a manner that stimulates strong emotions in followers to gain their support for a change within an organisation (Yukl, 2013). Being an inspirational leader requires the leader to be able to appeal to followers' emotions and values to generate commitment to an organisational cause (Yukl, 2013).

#### **2.4.8 Upskilling Leaders**

Porfirio et al., (2020) and Kotter (2007) argue that no business can survive over the long term without the ability to reinvent itself through organisational changes and critical business adaptations. As a result of digital disruption, leaders will face new leadership challenges for which they need to add to their existing skill sets (Kane et al., 2019; Schrage et al., 2021). Therefore, developing an adaptive capacity (Bennis, 2013; Kane et al., 2019) and leading a business through change are some of the essential capabilities of a leader today. A key consideration is choosing the right executive to lead the digital transformation (Weill & Woerner, 2017). Kane et al. (2016) posit that in leading a digital transformation, the most important leadership skills are having a transformative vision, forward thinking ability, and possessing a change-oriented mindset as opposed to having pure technological skills. Therefore, having the right skills is important.

On the other hand, Hanelt et al. (2020) suggest that three important leadership skills in overcoming digital transformation challenges include digital transformation awareness, digital transformation acceleration and digital transformation harmonisation. Due to shifting contextual conditions, digital transformation awareness is required for managers to sense and react to market changes (Hanelt et al., 2020). Digital transformation acceleration relates to the ability to implement fast execution and experimentation in the marketplace.

These leadership skills are critical to inspire teams, navigate complexity when it arises and to cultivate distinct digital cultures where necessary to drive creativity and innovation in rapidly changing environments (Kane et al., 2016). Organisations that neglect to develop digital talent (Kane et al., 2017), increase employee engagement and reinforce their organisational purpose (Schrage et al., 2021) are likely to experience increased staff turnover as the competition for digital skills intensifies. Good leadership is a prerequisite to navigate the complexity and change that digital transformation brings (Bolden & O'Regan, 2016). The inability to formulate a transformative vision can easily create confusion and a lack of direction leaving managers and employees confused and uninterested (Kotter, 2007; Kane et al., 2017).

Effective digital transformation requires that leaders measurably transform themselves and enhance their own "affective digital transformation" (Schrage et al., 2021, p. 37). Affective digital transformation requires leaders to focus on enhancing focus on developing skills in areas such as purpose, engagement, fairness, inclusion, and representation (Schrage et al., 2021). This is supported by Ancona (2019) who asserts the importance of leaders quickly evolving or alternatively risking extinction.

Projecting such attributes which are related to the softer kind of skills can be difficult for leaders and is often difficult to discern especially when recruiting leaders or managers into organisations. They are also difficult to discern in incumbents. As such there seems to be a possibility that successful digital transformation requires strong and bold leadership capability infused with new age skills and approaches to deliver desired business outcomes. Based on the literature, it will be vital to understand how leaders are being equipped with skills to lead digital transformation. Furthermore, the exploration of how such skills can be imparted especially in pre-digital organisations such as mining companies, is key.

#### **2.4.9 Digital Governance**

Digital governance is vital to help leaders oversee and monitor digital transformation initiatives (Obwegeser et al., 2020). Whilst areas such as finance, operations and human resources have strong governance over them, there is a lack of consistency in the governance of technology (Westerman et al., 2014). A 2019 study by Obwegeser et al. (2020) found governance related challenges to be among the top digital transformation challenges that the organisations faced. As a result, the governance related risks from the implementation of digital transformation make digital governance an important requirement for organisations (Kane et al., 2018; Westerman et al., 2014). Digital governance helps provide oversight, coordination, and resource allocation. Westerman et al. (2014) advocate for the creation of governance committees, in the form of steering committees, executive committees or innovation committees, to provide the oversight. These committees are responsible for

reviewing and approving technological investment business cases, providing policy oversight, and determining the capabilities required (Westerman et al., 2014). Obwegeser et al. (2020) add to this by advocating that a well governed digital transformation should include flexibility that allows multiple kinds of digital initiatives but at the same time ensuring adequate rigidity to realise strategic alignment and efficiency.

## **2.5 Spill over perspective**

The spill over effect concept is characterised by the impact that a multinational corporation's activities and investments have on a local firm by impacting its overall level of productivity (Eden, 2009; Harris, 2009). Technology spill overs involve the movement of technological knowledge from an MNE to a subsidiary which the subsidiary uses to create competitive advantage depending on the scale and complexity of the technologies shared (Marin & Bell, 2006). In most cases low-income countries are characterised by significant technological and skills gaps, thus making them well positioned to receive technology and skills spill overs from their multinational corporations (Liedong, Peparah, Amartey & Rajwani, 2020; Driffield & Love, 2003; Chindondondo, 2020). However, it has been noted that where institutional voids exist, an organization's ability to adapt its strategy to suit local conditions can create competitive advantage (Doh, Rodrigues, Delmohout & Makhija, 2017).

Emerging market countries have limited skilled labour, feeble local institutions, erratic governments and undependable infrastructure (Liedong et al., 2020). Zimbabwe is a low-income country with extremely difficult market conditions which have been characterised by skills flight thereby impacting the overall Research and Development (R&D) expenditure within the country (Chindondondo, 2020). A master's level research, by Hulme (2020) on 'digital transformation of multinational subsidiaries operating in emerging markets', supported this and found that Zimbabwe has a weak institutional environment that is characterised by political and economic instability.

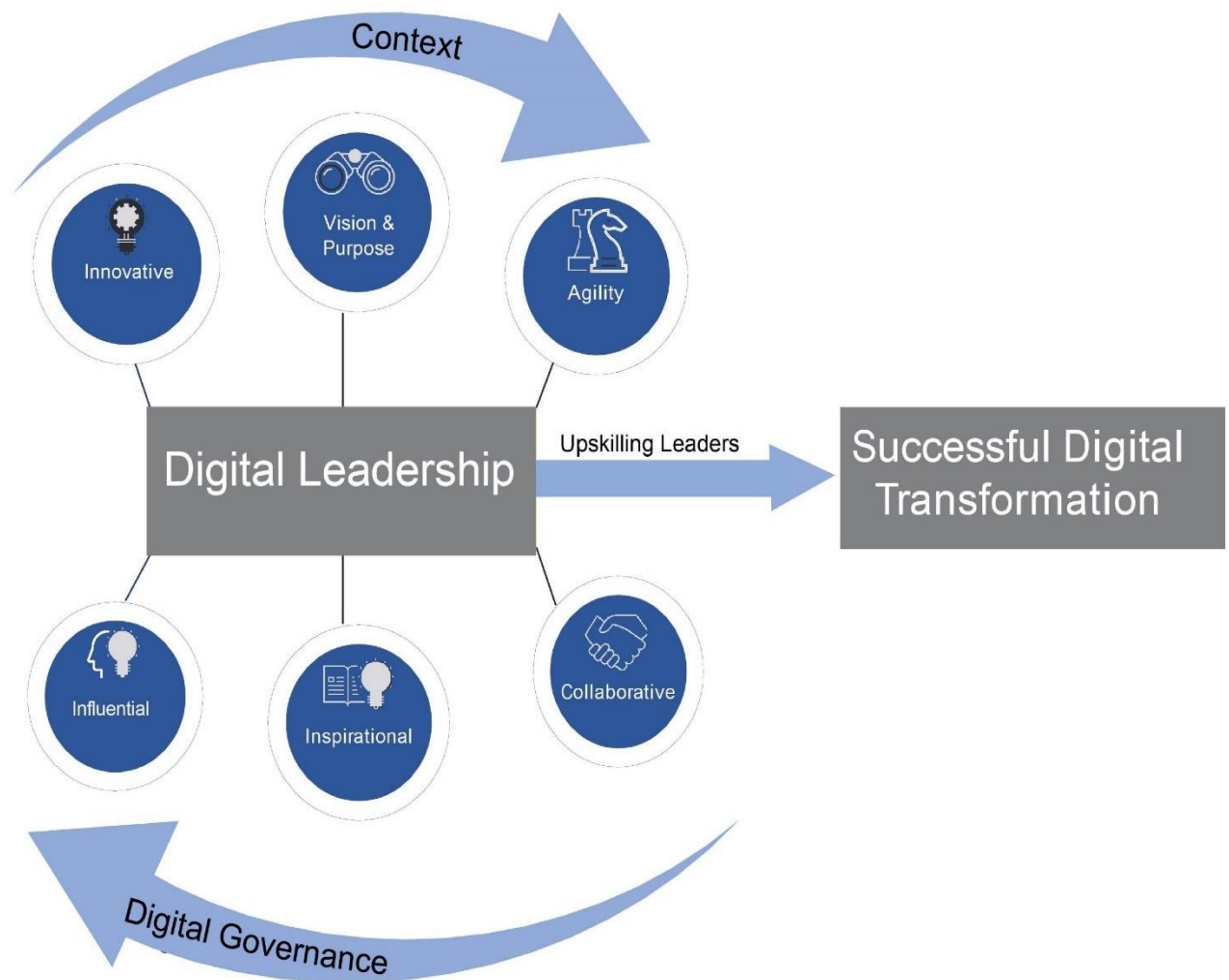
Since the PGM producing mining companies in Zimbabwe are owned by foreign shareholders (Government of Zimbabwe, 2018), this research finds it important to explore the technology spill over effect to establish the extent to which technology spill overs have influenced their digital transformation journeys. It is therefore pertinent to explore the role MNEs play in the digital transformations of their subsidiary companies. While the subject of the technology spill over effect on digital transformation is not the core part of this research, where aspects of it are identified during the research, they will be highlighted.

## 2.6 Conclusion

The importance of digital transformation will remain and will accelerate in the future. As has been shown by the literature review, while there has been an increase in academic interest in the subject, a lack of conceptual clarity and inconsistencies exist. As a result, insights from the literature point toward a need to understand the influence of leadership capabilities that enable successful digital transformation which meets desired organisational outcomes. Porfirio et al. (2020) studied the leadership and management characteristics that help further digital transformation implementation. The conclusion reached by these scholars was that effective leadership appears crucial to mobilise action towards digital transformation. While Porfirio et al.'s (2020) study found that "more democratic leadership styles, more coherent managers actions and more efficient strategic management processes favour the development of digital transformation processes" (p. 616), this study was, however, only confined to Portuguese companies and applied a quantitative methodology.

This presents an opportunity to enhance the existing body of knowledge and warrants a study of the gap between the recognition of the importance of digital transformation and its hands-on implementation to understand the leadership capabilities that are required for its successful implementation in a developing world country, such as Zimbabwe with a focus on the PGM mining industry where digital transformation is a key business imperative currently. The mining sector is under pressure to increase productivity, efficiency, and agility (Westerman et al., 2014). Increasing efficiency in mining operations enhances competitiveness (Westerman et al., 2014) due to the limited extent that mining companies can control world commodity prices.

Figure 5 shows the conceptual framework that emerged from this chapter



**Figure 5: Proposed conceptual framework derived from the literature review**

Source: Author's own compilation

This chapter presented the review of extant literature on digital transformation, leadership, and spill overs. The next chapter addresses the research questions within this study.

## **CHAPTER 3: RESEARCH QUESTIONS**

### **3.1 Introduction**

This chapter aims to explore the research questions of this study. This chapter considered the background, context and literature described in Chapters 1 and 2 in formulating the research questions. The overall research question explores the influence that leadership capabilities have on leading successful digital transformation. The overall research question asks;

**What influence do leadership capabilities have in facilitating successful digital transformation of the PGM mining industry in Zimbabwe?**

### **3.2 Research sub questions**

**Research Question 1. What do leaders understand by digital leadership as well as its importance of digital transformation in the PGM mining industry?**

Digital transformation requires digital leadership (Schrage et al., 2021; Kane et al., 2020). Furthermore, successful digital transformation is led from the top and requires strong leadership (Kane et al., 2015; Andriole, 2017). This question seeks to gauge the extent to which leaders understand digital leadership. A lack of strong digital leadership can lead to organisations struggling to derive the full benefits of digital transformation (Westerman et al., 2014; Kane et al., 2017).

**Research Question 2. How essential is the role of leadership in successful digital transformation?**

Leadership is crucial to promote successful digital transformation (Porfirio et al., 2021). Where leadership is effective, the organisation stands a better chance to improve its organisational capability and deliver business adaptations relevant for digital transformation (Antonakis & House, 2014; Ready et al., 2020; Westerman et al., 2014). This question will allow deeper insights in understanding the importance of leadership in successful digital transformation.

**Research Question 3. What characteristics or capabilities does a leader require to lead successful digital transformation?**

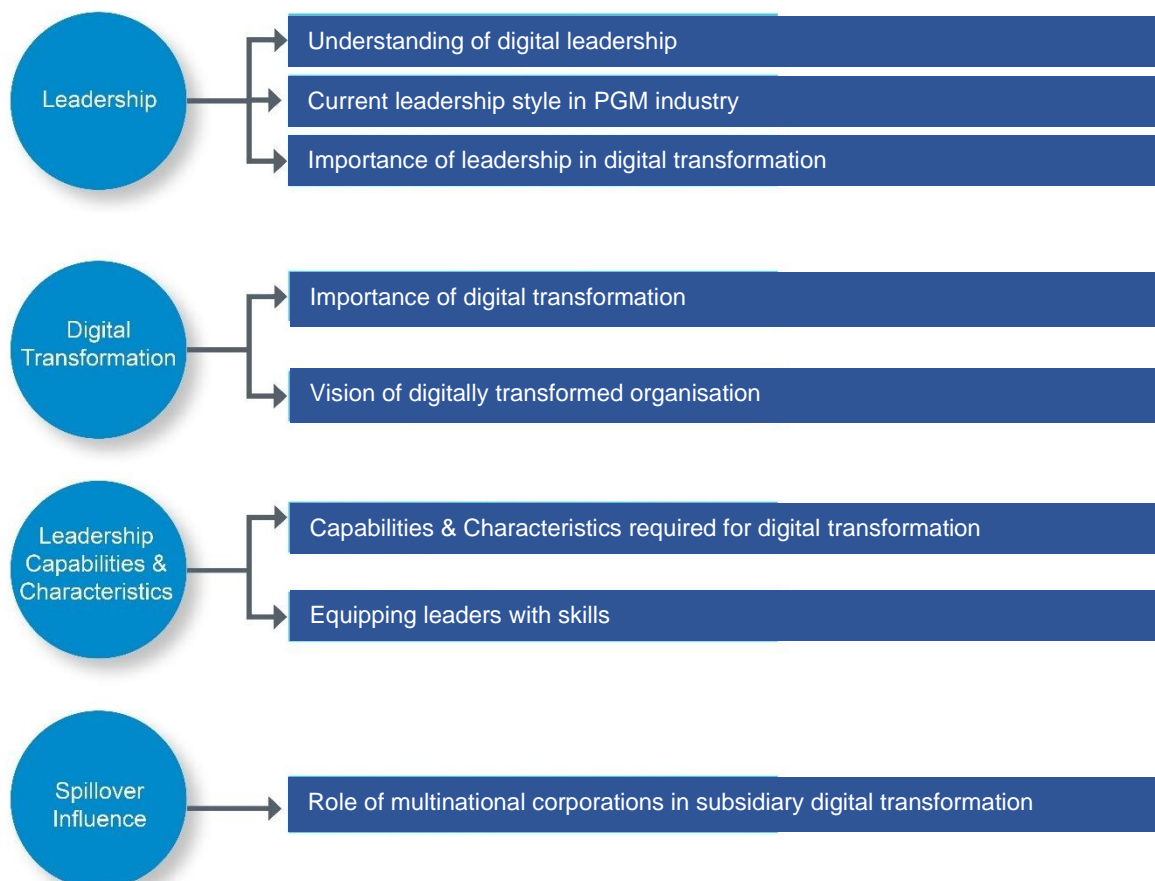
Specific organizational capabilities are key in making digital transformation a success and delivering on its intended benefits (Vial, 2019; Porfirio et al., 2021). Bonnet and Westerman (2020), Westerman et al. (2014), and Kane et al. (2018) highlight that digital capability and leadership capability are two key capabilities that allow an organisation to turn digital transformation success into business advantage. This question seeks to get a deeper understanding of the leader capabilities required to lead successful digital transformation. It

also explores the capabilities that leaders believe are most important for leading successful digital transformation.

#### **Research Question 4. What role do multinational corporations play in their subsidiaries undergoing digital transformation?**

Technology spill overs from a multinational corporation parent to a subsidiary help create competitive advantage for a subsidiary depending on the scale and complexity of the technologies shared (Marin & Bell, 2006: Liedong et al., 2020: Driffield & Love, 2003). This question seeks to assess the role that multinational corporations are playing in the digital transformation of their subsidiaries in the PGM mining industry and provide an improved understanding of the part they play.

Figure 6 below gives a synopsis of the main research components of this research and their link to the research questions.



**Figure 6: Major components of research study**

Source: Author's own compilation

This chapter outlined the research questions of this study. The next chapter presents the research methodology and research design that applied.

## **CHAPTER 4: RESEARCH METHODOLOGY**

### **4.1 Introduction**

Research strategy encompasses an overall approach to research and includes philosophical assumptions that inform research design, the research question and methods applied to respond to the research question (Bell, Bryman & Harley, 2019). This section explains the approach applied in testing the research questions from Chapter 3. It highlights the choice of research methodology, the proposed research design and the application of the chosen methodology. The main aim of this research is to understand the leadership capabilities required to lead successful digital transformation.

This study followed an interpretivist philosophy using a qualitative and exploratory approach. Semi-structured interviews were carried out, via digital platforms, with participants who met the sample criteria. The research design, quality controls and limitations are explained in this chapter. The research design, quality controls and limitations are explained in the sections that follow.

### **4.2 Choice of Methodology**

#### ***4.2.1 Philosophy***

The purpose of the research entails understanding the leadership capabilities that influence successful digital transformation. A qualitative research method is generally used when an issue needs further exploration for a specific group or population (Creswell, 2007; Bell et al., 2019). In addition, qualitative research is applied to build a detailed understanding of a context or setting within which a specific group or population deals with specific unfolding social phenomena (Creswell, 2007). Due to the lack of conceptual clarity and maturity of the digital transformation concept and its application, a qualitative approach is appropriate to understand the leadership capabilities that are required for this unfolding phenomenon. Bell et al., (2019) posit that qualitative methods are better suited to the generation of theory and also when quantitative measures cannot adequately address a research problem (Creswell, 2007). A qualitative research method is therefore appropriate to understand leadership within a digital transformation context due to the fact that it is still emerging and needs to be explored further.

An interpretivist approach was followed to explore the leadership capabilities necessary for successfully leading digital transformations through leaders' lived experiences of leaders. Bell et al. (2019) posit that interpretivism is primarily focused on comprehending human behaviour within its natural environment and as a result, this guided the selection of the interpretivist

approach. Interpretivism was therefore, deemed appropriate to unpack the leader capabilities within the digital transformation context. This allowed the researcher to explore the leaders' experiences in the context of the PGM mining business environment where digital transformation is executed.

#### **4.2.2 Approach**

This research sought to make a research contribution on the leadership capabilities required for leading successful digital transformation. An inductive logic was adopted. Eisenhardt, Graebner & Sonenshein (2016) argue that inductive research is especially useful in understanding issues that are multifaceted and muddled often with constructs that are difficult to measure. Digital transformation is a construct that currently is characterised by a lack of conceptual clarity and maturity in its application (Bolden & O'Regan, 2016; Verhoef et al., 2019; Vial, 2019). Due to the fact that this research sought to explore experiences of leaders within the context of a business environment, an inductive approach was considered appropriate.

### **4.3 Research design**

In view of the limited time the researcher had to complete this study, a cross-sectional study was carried out focusing on data collection at a particular point in time. In Chapter 2 a deductive approach was primarily used to generate research questions by examining parts that required further exploration based on the current theory and knowledge contained in literature (Maxwell, 2009). The research questions then informed the significant components of the research design and aided in focusing the study (Maxwell, 2009). Following the gathering of the data, an inductive approach was taken to analyse the data, identify comprehensive themes and determine whether any new theories emerged (Creswell, 2017).

The method employed for this research was mono type method in the form of qualitative research. A similar approach was noted in research carried out by (Kunaka, 2019), who performed a study on 'Leadership competencies for digital transformation in a telecommunications organisation' and also in a study carried out by Pillay (2020) on 'Understanding digital leadership competencies to enhance collaboration in South African banks'.

#### **4.3.1 Population/Research Setting**

The population is a grouping from which a sample is normally selected (Bell et al., 2019). The identification of the population for this research was based on the researcher's understanding of the PGM mining industry in Zimbabwe which includes three mining entities (Government of

Zimbabwe, 2018). The population of this study were individuals who hold senior management roles in the PGM mining companies in Zimbabwe. This population was required to have considered, adopted or attempted to adopt digital transformation initiatives in furtherance of their organisational strategy. Senior management roles within the context of this study included Chief Executive Officers (CEO), Strategy Executives, Managing Directors, Executive Directors, Senior Managers, General Managers, Managers and management Executive Committee members. These individuals had to have participated in strategy formulation and involved execution of strategy through the proposed, or actual adoption of digital transformation. This population was therefore expected to have insights into organizational strategy, digital transformation and the role of leaders in planning and executing it. The population geographically originated predominantly from Harare and the Great Dyke where most PGM mining operations are located.

#### **4.3.2 Unit of analysis**

The unit of analysis is defined as the primary entity under analysis and the entity about which the researcher wants to make a specific conclusion (Bell et al., 2019; Creswell, 2017). For this study, the unit of analysis was individual leaders holding senior management roles in PGM mining companies based in Zimbabwe. These individuals were drawn from the three levels of leadership below the Chief Executive Officer level as shown below in Table 5.

**Table 5: Criteria for unit of analysis applied**

<b>Level</b>	<b>Criteria</b>
Executives	These are leaders who are one level below the board level and include the C-suite executives such as CEO's, Managing Directors, Chief Financial Officers (CFO).
Top managers	These are managers that report to the C-suite and include general managers and senior general managers.
Senior managers	These are line and support functions managers who are directly responsible for day-to-day operations.

Source: Author's own compilation

The participants were individuals who had input and took part in strategy formulation and execution within the organisation. This unit of analysis was appropriate because their experience provided them the opportunity to engage meaningfully in terms of the relationship between digital transformation and leadership. The level of analysis for this research was the PGM mining industry in Zimbabwe.

### **4.3.3 Sampling method and size**

Care needs to be taken in finding a good fit between a sample and a research question (Bono & McNamara, 2011). The two techniques used in qualitative research are probability and non-probability sampling. For this research non-probability sampling was applied due to its flexibility (Bell et al, 2019). Purposive sampling was applied for this study. Bell et al., (2019) define purposive sampling as being a kind of non-probability sampling in which sample constituents are selected in line with the researcher's view on what is tactically relevant for the research. In purposive sampling respondents are chosen according to preestablished criteria that is suitable for a certain research objective (Guest, Bunce & Johnson, 2006: Maxwell, 2009). A non-probability purposive sampling technique was adopted considering the knowledge and insights expected from the participants.

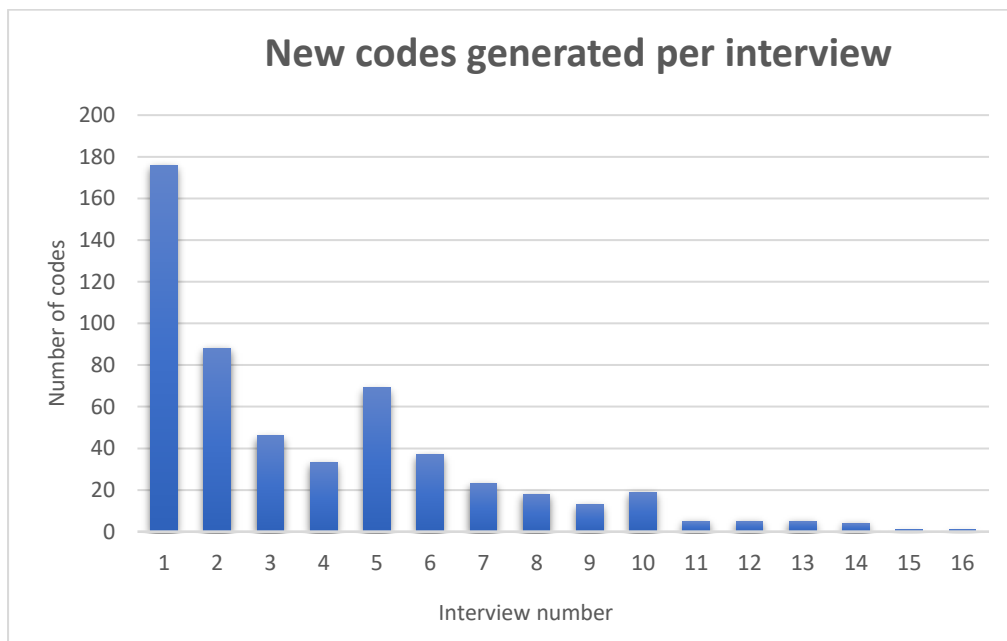
Due to the application of judgement in selection of the participants, the purposive sampling applied in the study did not permit the researcher to generalise the findings to a wider population (Bell et al., 2019; Guest et al., 2006). This method of sampling was deemed congruous for this research since it is based on gathering individual perceptions, experiences and opinions regarding the digital transformation and leadership capability constructs within participants from the PGM mining industry. This is in line with the views of Maxwell (2009) who supports the use of purposive sampling in order to allow for the selection of a sample that is aligned with the theories being researched. This makes the population hard to reach and to some extent hidden thus meeting the criteria for applying non-probabilistic purposive sampling (Bell et al., 2019; Guest et al., 2006). In applying purposive sampling judgement was applied in selecting participants from two of the three PGM mining companies that constitute 77.5% of total national PGM production (Chamber of Mines of Zimbabwe, 2021) taking into consideration their roles, knowledge, experience and expected insights.

Bell et al., (2019) highlight the need to optimally determine sample sizes for qualitative research in order to prevent data saturation and theoretical saturation challenges. This is affirmed by Guest et al. (2006) who highlight the importance of carefully selecting purposive samples especially where the area of research is relatively indefinite, thus making a sample of sixteen interviews adequate. A total of semi-structured 16 interviews were planned and carried out in line with guidelines on purposive sampling (Guest et al., 2006). The sample was derived from the researcher's own networks. At 15 and 16 interviews the researcher checked whether saturation point had been reached.

#### 4.3.4 Data saturation analysis

Data saturation reflects an appropriate sample size and refers to the point at which additional interviews do not generate new codes (Guest et al., 2006). The 16 interviews that were carried out were analysed to assess whether saturation had been reached (Bell et al., 2019). This was done through reviewing whether new codes were emerging from the last two interviews carried out. Based on the scarcity of new codes from the last two interviews, the researcher did not carry out further interviews as saturation had been reached.

Figure 7 below shows the saturation analysis that emanated from the coding process.



**Figure 7: New codes generated per interview**

Source: Author's own compilation

#### 4.3.5 Data gathering process

Sixteen semi-structured interviews were utilised to gather primary data. A semi-structured interview is used “to obtain both retrospective and real-time accounts by people experiencing the phenomenon of theoretical interest” (Gioia, Corley & Hamilton, 2012, p. 19). It can be applied in an exploratory study in which the interviewer has a set of questions but has some flexibility to alter the sequence of posing questions and also has the room to ask further questions to probe areas of interest further (Bell et al., 2019). This choice of semi-structured interviews (on a Microsoft Teams platform due to Covid19 restrictions) allowed the researcher the flexibility to probe the participants further and explore significant replies. All the interviews

were recorded using both a mobile phone and on Microsoft teams with participant consent to enable transcription, analysis and accuracy (Josselson, 2013). Prior to the interviews happening, the researcher prepared by reading about what a good interview looks like and common interview mistakes as outlined by Josselson (2013).

An interview protocol was developed and tested for both quality and interview practice purposes (Josselson, 2013). As guided by Maxwell (2009), the interview protocol was developed not just from the literature but with a view to ensuring it facilitated the gathering of data that answers the research questions. The interview protocol was refined and tested through a pilot interview that was carried out with a colleague whose doctoral thesis research was qualitative in nature. The pilot interview feedback was used to refine certain questions and for the elimination of some sub-questions that were deemed to be redundant. The pilot interview helped determine the approximate duration of the interview and whether it could be completed within one hour. The data that was gathered from the pilot interview was excluded from the data set (Josselson, 2013). The interview guide utilised for collecting data is shown in Appendix 2. Regarding the main research question (RQ3), during the interviews the researcher asked the participants a follow up question to reflect on which of the leader capabilities that they had identified ranked in the top five in terms of importance. This follow up question allowed the researcher to gather data not just about the frequency of mentions but about the participants' ranking of the five most important mentions. This data is covered in Chapters 5 and 6.

The participants were drawn from two of the three platinum producing organisations in Zimbabwe. These two organisations contribute 77.5% of the total platinum production in Zimbabwe (Chamber of Mines of Zimbabwe, 2021). Therefore, this sample is considered a fair representation of the PGM mining industry in Zimbabwe. The list of participants and their organisational profiles are shown in Table 6 below.

**Table 6: Participant list and categorisation**

Participant Reference	Position	Meeting platform	Role category within mining company	Duration
L001	Executive	Microsoft Teams	Support	50 minutes
L002	Top manager	Microsoft Teams	Support	51 minutes
L003	Senior manager	Microsoft Teams	Support	53 minutes
L004	Top manager	Microsoft Teams	Support	43 minutes
L005	Senior manager	Microsoft Teams	Operations	57 minutes

L006	Senior manager	Microsoft Teams	Support	53 minutes
L007	Executive	Microsoft Teams	Support	61 minutes
L008	Top manager	Microsoft Teams	Operations	72 minutes
L009	Executive	Microsoft Teams	Support	61 minutes
L010	Executive	Microsoft Teams	Support	128 minutes
L011	Top manager	Microsoft Teams	Operations	50 minutes
L012	Senior manager	Microsoft Teams	Support	67 minutes
L013	Senior manager	Microsoft Teams	Operations	54 minutes
L014	Top manager	Microsoft Teams	Support	74 minutes
L015	Top manager	Microsoft Teams	Operations	61 minutes
L016	Top manager	Microsoft Teams	Operations	56 minutes

Source: Author's own compilation

A total of sixteen interviews were carried out on Microsoft Teams with participants across the three tiers of management (Executives, Top Managers and Senior Managers). The participants were further split between Operations (Mining, Processing, Smelting) and Support functions (HR, Finance, Risk management etcetera).

#### **4.3.6 Data analysis approach**

The primary data from the participants was collected via 16 semi-structured interviews with leaders from the PGM mining industry in Zimbabwe. The data that was gathered from the participants was analysed iteratively. The process of theory building is an iterative one and it continuously oscillates between theory and data (Bell et al., 2019). A thematic analysis was utilised in analysing the data.

The data was analysed using a 5-step inductive approach to thematic analysis (Braun & Clarke, 2006) using AtlasTi and Microsoft Excel. As guided by the process in Saldana (2013), the descriptive first level codes were developed from the data and then code groups were developed. The goal of the coding process was to fracture the data to be able to rearrange it into themes (Maxwell, 2009). From there, the code groups were further developed into themes. The themes were then developed into groups of themes and then into theoretical categories (Saldana, 2013). This information was then used to compile the research report and extract quotes used in Chapter 5. Braun & Clarke (2006) consider thematic analysis a suitable method

for conducting qualitative research within the behavioural sciences construct within which this study falls. Therefore, the method applied the researcher is considered appropriate.

Saturation is important for researchers to practically obtain an understanding of an optimal sample size before embarking on interviews on the ground (Guest et al., 2006). The researcher tracked new codes that emerged from the interviews as they progressed to assess whether saturation had been achieved. By the time the researcher got to interview 15 and 16 saturation had been reached.

#### **4.3.7 Research quality and rigour**

##### *4.3.7.1 Reliability and validity*

Bell et al., (2019) posit that reliability and validity are key in determining and testing the quality of business research. Different elements were applied to address reliability and validity of the study as expanded upon below.

Reliability was addressed through the use of a standard interview protocol which was tested through a pilot interview prior to its application. All documentation in this regard was maintained and stored in AtlasTi.

Accuracy was addressed through several verification processes. Firstly, the interview recordings were utilised to verify accuracy of the transcription process and secondly to ensure that accurate quotes were used in Chapter 5. The accuracy of the initial coding process was reviewed several times with constant reference to the transcripts and categories maintained in AtlasTi.

Informant bias was addressed through use of open-ended questioning of experienced and knowledgeable participants, and the provision of anonymity to allowed participants to freely engage (Martin & Eisenhardt, 2010). As recommended by Maxwell (2009), during the interviews the researcher applied participant validation techniques through paraphrasing and asking the participants to confirm the researchers understanding of what they said.

Discrepant evidence that did not appear to be explained by theory in the literature review was not ignored (Maxwell, 2009). It was further examined and presented to the reader to draw their own conclusions along with the researchers own potential explanations (Creswell, 2017). In this regard, answers to certain research questions were determined to be inconclusive as a result of such discrepant evidence.

##### *4.3.7.2 Triangulation*

Triangulation is an important method of cross-checking observations or findings using a different method, source of data or theory (Bell et al., 2019; Creswell, 2007; Maxwell, 2009).

This allowed the researcher to improve confidence in the findings thereby increasing reliability. Within the context of this research, triangulation was applied into this study in the form of data triangulation and theory triangulation. Data triangulation was carried out in the form of cross group and intra group comparisons for specific research question findings to assess whether findings in one group correlated with those of another. Regarding theory triangulation, the researcher explored multiple theories in academic literature to support or disprove the research findings.

#### *4.3.7.3 Researcher bias*

Bias impacts data collection or analysis through the researcher's preconceptions or values (Maxwell, 2009; Creswell, 2017). The risk of the researcher introducing biases and assumptions into the study was minimised through ensuring that interview questions were aligned to literature. Subsequently the interview questions were tested before use through a pilot interview to ensure they were clear. Furthermore, the researcher did not benefit from the study other than to contribute to the emergent discourse on leading digital transformation.

#### *4.3.7.4 Research ethics*

The study was conducted in a manner that complies with the requirements of ethical standards of research (Maxwell, 2009). Participants were requested to complete a consent form and ethical clearance was obtained prior to gathering data. Furthermore, the participants were anonymised, and data reported with no identifiers in line with ethical standards of research. There were no incentives offered to any of the participants. All data from this research will be saved on a password restricted external hard drive device.

### **4.4 Research Limitations**

Bell et al., (2019) argue that, by its nature, qualitative research by its nature is very subjective and has flaws or common criticisms. As a result, certain limitations were identified as follows:

- The study was limited to the PGM mining industry in Zimbabwe and focused on leaders who have been involved in digital transformation initiatives. Bell et al., (2019) state that the scope of findings of qualitative research is normally restricted and cannot be used to generalise about a complete population from one study. As such the study cannot be generalised to other mining sub-sectors, the whole mining industry, other industry sectors or to other developing countries.
- The study showcases the views and experiences of managers in the PGM mining industry in Zimbabwe. It does not share the views of employees, who are directly impacted by the

leadership influences. As such employees may have differing views and perspectives to those of their managers and such views could be separately studied.

The study did not look at technical and technological elements of digital transformation.

- Qualitative research is reliant on the researcher's ingenuity and the researcher him or herself is the main means of data collection (Bell et al., 2019). As such, this impacts the replicability of this study.
- The researcher had no prior training in interviewing techniques. Potentially, this can influence the interview process and data collected. To mitigate this, a pilot interview was conducted, and feedback sought from an experienced colleague whose doctoral thesis was based on qualitative research. Through this pilot interview valuable feedback was received on the interview guide and interviewing skills.

This chapter outlined the research methodology and research design. Next, the findings from the data gathering process are presented.

## **CHAPTER 5: RESULTS**

### **5.1 Introduction**

This chapter presents the findings from data gathering, and analysis processes. The data sample used is explained first and entails how saturation was achieved. Following this, the suitability of the participants is presented. Thereafter the detailed results are shown as presented by each research question.

### **5.2 Sample Description**

Sixteen interviews were carried out as part of this research. Prior to that, one pilot interview was carried out before the commencement of the interview process to test and refine the interview guide.

Table 6 that is placed in Chapter 4 presented the data illustrating the participants' designation, which part of their mining business their role is and the length of the interview. To ensure that anonymity was maintained, participant reference codes were used, and these codes were used for the findings and the quotations that are included in this chapter. Since the participants were drawn from two of the three PGM mining companies, the company references (names) were excluded from the table because if they were included some of the participants could be easily identified. The participants were drawn from two platinum producing organisations in Zimbabwe whose combined platinum production is 77.5% of the total platinum production in Zimbabwe (Chamber of Mines of Zimbabwe, 2021). As such, this sample was considered adequate for the purposes of this research.

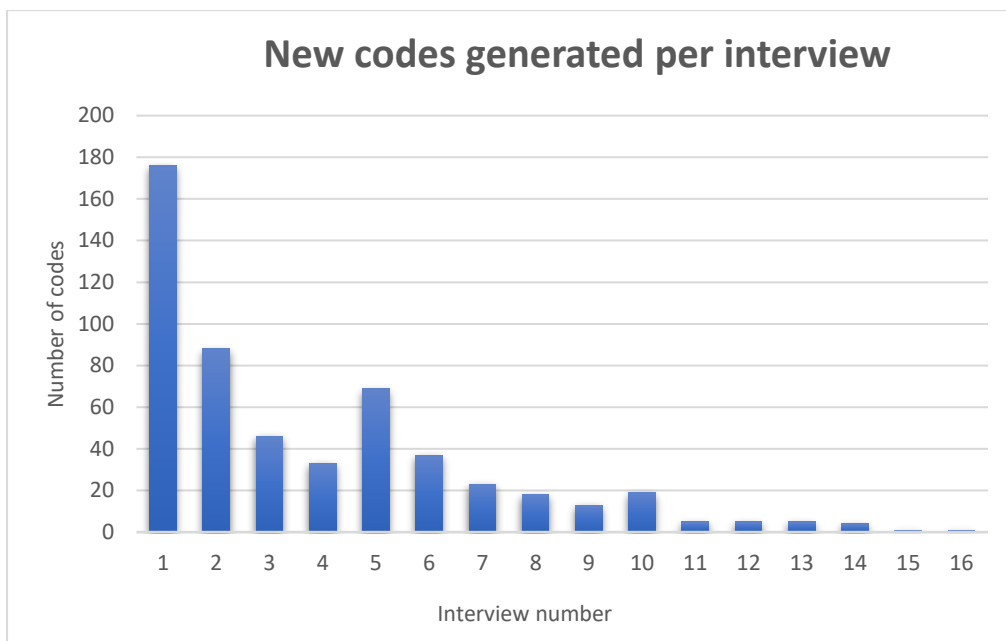
The list of participants, their positions and groups are shown in Table 6 which is placed in Chapter 4. All the interviews were carried out on Microsoft Teams which is an online meeting portal, due to the ongoing Covid-19 restrictions. As part of the research, the researcher undertook to explore and understand the experiences of the managers in the platinum mining companies in Zimbabwe that have considered, adopted, or attempted to adopt digital transformation initiatives in furtherance of their organisational strategy. To ensure appropriateness of the sample, the researcher initially reviewed the integrated annual reports of the PGM mining companies or those of their parent companies to ensure that digital transformation was indeed part of their strategic agenda.

From there, participants were identified in organisations that met the sample criteria and arranged interviews with them. The participants interviewed were senior managers, top managers and executives within the PGM mining industry in Zimbabwe. Furthermore, the researcher categorised the participants into groups, one being for operations and the other was for support functions. This was due to the fact that digital transformation can be viewed

differently from an operational and support function perspective. Operations include departments or functions that drive the core mining business and processing activities while the support functions include all the other corporate departments or functions that provide corporate support such as finance, Human Resources (HR), Information Technology (IT), risk management and the strategy groups.

### 5.3 Data Saturation

Saturation is key to obtain an understanding of whether a sample size is optimal (Guest et al., 2006). The researcher tracked the codes that emerged from the interviews as they progressed to assess whether saturation had been achieved as per the table below. Figure 8 below signals that data saturation was achieved and hence the collection of the data was stopped after the 16<sup>th</sup> interview.



**Figure 8: Evidence of data saturation**

Source: Author's own compilation

### 5.4 Suitability of interview participants

To demonstrate that the participants met the sample criteria and were involved in and had views on digital transformation, the following sample quotes were extracted from the interview transcripts:

*“Our organisation is one of the companies or mines that is serious about digital transformation. We have got a programme, strategic programme that we call modernization of the mine or mine modernization, mine automation” (L014).*

*“I think we have really moved in strides in terms of digital transformation. If you look at the mining side there’s a lot of technological innovation which has come through in terms of even our ability to be able to monitor what’s happening underground. Our emergency rooms there, tracking people, even with the time equipment goes underground, the coal face, all that FDM, technological improvements and also we are busy working on more and more improvements” (L011).*

*“If you look at ourselves as an organisation, we are among the leading mining companies in terms of mechanization and automation. We have mechanized most of our processes and then underground environment. Its more connected than most of the traditional mines and we now have communication highways underground that are allowing us to automate most of the processes, machines talking to each other, we able to tag so that, everyone that goes underground is tagged as we are able to track those people on central control room that is on surface...We are going to be the first mining company here, if not in Southern Africa to put LTE communication highway underground” (L013).*

*“Like our CEO [name removed] who said if a mine is not mechanised and digitalised, I’m not going to bring a proposal for investment consideration to the board. I think it was drastic way of saying that probably people were not changing fast enough so let’s put a barrier there” (L010).*

*“If you ask me whether we are currently benefiting from whatever that has been done. We’re probably are not yet getting huge results from digital transformation largely because of poor adoption, poor alignment and all that. So, the short answer is we have started, we’re not yet there, we’re definitely behind other players, but we have taken a direction that we’re going there” (L012).*

*“If I look at our organisation something that we are now trying to correct but I think there's been a disjointed kind of implementation where you find that on the operations aspects of it, there was a lot that was happening there but the services or support aspect was actually not integrated into the digital transformation. So, the integration of the whole system throughout the value chain from operations all the way to service functions what is really needed” (L001).*

#### Conclusion regarding the suitability of participants

From the above quotations, it is clear that the participants have been involved in digital transformation within their organizations and therefore they are in a position to share experiences and thoughts around the subject.

### **5.5 Presentation of Results**

The results that are presented here are in line with the research questions drawn from Chapter 3.

### **5.6 Results for Research Question 1**

#### **Results for Research Question 1: What do leaders understand by digital leadership as well as its importance in the digital transformation of the PGM mining industry?**

The overall aim of this research question was to build a context to the research interview and assess the participants' understanding of digital leadership within a context of a digital transformation. Digital leadership has various definitions and is understood differently by different people. This question was asked to understand what leaders in the platinum mining industry understood of digital leadership.

The next part of this question aimed to explore participants' views on the current leadership style within the PGM mining industry and the influences of that particular leadership style. Digital transformation requires certain types of leadership styles to successfully implement and this sub-question sought to understand participants views on what the current leadership style actually is.

The third part of this question sought to understand how participants assessed the importance of digital transformation in the platinum mining industry and whether it had a significant impact on their organisation. Digital transformation has been described as a strategic game changer and this question sought to explore whether participants viewed it as being of high significance within the platinum mining industry.

The results from this question are shown below:

### **5.6.1 Question 1a: What do you understand the term digital leadership to mean?**

Several leaders largely understood digital leadership as fundamentally being about leading people albeit in a different environment that is more technologically advanced as highlighted by two leaders who described it as:

*“Leading at the forefront of the digital wave” (L014).*

*“Look, digital leadership is different from ordinary leadership in the sense that it happens in a different environment, but leadership is leadership. The digital perspective makes it a bit more dynamic with a lot of changes, so it’s going to be different from normal leadership where the environment is pretty much the same and you can learn from the past. I think from the digital perspective you’re dealing with new things all the time. So, it is going to be, from a leadership perspective, it’s the same you have to lead, but I think the environment is different, so it calls for a different perspective on how you do it” (L003).*

Other leaders linked it to systems that are required to ensure that an organisation can become digitally enabled in line with its strategy. One leader stated:

*“...digital leadership is a system, it’s an organizational system that is put in place by the leader to ensure that an organization can become digitally enabled effectively. So, it’s those systems that are required to ensure that an organisation can become digitally enabled. So those systems, that’s why I was talking more of systems when we were talking about digital leadership...Have you put in place in the organisation, the whole strategy and all these tools that we utilise in the whole leadership realm? Including the training, the skills, everything. So, a digital leader is someone who is capable of putting the systems that are required to make sure that an organisation can effectively transform to become digitally enabled” (L010).*

Some leaders linked it to the modernisation of their mining organisations as highlighted by another leader who described it as, *“the leadership required to successfully modernize your organization” (L015).*

On the contrary, one leader believed that digital leadership as a concept was just a fad and that it is more of a play on words that simply referred to leadership:

*“The term digital leadership to me is a fad that I have never understood what it means. It almost appears that they’ve taken two very good terms, put them next to each other, I don’t know what digital leadership means. However, we can talk about digital transformation. To me digital transformation is where traditional processes, systems and processes are effectively digitised and technology is adopted to change the way we work. It comes in a lot of ways and there are a lot of, there are lots of initiatives. Some people say digitalisation is part of technology enhancement, some people say it’s the other way and it’s all about digitising processes and applying technology to change the way we work” (L012).*

#### Conclusion regarding sub-Question 1a

From the feedback, participants concurred that digital leadership was essentially about leading an organisation within a context that is driven and characterised by digital technologies. Digital leadership remains a leadership discipline and is ultimately key to instil confidence in the people that are being led through a digital transformation journey. The participants also highlighted how a digital leader needs to have systems in place to ensure that the organisation is successfully modernised.

#### **5.7 Question 1b: What in your view is the current leadership style in the platinum mining industry?**

This sub-question sought to understand what leadership style exists within the PGM mining industry. Most participants described various leadership styles as existing in the platinum industry. However, the leadership style within the industry was mostly described as being hierarchical and autocratic.

A total of four out of the 16 participants described the current leadership structure as being hierarchical and traditional as it was characterised by having a hierarchy in place and is used to drive performance and deliver results. The hierarchical status of the leader enables them to influence followers. A total of three of these four participants described it as:

*“If I look at the leadership style right now, I think it is still heavily traditional. In other words, the traditional way of doing mining. I think the hierarchy is respected in a big way and when the hierarchy is respected you find that it doesn’t really leave people to open up, you will at times miss good ideas that people have because that hierarchical system” (L001).*

*“Leadership is still hierarchical and not a lot of choice has come through despite the technological advances which are coming through” (L004).*

*“Its top-down, it’s very... its hierarchy centered. It does not allow bottom-up discussions, it creates fear” (L009).*

The participants agreed that the hierarchical leadership style is not an ideal style that should be obtaining in the PGM mining industry at this stage and believed that it should change. Most of the participants highlighted their preference to see a leadership style that allows collaboration. One participant highlighted the need to have a blend of leadership styles that ultimately end up with the leaders being collaborative. The participant highlighted that a more authoritative leadership style would be required to encourage slow and hesitant individuals to align to the change that digital transformation brings:

*“Because the end game will be you want a collaborative leader. But I would actually argue and say at the point of the digital transformational change we need a blend or a combination of an authoritative and a collaborative leader or somebody who’s able to coach and lead the process. And the reason being, you are going to get people who take to the change quickly and move on. There will be those that are slow and hesitant” (L008).*

Another five out of the 16 participants described the current leadership style as being autocratic in nature and not evolving fast enough over the years. The participants highlight that the instructions have to be followed and people need to follow the instructions that they are given.

*“The leadership styles in Zimbabwean mining industry evolved quite slowly over the years. To the extent that what I left 15 years ago is what I found when I came back this year and I still think it’s heavily autocratic, the traditional type of leadership where authority accumulates in the manager and the manager uses it to influence decisions and run everything. Everything is dependent on authority. Unlike the other side of it which would be more collaborative. So, my thinking is the industry is still a break your helmet sort of way, where the leader uses his authority to push for things to happen*

*and the leader's strategy, he gets what he wants. The leaders approach carries the day with very little collaboration" (L012).*

*"You do what they say, you follow instructions, and you don't ask" (L010).*

Contrastingly, there were some participants who highlighted that the leadership style varies and is very much situational and depends on what situation is obtaining at the time. From their perspective, a leader should adapt their leadership style owing to the dictates of the various situations. Such participants did not want to assign only one leadership style as a result of this. This is confirmed by L016 and L003 below:

*"I would like to believe that yes, leadership styles vary, you have got these different styles that I have mentioned. But personally, as an individual all those leadership styles...they can exist in an individual. 6,7, or 8 as they are. But then what drives you into a style is the situation. So, I would like to believe that I personally choose the style depending on the situation" (L016).*

*"It's my take that leadership is going to be based on who and what you are leading, the context in which you lead and what is at stake. In terms of mining, it's definitely that way" (L003).*

Notwithstanding the view that the current leadership style is autocratic, some participants did acknowledge that in their view, an autocratic leadership style is not ideal for the PGM industry:

*"In my view digital transformation cannot be sustained by a purely autocratic leader because most of the things that you do, you do them through people. You cannot single handedly do them, I don't think it works" (L012).*

*"I think there's an acknowledgement that autocratic doesn't work and its old style and people don't accept it and they frown upon it because you're not the only person who knows everything. But there's still quite a bit of authority around the fact that listen,*

*this is a procedure, we will follow it to the tee, if there's a change then we need to follow certain processes. No if's, no but's" (L008).*

Several participants highlighted that there are factors that influence the current leadership style in the PGM industry. These factors that influence the current leadership style include but are not limited to the need to keep employees safe while working on the operations side of the mining organisation, the presence of a largely unskilled labour force, and the need for adherence to regulatory requirements. Participants also highlighted that the prioritisation of operational efficiency and the high-power distance also influence the leadership style.

*"I think safety also plays a part in the authoritarian style because at the end of the day the manager wants to be safe but what then happens is that as long as you have people doing a lot of manual processes they inevitably there is going to be some accidents so to try and get around it most people tend to shout at people, over punish people in case they make a mistake or there is a safety incident. You know people who wants to demonstrate and show an example that this is a no go area and this is something that you should ever do but inevitably that leads to more of a command type of leadership than anything" (L002).*

*"Yeah, it's mainly the risks and the conditions and then the other one is the type of skills that the mining sector used to attract because the industry or the job or the processes there, they are very manual, risky, and very manual so the mining industry at the lower level used to attract unskilled, there is a lot of unskilled, labour force that we used to have in the mining sector. The tasks were then performed manually, and all that. So that's obviously the change that we are seeing that's now changing from the use of a lot of unskilled labour to now moving towards more skilled labour force. So, it's mainly to do with work processes were design, unautomated, high risks that we've got in those processes and all that" (L013).*

*"I think it's because it involves loss of lives of people. Typically, in a mine people go underground, there are safety issues there. In case of an emergency there has to be one voice that speaks and everyone else listens to the voice" (L005).*

*“I think it is similar to any industry where safety is paramount. If you go to the aviation industry, you go to the army, mining is also equally dangerous. So, you cannot have people just doing stuff. So, I think people say it that way but any industry where lives are involved you need that kind of leadership. I don't think you can do without it...it's gotta be hierarchical and you need to follow procedures otherwise you could create disaster in no time. And it's highly regulated so in an industry like that you do that” (L003).*

*“Zimbabwe scores quite high in terms of power distance” (L012).*

### Conclusion regarding Sub-question 1b

From the feedback, most participants highlighted that the current leadership style in the PGM industry is hierarchical and autocratic. The participants mostly concurred that they would like to see the current leadership style change to a more collaborative leadership style within the industry. They attribute the current leadership styles to the need to adhere to safety requirements, high regulations, and the historically unskilled labour force in the mining industry. On the other hand, some of the participants highlighted that the leadership style is situational and is driven by each leader's assessment of the demands of various situations and the needs of their followers.

### **5.8 Question 1c: How important in your view is digital transformation for the PGM mining industry?**

This sub-question sought to explore the importance of digital transformation and to explore the impact that it has on the PGM industry. In their responses, participants shared their views on the importance of digital transformation including the benefits that it brings for organisations in the PGM industry.

#### **Importance of digital transformation**

The majority of participants agree that digital transformation is of critical importance in the PGM industry and that it is a significant factor in the long sustainability of the industry. The participants concurred that the long-term survival of the PGM industry depended on digital transformation.

*“No, it's actually a game changer. Infact the very survival of the PGM mining industry depends on it...If you have a look at the issues to do with productivity....once your productivities drop, your costs get hammered. So, for you to be able to make sure*

*your men are safe, your productivities either remain the same or improve, ideally improve, digital transformation is key to the very survival of every operation if you ask me. What my suspicion is, if you have a look at where we were five years back in regards digital transformation and how fast we are now moving with digital and technology, the growth may not yet be exponential but you can quite clearly see that it's actually gone way up significantly year on year. So, it's something that we cannot run away from. Our survival depends on it. If we are going to remain a cost leader, a productivity leader and one of the safest mines, we need it" (L008).*

*"I don't foresee those sustaining the current prices into the future. If they can't sustain prices into the future, then there's no way the platinum industry will be able to or the PGM industry will be able to sustain itself if it doesn't do something drastic in terms of reducing the operational costs drastically...One way of doing that is digital transformation, that's the only way, that's the major way. Everything else you're just scratching the surface; it's not going to assist" (L015).*

*"It's a survival game now. It's not about whether you need to transform. If anything, it's about when, you have to do it. You need a transformer, and you need to do it now. So, I think it's quite important there because there's no way in which we can get giant steps, significant changes and also continue to meet our ever-shrinking space in terms of increasing demands with the ESG's and all that without embracing digital transformation" (L010).*

The participants highlighted that with ore bodies becoming less rich and deeper to mine, more efficient and less costly methods are the route through which they can continue to mine sustainably. Embracing effective digital technologies was considered key in the sustainability of the PGM industry. This is confirmed by L012 below:

*"We're in a situation where resources are getting scarce. We're using up resources. So, the ore bodies are becoming less richer, they're further down the earth hence more difficult to extract economically. The only way you can boost that efficiency is if you become more effective. And you can only become more effective if you use tools, processes and systems that are by themselves efficient in doing what they need to do. So as the resources become scarce you need to adopt effective technologies" (L012.)*

Despite the immense technological upgrades it brings, digital transformation must create value for shareholders. Two participants highlighted that pressure from shareholders for a greater return on their investment makes digital transformation important for the PGM industry as highlighted by L001:

*“Return to shareholders is a big issue. I think shareholders are demanding you deliver value because of its long-term nature and because it is capital intensive and so forth, return to shareholders is a big issue. Shareholders are demanding that they get their pound of flesh” (L001).*

### **Benefits of digital transformation**

In addition to the importance of digital transformation in the PGM industry, participants highlighted a range of benefits that digital transformation brings to the PGM industry.

Table 7 below presents the key benefits of digital transformation and the frequency of mention thereof, as highlighted by participants.

**Table 6: Key benefits of digital transformation**

Rank	Benefits of digital transformation	Frequency
1	Improvement in safety	15
2	Improved productivity and operational efficiencies	14
3	Reduction in operational costs	12
4	Reduction in headcount	7
5	Reduction in capital expenditure costs	5
5	Environmental benefits	5

Source: Author’s own compilation

From the table, safety, productivity and operational costs reduction received the highest numbers of mentions compared to the other benefits such as capital cost reduction and environmental benefits. The benefits mentioned are expounded upon below.

#### **Improvement in safety**

Improvement in safety emerged as a key benefit of digital transformation for most of the participants. Most participants acknowledge that safety is of supreme importance in the industry and that digital transformation will go a long way to improving safety by minimising the number of men underground. This is confirmed by L014:

*“Then another one that I will not over emphasize is safety, which has also benefited. That one benefited big time arguably the most key performance indicator that has benefitted the most. As you know mines are known for being very dangerous places. Digitalisation has assisted in a lot of ways to smoothen operations, to remove men from high-risk parts of the operations” (L014).*

#### Improved productivity and operational efficiencies

It emerged from most participants that an improvement in productivity and operational efficiencies is a key benefit of digital transformation. Productivity is an important Key Performance Indicator (KPI) within the industry, and it measures the tonnage of ore that is produced per person or per team during a fixed period. What emerged was confirmed by L006 who indicated:

*“It will enable us to improve on our throughput. I will give you an example. There is a re-entry period when we do our mining activities because after blasting you are not able to go into the mine for example for 4 hours. And during that period the conditions underground will not be conducive for people to go underground. But that time that we lose each day, the 4 hours, if you’re using automated pieces of equipment like your automated LHD’s and your dump trucks. It means that time you can still be able to utilize that period and still mine. So, what it means is your productivity increases and also you reduce the employees that you will be employing. So, it means you have already reduced your costs, but you have upped your productivity or your production” (L006).*

#### Reduction in operational costs

Most of the participants also mentioned that digital transformation will benefit the PGM industry through a reduction of operating costs. Within the mining industry, the price at which metals are sold is determined by metal exchange markets and not the mining companies. What the mining companies control is the cost at which they produce an ounce of PGMs. As such, it is important for mining companies to minimise costs to be sustainable.

*“Because inherently your costs will reduce because, mind you, you start producing more tonnage probably even if you say your overall costs remains the same. But because you have increased the tonnage over the same period it means your effective*

*cost actually goes down. But remember also you reduce your manpower levels. You just have your capital costs for acquiring that automated piece of equipment. So, it means you reduce your direct costs” (L006).*

#### Reduction in capital expenditure costs

It has been mentioned that digital transformation will reduce capital expenditure costs as a result of better capital efficiency. Through digital transformation, underground mining equipment whose useful life averages approximately 5-6 years will have longer useful lives and only need to be replaced at longer intervals as a result of analytics driven predictive maintenance and automated mining fleets that will experience reduced wear and tear. As a result, capital expenditure will reduce as highlighted by L008:

*“The machine will now be running itself. So, what are the odds that someone is going to hit it against the pillar? Close to zero. Because it has got inbuilt safety nets that if it’s getting close to a wall, it will stop. What are the chances that somebody will over rev it? Zero, because that machine will be running itself. What are the chances that somebody will over break? Zero, because it will be running in a controlled fashion. So, all those issues that I mentioned, what are the chances that it will over speed? Zero, because it will again be controlling itself. All those issues that I’ve mentioned, be it property damage against the wall, over revving, over breaking, over speeding, all those things become history. And what you will notice is that your maintenance cost will come down but additionally to that, your capital cost will also come down. And the reason why is because you’re not damaging them during the short intervals and you therefore will be able to get longer life. And therefore, instead of you buying a dump truck, let’s say arbitrarily every 5 years, it could go up to every 6 or 7 years if not 8 or 9 years and therefore your capital cost also comes down” (L008).*

#### Reduction in headcount

The reduction in head count was observed as a benefit of digital transformation by several participants. This reduction in headcount was observed to be a result of the automation of operations and process optimisation. L011 confirmed this and mentioned:

*“I remember from when I started working here coming from the university, this plant would be having probably per shift 40-50 people. Some were starting a pump here and another there. But there’s that transformation which happened to say guys, we just*

*need a central point where you have got your operator who controls the whole plant and whatever comes from there, running units. It's digitally captured, reports are also electronically produced, and there's no more human intervention...In a shift, we would have 40-50 people, but now we are sitting at about 10-12 people. On that leg obviously we have done very well and also that minimization of having people all over the show" (L011).*

### Environmental benefits

Some participants believed that digital transformation would improve environmental impact. They highlight that digital transformation will reduce degradation and environmental pollution through leveraging technology to enhance Environmental Social and Governance (ESG) alignment and compliance. They highlight that currently, the industry produces solid rock waste, air pollution and effluent waste.

*"We see the mining industry is becoming a much safer place, safer environment that is actually the biggest area that we have seen digital transformation playing...We are now going to see a safer mining environment and then we're also going to see less pollution, environmental pollution. So, our environmental social governance side of things are going to be greatly improved in the mining sector as concerned with digital transformation. So, we see digital transformation as a very central in creating this mine of the future (L013).*

### Shortcomings

On the other hand, a few participants highlighted some shortcomings of digital transformation which need to be managed. These included, firstly, the perception that jobs will be lost and the impact that this will have on managing industrial relations:

*"Like I'm telling you, one of the biggest issues it brings is fear and threats into people's mind. Because there's significant change management issues that come into play. You know people are quickly shaken out of their comfort zones and it's not something that is, easy to deal with. You are telling someone who is 55 years old or 50 years old. And you are saying okay, in 1 year, in 2 years' time this is what I expect. And you want that person to quickly transform himself to be ready to fit in to the holes that you would have created when he knows he's a square peg, it's not easy. So, I think it is one of the biggest challenges to be honest" (L015).*

Secondly, participants highlighted the loss of privacy that increased technology usage will bring, especially underground where tagging and tracking systems are already in use:

*“As you collect a lot of data in a digitized environment, we also encroach on the person to the extent that sometimes people feel we are encroaching on humanity. You want to track people underground. So, you give them a wearable, but that will also then inadvertently tell you when he goes to the loo. And that becomes too invasive. And labour unions may not take it” (L012).*

#### Conclusion regarding sub-Question 1c

From the feedback, participants confirmed the significant importance of digital transformation and its impact on the long-term sustainability of the PGM industry. Participants emphasised the benefits that digital transformation brings to the industry. These include but are not limited to an improvement in safety, increased productivity and operational efficiency. The participants also highlighted that with digital transformation, the PGM industry will realise a reduction in operational costs, capital expenditure costs and headcount. Furthermore, digital transformation would result in better ESG alignment and compliance.

### **5.9 Results for Research Question 2: How essential is the role of leadership in ensuring a successful digital transformation?**

This question sought to explore the how vital leadership is in executing digital transformation successfully. Digital transformation requires leadership for it to succeed. The research question is divided into two sub questions as follows:

The first part has been explained in the preceding paragraph. The question also sought to understand whether there were other factors that the participants viewed as important in successfully executing digital transformation.

The second part sought to establish whether leaders have a vision of their mining organisation post digital transformation and whether they are able to articulate that vision. A vision is often referred to as a spoken portrait of an organisation’s aspirations. Having a vision that is clearly articulated helps leaders to create a picture of the future for their followers and also helps them not just understand the ultimate purpose of their work but also understand where they fit into that future.

The results from this question are shown below:

### **5.9.1 Question 2a: How essential is the role of leadership in ensuring a successful digital transformation in PGM mining?**

The participants resoundingly concurred that leadership plays a pivotal role and is seen as a prerequisite for a digital transformation to succeed. Digital leadership is key to lead in a digital environment, and not just the ability to navigate new technologies. One participant mentioned: *“For digital transformation to work, leadership is absolutely key” (L008).*

The participants highlighted several key areas that they believe leadership plays a key role in during the digital transformation process.

#### Strategic direction and vision

Most participants emphasised that leadership plays a key role in setting the strategic direction and vision of the organisation during the digital transformation process. Leaders must clearly set their strategic direction and articulate their vision as stated by the following participants:

*“Because the leadership sets the vision and strategy. The resources then follow. So, if we are just focusing on leadership only forget about everything. Because even if you look at the way we do our business, strategy comes first. Then whatever are the pillars from the strategy must be found in the business plan, you are now justifying what resources you are spending in your business plan on the basis that the board has ticked off the strategy. So, without leadership I think let’s just say nothing will happen” (L010).*

*“What is digital transformation is your digital strategy. One needs to clearly put its strategy with the vision all those things, the vision and all those things you want. So, leadership is there to evaluate and ensure that there’s a sound digital strategy to be followed which is central to this whole transformation. Then once that strategy is approved, leadership is there to ensure that the resources that are required to support that digital strategy are provided” (L013).*

*“So, your leadership it has to be able to be a visionary leadership which first of all has to define the organizational strategy to say where are we now? Where do we want to*

*be? And align it accordingly. So that leadership has to have that vision that ability to say we are going to have a positive disruption in the way we do things” (L011).*

### Structure

Several participants believed that leaders have a vital role in ensuring that the organisational structure is appropriately adapted to suit the demands that digital transformation brings. The participants highlighted that if the structure is not adapted adequately to provide leaders enough time, resources and funding, then the digital transformation may not succeed. Furthermore, some of the participants mentioned the need for leadership to put in place other oversight structures or committees to monitor the digital transformation process and to drive accountability. This is evidenced by the following three participants:

*“So, you need to have that vision, then set strategy, then also put in a structure to support your vision as a leader.” (L011).*

*“I think for you to sustain most of these initiatives, your structure needs to change to align to the demands of that technology. If you maintain it, if you’re rigid, people will always go back to do what they used to do” (L012).*

*“So, you actually find that when we started our digital transformation journey, we put in place the research and development committee. Initially it was chaired by the technical director, but the managing director also saw that this thing has also to be driven from the highest level and is now chairing that himself” (L002).*

### Resourcing

Several participants made the point that leaders need to ensure that appropriate resources are allocated to digital transformation to enable it to succeed. Without an appropriate allocation of resources, digital transformations are unlikely to succeed. Three participants mentioned:

*“Leadership creates an environment that results in the achievement of the strategy and there are various tactics that are available to leadership. One of them is the deliberate allotment of time, money, and resources to that particular area. If you don’t allocate time and money, forget it. No matter how much you bark and shout, no one*

*is going to do anything. So, time and money resource creates the environment that leadership needs to embed to make sure that this thing happens (L009).*

*“If you don’t have a budget for that you can’t do it, so its leadership that comes through and puts together a budget, they actually have to motivate, and have it approved to say we are going this route. So, it’s all those resourcing, it requires leadership to put the resources together” (L014).*

*“I saw this when we did the [removed for confidentiality] project. I always have deadlines that I need my [removed for confidentiality] team to meet every day. Every single day, every other week, every other month. If I don’t capacitate them to deliver, because I also want this digital transformation project delivered, they are going to come to me and say but, you had said to us stop doing everything, because I want this thing done today. If I don’t avail them extra resources, I am already setting them up for failure” (L002).*

### Leadership Commitment

Commitment was highlighted by several participants as being an important factor that leaders needed to demonstrate as part of the process to lead digital transformation. Leadership commitment is important to signify to followers that leaders are unequivocally focused on sustainably driving the digital transformation process. This was considered key as mentioned by the following participants:

*“Leadership is central to achieving digital transformation, the first is commitment to digitally transform. That commitment comes from leadership. If the leadership’s view or perception of digital transformation is very weak then it will remain a buzz word but what they will be doing on the ground, they will not be aligned to that” (L014).*

*“So, leadership is central, without leadership commitment, you cannot digitalise. That’s why you can have pockets of brilliance here or there because there will be no buy in at leadership level because those are the ones who drive it now, when the drivers are not convinced that it is not the way to go then you are not going there” (L012).*

*“But once the leader is committed to it top down, it’s easier even for people from the bottom to collaborate, to come up with ideas, motivate them, execute them and go. So, leadership is very important” (L016).*

### Culture

Several participants highlighted that the leaders were key in cultivating the right culture for digital transformation to succeed. The right culture is key and the leaders must set the tone in creating a culture that allows the followers to embrace digital transformation and the changes that it brings.

*“You must also be a leader who drives the culture. You must be able to modify the culture at an organization to be able to lead technological transformation” (L006).*

*“Leaders promote the right culture because we need a new culture in the organization, to be able to drive digital transformation and you want a culture that is built around innovation. So, leadership is there now to allow, provide and ensure that new culture is born within the organisation, so those are your key success factors in transforming the organization (L013).*

### Change management

Some participants emphasised the importance of leaders driving the change management process which often accompanies every digital transformation. In the change management process, participants highlighted that leaders need to communicate well and also utilise their influence to help followers to embrace digital transformation. This is evidenced by two participants who said:

*“For you to be able to manage the change there is going to be a whole lot of hoops that people have got to jump over. Have you communicated? Have you explained the nature of the change? What are the impacts? How are we going to make sure that the process is done as effectively as we possibly can? So, and without strong and solid leadership to take the business through that, I tell you we’d be chasing our tails for*

*another 5-10 years and digital will be proving difficult to move to. Not because it doesn't work but because the change is not being managed as it should" (L008).*

*"Transformation needs leadership to influence. Because leadership is also about influencing the course of the business. If that influence doesn't come to bear and doesn't get crystallised or concretised it will never happen anywhere" (L010).*

### Consultative

A few participants believe that leaders must be open-minded and reflective enough to engage consultants along their digital transformation journeys. These participants believe that leaders cannot possibly know everything about digital transformation and that they should seek help as and when they require it. The participants highlighted that consultants help leaders by benchmarking the organisation's digital transformation journey to peers and other players. As two leaders said:

*"Leaders should consult experts because the problem is we think we know these things. We can Google say cloud computing and say yeah that's what we want because you see it on the internet. It doesn't work. You need someone who has done it and applied it in industry before. So, consult, invest the money in developing the idea rather than in executing, rather than going direct to execute. Then once you have identified those that drop out at the end of the funnel that will have direct benefits, they are aligned to your business, and they are aligned between themselves" (L010).*

*"So, a few months back I think the belief was we know where we're going...up until a point we're then like no, we're not moving, there's no traction in any one of these, we're touching here touching there, there's no incremental progress. And we reflected and we said no, are we structured enough to be able to drive execution? And at that stage we zeroed in on the list, decided to approach external help to assist us in developing that scope as we do not have the expertise, to develop that scope, assess our infrastructure, ability of supporting and also do the change management and carry people along with us" (L012).*

### Conclusion regarding sub-Question 2a

From the feedback, participants resoundingly confirmed that leadership is a pre-requisite and is of critical importance in digital transformation. Participants emphasised that, within the context of a digital transformation, leadership is key in setting the strategic direction and vision, displaying unwavering leader commitment, determining an appropriate organisational structure, providing adequate resources, creating the right culture, driving change management and consulting when required.

**5.9.2 Question 2b: What organisational vision do leaders have regarding the digital transformation of their mining organization?**

Most participants highlighted that they had a clear understanding of the vision of what their organisation would look like once the digital transformation journey was complete. To successfully implement a digital transformation, it is vital to be clear on the destination and what that destination looks like. There needs to be an understanding of how different that destination looks to the present-day organisation. It is also important for followers to own the vision and develop a commitment to achieving it. These participants agreed that having a clear vision was key for leaders and followers to successfully deliver digital transformation and achieve its objectives:

*“I think the leader has to have a clear vision of what has to be done and that becomes a very key aspect. A vision has to be very clear in order for the work force buy into that vision because if they don't those are the guys that are mostly likely it to implement so if they don't understand it, then it becomes a problem” (L003).*

*“I think the first thing starts out with spelling out your vision to your team. Once that vision is spelt to the team then, within the team, find a group of people or a team that will set up that then drive your vision within the team. Because we also then want to create an interface between that team and the people. Because if the vision remains with you and you want to drive it yourself then you are like not giving people the floor to really get involved. So, I believe you sell the vision to the people then within the team you assemble a team of maybe five people that then drive that idea. Once they own the idea then its... you have solved it. It's no longer your dream. It becomes that teams dream and everyone's dream, your role now is to guide, that's what I believe” (L016).*

When it came to describing the attributes of the vision of their future mining organisation, participants articulated the following elements of their mining organisation's vision:

### Automated operations

Participants concurred and shared how a key element of their future mining organisation included mining operations that have a significant level of automation in them as follows:

*"I think from a vision point it's clear. Because I think you can see even our strategy talks to that to the extent that even wholistically around one of our biggest mines in the future is being designed to be a digitally transformed mine if I can call it that. So, it will be a digital ready. So, for instance automated dump trucks will be used there. We're doing trials now on [removed for confidentiality] which is where digitalization will be impactful" (L005).*

*"I think if we look at our modernisation strategy, it sets out very clearly what mining would be looking like. For example, we will be running [removed for confidentiality] mines [removed for confidentiality] and to support those [removed for confidentiality] mines, automation and digitalisation is central. And what is all happening now is to set up or prepare these [removed for confidentiality] mines to be able to be operated at that level, because the risk will increase when there are [removed for confidentiality] mines, so higher concentration risks so automation now is made to come in and plug out all the risks that would have materialized. So, there is a clear vision and a clear road map that we call the modernisation road map, that defines clearly what our future will look like when we reach full throttle digitization of the operation" (L014).*

### Zero harm or increased safety ambitions

With most participants in agreement, a vision of a safe mining organisation emerged where there is minimal harm to employees by ensuring that they have less exposure to high-risk areas underground.

*“We will be the first in the industry that would have removed men from the face where we will be using pieces of equipment that are remotely operated and we will now have zero injuries in terms of falls of ground because the men will no longer be working in the faces” (L006).*

*“For me a digitally transformed mine, if I’m talking of my area, we don’t want a human being at the face underground. That’s pure and simple. If you have a look at, if you are able to achieve that, you have sorted out the big issue which is the safety of men and related to that, you are also taking away human error and inefficiencies associated whether its human error, fatigue, attitude, and all sorts. So, for me the key, key issue is getting people away from the face” (L008).*

### Employee composition and the skills of the future

Most of the participants believe that the number and skill composition of the workforce of the future will be fundamentally different to what it is today. Participants believe that there will be less employees in the future due to automation. Such employees will be multi-skilled and better suited to the technologically advanced environment of the future.

*“So, we’re thinking of our organization in the future where we’re going to have less and less. Infact less than 50% of the people we are employing at the moment. That will be the new organization, highly automated possibly, a lot of data intelligence, data mining, data intelligence” (L013).*

*“So, I think it is very clear even in terms of the multi-skilling that is required, the worker that you know we want to see in the next 10 years or so I think it is all laid out.” (L002).*

*“I think the human side of things also has got to undergo a significant transformation. So that the best skills are going to be matched with the requirements of the new*

*normal that we would have created. So, I'm quite aware. I'm quite alive to what it looks like and what we need to do on the human capital to make sure that we are ready for that" (L015).*

#### Efficient support systems

Participants concurred that their organisation will have better support systems to enable quicker and more efficient decision making as a result of digital transformation.

*"This organisation will be heavily dependent on decision support systems which will be coming from the digital networks. And it will be highly collaborative because wherever you are, you can collaborate with anyone. So maximum/optimum utilization of the resources can only happen in a digital platform if we take this man and enhance the information that they have or enhance their decision, give them a decision support system. Give them the information then further enhance their decision support system" (L010).*

*"I think it has been made very clear. I know exactly where we want to end up, and I know where at this stage. I think just starting by looking at the whole business cycle and our enterprise resource systems like [removed for confidentiality] we know where we want to be, and we actually want to close the month on the 30th and the following day we have produce our financials. Once the production numbers are being reported from the control room no more human intervention to compile them it just comes all the way right up to the financial reports" (L002).*

#### Unclear vision

On the other hand, some participants highlighted that they were not entirely clear on what their organisational vision is or how clearly it had been communicated. With this, there is a risk that leaders may not be able to sufficiently attain the buy-in of their followers if they themselves are unclear on the vision. Another participant highlighted that with the speed of change that digital transformation brings, it would be difficult for the organisation to articulate a vision as this would be comparable to chasing an always moving target.

*"It is not fully articulated. I always say when I sit in meetings, I always ask the question to say what do we want to look like? So, it needs to start at a board level for me to*

*define what a digitalised organisation statement is. I've understood that those statements mean nothing. Defining what it is and even to just say the end to end functions of our organisation need to come to the party in terms of digitalization is actually a much more powerful than to say we need to be digitalized (L009)*

*“Look I've been asked that question and I think that's where people miss it a lot. The guys say no no, we want to know where we are going. If someone asks you today and says give me an idea of, what are we going to be doing in 5 years' time, absolutely anyone who tells you they know is not being honest so it's not true. We didn't know that we would be working from home today if someone had asked. But all you need to do is be there so that you are ready with whatever systems because you are running the business in an environment, so you need to make sure that you are ready in the environment and shift. So digitally transforming organisations should be agile enough to shift because we don't know where or what you'll b.” (L003).*

#### Conclusion regarding sub-Question 2b

Most participants indicated that they have a clear vision of what their organisation would look like post digital transformation. Having a clear vision is key for followers to own the vision and commit to achieving it. Participants further highlighted that their PGM mining organizations of the future will be more automated operationally highly safe with fewer workers underground. They will also consist of more multi-skilled employees and have more advanced decision support systems in place.

#### **5.10 Question 3: What capabilities or characteristics does a leader require to lead a successful digital transformation?**

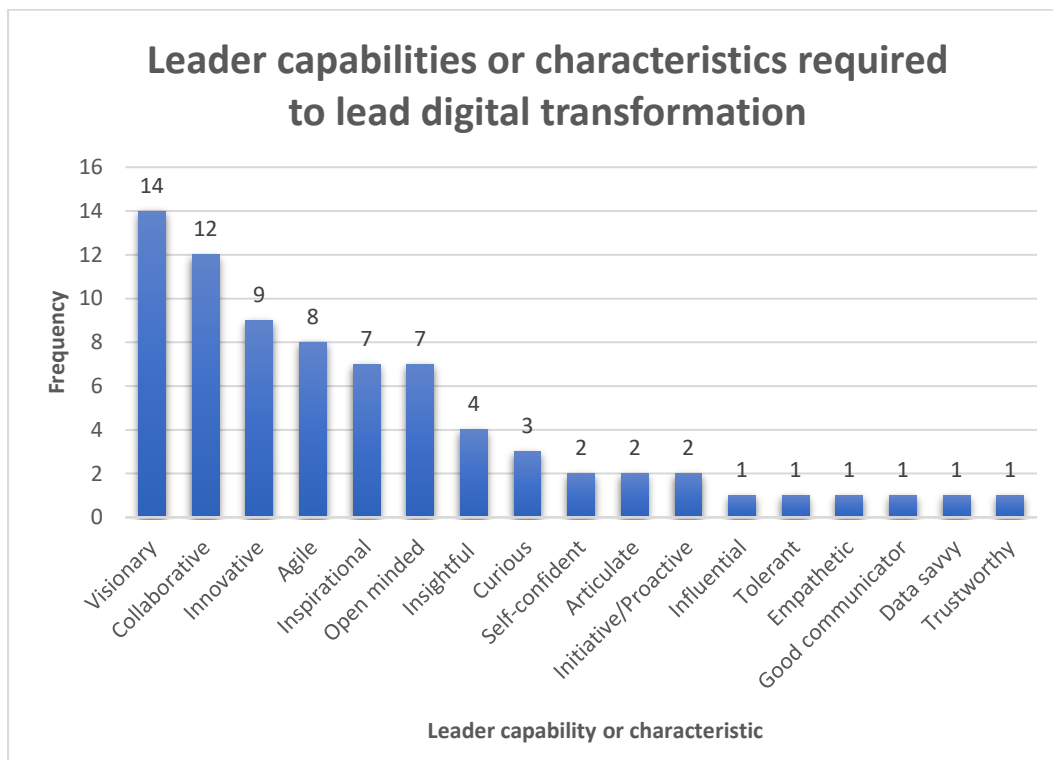
This question sought to establish participants' views on the capabilities or characteristics leaders require in successfully implementing digital transformation. Certain leadership capabilities are required for leaders to realise successful digital transformation. This question was posed to leaders in such a way that they could rank the various capabilities and characteristics that they felt were important.

The second component of this question sought to establish the ways that leaders are being equipped with the skills that they viewed as necessary to successfully lead digital transformation. Digital transformation creates new challenges for leaders who need to add to their existing skill sets to effectively lead digital transformation.

**5.10.1 Question 3a: What capabilities or characteristics does a leader require to lead a successful digital transformation? From your perspective, please rank the top five capabilities or characteristics in terms of importance.**

Leader capabilities include both knowledge as well as skills, and they are important for effective leadership. Leader characteristics are individual attributes or traits that are relevant in the execution of a leaders’ leadership responsibilities.

Figure 9 below presents the leader capabilities and characteristics that are key for effective digital leadership and the frequency of mention thereof as highlighted by participants.



**Figure 9: Leader capabilities or characteristics required to lead digital transformation**

Source: Author’s own compilation

Participants mentioned various leader capabilities and characteristics that they believed leaders require for successful digital transformation. As can be seen from Figure 8, being visionary, collaborative, innovative, agile, inspirational, and open-minded received the higher frequencies of mention. On the other hand, there is a discernible drop in frequency of mentions from being open-minded to being insightful and the rest of the leader capabilities or characteristics.

The data regarding participants' top five ranking of the leader capabilities or characteristics that they felt were the most important is shown in Table 8.

**Table 8: Rankings in order of importance: Capabilities and characteristics**

Participants rank in terms of importance	Number of participants from the sample who prioritised it at this rank					
	Visionary	Collaborative	Innovative	Agility	Inspirational	Open minded
1 <sup>st</sup> most important	6	0	4	1	0	1
2 <sup>nd</sup> most important	5	2	3	1	2	0
3 <sup>rd</sup> most important	1	3	1	1	2	4
4 <sup>th</sup> most important	1	2	0	4	2	1
5 <sup>th</sup> most important	1	5	1	1	1	1
<b>Total</b>	<b>14</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>7</b>

Source: Author's own compilation

This table shows which capabilities and characteristics were ranked in order of importance. At a glance, being visionary and being innovative stand out with six and four number one rankings respectively. Being visionary also stands out with five, second most important rankings. While being collaborative had the second most mentions, five of those mentions ranked it as fifth most important.

The capabilities and characteristics that participants mentioned are described below:

#### Visionary leader

A total of 14 of the 16 participants mentioned that being a visionary leader was the main capability or characteristic that enabled leaders to successfully lead digital transformation. Of these 14 participants, six ranked being visionary as the most important capability while five ranked it as the second most important capability. Participants concurred that a visionary leader is one who clearly articulates a picture of the organisation's future in a way that the followers can buy into and understand where they fit in.

*“Actually, you must be a visionary leader to understand what will happen in 10 years, 20 years and to see where the organization is going” (L006).*

*“I think the leader has to have a clear vision of what has to be done and that becomes a very key aspect. A vision has to be very clear in order for the work force buy into that vision because if they don't those are the guys that are mostly like it to implement so if they don't understand it, then it becomes a problem” (L001).*

### Collaborative

A total of 12 out of 16 participants identified being collaborative as a capability or characteristic that enabled leaders to successfully lead digital transformation. Of these 12 participants, two ranked being collaborative as the second most important capability while three ranked it third, two ranked it fourth and five ranked it the fifth most important capability. The participants highlighted that collaboration involves coming together to share skills, information and knowledge to achieve a shared purpose.

*“Collaborative is very important. A collaborative leader yeah. You need one who is collaborative. The one who can sit with a team and be deliberate about how all of those components come into one total picture. Leadership in mining needs to collaborate” (L001).*

*“So that's all collaboration. That's why you find now even when we do projects, our team will be multi-disciplinary. And then you then also have a client team which is more operational but again multi-disciplinary. And then we combine this with external focus or external guys who come in as service providers, be it an EPC or an engineer or consultant or a reviewer. These are all different organizations or different business units collaborating for a solution. So, it's obviously forcing us to move out of our silo's. To the extent that even when you report now, you report as teams yeah so, I think it's all pointing at the importance of collaboration” (L011).*

*“The issue of collaboration is key as well. It is not one person who says I know it all, so you find different people...so collaboration becomes important” (L009).*

## Innovative

With nine out of 16 participants in agreement, being an innovative leader was stated as being a key leader capability to successfully lead digital transformation. Of these nine participants, four ranked being innovative as the most important capability while three ranked it second, one ranked it third and one ranked it as the fifth most important capability. The insights shared by the participants highlighted that innovation is about generating ideas to solve previously unknown problems or to find more efficient or effective ways of doing things. They highlighted that an open mind is key to innovation because at times some of the best ideas come from followers that are least expected to think of them. Innovation needs a mindset that is open to learning and unlearning so that new ideas can be assessed with objectivity and rigour. One participant highlighted the need for a leader to be passionate about innovation, while other leaders shared how innovation is a core part of digitisation and that leaders must believe in it:

*“You need to be a guy that loves innovation obviously” (L013).*

*“Innovative, absolutely. Because digitalisation is also key around the discussion of innovation. And if you look at principles around innovation it’s creating things out of things you’ve not seen before” (L009).*

*“Innovation is very important, so you will need leaders who believe in innovation. A leader who believes that yes, they are getting good results today, but they can get better results. A leader who believes that the best processes that we are going through now will not serve us tomorrow” (L014).*

## Agile

A total of eight out of 16 participants highlighted that agility is important to enhance leader capability to successfully execute digital transformation. Of these eight participants, one ranked being agile as the most important capability while one ranked it second, one ranked it third, four ranked it fourth and one ranked it as the fifth most important capability. To continue to be relevant and successful, the leaders need to be agile. The participants revealed that change occurs frequently with contexts and circumstances shifting. Therefore, being an agile leader is very important to be able to adjust to change.

*“So, it requires, if I can loosely call them, agile leaders you know.....So, I think its agility- the ability to embrace change I think, yeah. That should do it” (L005).*

*“From an agility point of view, because they'll be lots of twists and turn along the implementation road-map. As a characteristic they will be a lot of things so that's why the current aspect of agility is included there” (L001).*

### Inspirational

Several participants (seven out of 16) mentioned inspiration as a leader characteristic that enhances a leader's ability to successfully deliver digital transformation. Of these seven participants, two ranked being inspirational as the second most important capability while another two ranked it as third, two ranked it as fourth and one ranked it as the fifth most important capability. Participants mentioned that for them, an inspirational leader is one who inspires confidence and motivates his or her team to deliver irrespective of whether they are working remotely or are physically present.

*“So, when a leader exhibits some level of inspiration around them also using those pieces of technology and also showing and creating the vision to the team. I know our CEO one day he showed the team an app on his mobile of his security system at home. And he says I don't even know who's underground and how many people we have underground as a business. When you show people that thing, it creates inspiration. It creates inspiration and people then start thinking okay, I think we should do that” (L009).*

*“You need to inspire confidence to your team. And digital technology like as I said before, it can be resisted very strongly if you don't inspire confidence in your team, if you don't show that you are clear on what you need to achieve you may lose it. Not because digital transformation is the worst thing to do but because you would have failed to inspire confidence in your team to make them aware that digital transformation is the way to go...so you need to inspire confidence from across your people and outside and even outside and even the board to say this is the right thing to do for the company” (L014).*

### Open minded

A total of seven out of the 16 participants identified being open minded as an important characteristic for leaders to possess in their quest to drive successful digital transformation. Of these seven participants, one ranked being open minded as the most important capability while four ranked it as third, one ranked it as fourth and one ranked it as the fifth most important capability. Being open minded was summed up by the participants as being receptive to ideas across different organisational levels, not being risk averse and being willing to explore new ideas or concepts.

When one leader was asked what characteristic was most important for leaders to have, they responded *“I think it’s open mindedness outright” (L009).*

Another participant highlighted in their response that, *“I think to lead digital, if you look at all the guys who have been successful, these are the guys who are open-minded” (L003).*

### Other

Participants mentioned other leader capabilities or characteristics which had lower frequencies of mention as shown in Table 9 below.

**Table 9: Leader capabilities or characteristics: Overall frequency of mention**

Rank	Capability or characteristic	Frequency
1	Visionary	14
2	Collaborative	12
3	Innovative	9
4	Agile	8
5	Inspirational	7
5	Open minded	7
7	Insightful	4
8	Curious	3
9	Self-confident	2
9	Articulate	2
9	Initiative/Proactive	2
12	Influential	1
12	Tolerant	1
12	Empathetic	1
12	Good communicator	1
12	Data savvy	1
12	Trustworthy	1

From Table 9, it is apparent that several capabilities or characteristics received fewer frequencies of mention. These capabilities or characteristics which received lower frequencies of mention include being insightful, curious, self-confident, articulate, proactive, influential, tolerant, empathetic, good communicator, data savvy and trustworthy. It is noteworthy to mention that being influential received only one mention from the entire group of participants.

#### 5.10.1.1 Cross group and within-group analysis

An analysis was carried out to compare the leader capability or characteristic findings within and across groups to determine whether there were similarities or differences. Two categories of groups were analysed and these are the operations/support leaders' groups and the groups split between the executives, top managers and senior managers.

Table 10 below presents the leader capabilities, or characteristics split between operations and support function groups.

**Table 10: Leader capabilities or characteristics mentions: Operations and support function groups**

Rank	Capability or characteristic	Operations (6 participants)	Support (10 participants)	Frequency out of 16
1	Visionary	4	10	14
2	Collaborative	4	8	12
3	Innovative	1	8	9
4	Agile	3	5	8
5	Inspirational	3	4	7
5	Open minded	3	4	7
7	Insightful	1	3	4

Table 10 shows that in comparing the findings in respect of the operations and support function groups, there were noteworthy findings. Being innovative was mentioned overall by nine out of 16 participants. However, while eight out of the 10 participants in the support function group mentioned it as an important leader capability, only one of out the six participants in the operations group mentioned it as key.

Being insightful was mentioned overall by four out of the 16 participants. However, while three out the ten participants in the support function group mentioned it as an important leader capability, only one of out the six participants in the operations group mentioned it as key.

Table 11 below presents the leader capabilities or characteristics that are split between the executives, top managers and the senior managers groups.

**Table 7: Leader capabilities or characteristics mentions: Executives, top managers and senior managers groups**

Rank	Capability or characteristic or trait	Executives (4 participants)	Top Managers (8 participants)	Senior Managers (4 participants)	Frequency out of 16
1	Visionary	4	7	3	14
2	Collaborative	4	6	2	12
3	Innovative	3	3	3	9
4	Agile	3	2	3	8
5	Inspirational	1	4	2	7
5	Open minded	3	4	0	7
7	Insightful	0	2	2	4

Table 11 shows that in comparing the findings in respect of the three groups, there were noteworthy findings. Being collaborative was mentioned overall by 12 out of the 16 participants. However, while all four executives and six out of eight top managers mentioned it as an important leader capability, only two out of the four senior managers mentioned it as key.

Being inspirational was mentioned overall by seven out of the 16 participants. However, while two out of the four senior managers and four out of the eight top managers mentioned it as an important leader capability, only one out of the four executives mentioned it as key.

Being open minded was mentioned overall by seven out of the 16 participants. However, while three out of the four executives and four out of the eight top managers mentioned it as an important leader capability, none of the senior managers mentioned it as key.

Conclusion regarding sub-Question 3a

Participants highlighted several key capabilities or characteristics that they believe leaders require during the digital transformation process. Based on the findings, a list of key capabilities or characteristics emerged that includes being visionary, collaborative, innovative, agile, inspirational, open minded and insightful. The innovative and insightful capabilities were largely mentioned by leaders in the support functions group with minimal mentions from

leaders in the operations group. In addition, being collaborative received moderate mentions in the senior managers group, while being inspirational received minimal mentions from the executives' group. On the other hand, being open minded received no mentions from the senior managers group.

#### **5.10.2 Question 3b: How is your organization equipping leaders with skills to lead digital transformation?**

This question sought to understand how leaders are being equipped with the skills that they viewed as necessary to successfully lead digital transformation. Leaders need to enhance their existing skills sets to respond to the new leadership challenges that digital transformation brings.

The results from this question emerged as follows:

##### Skills gap

Participants highlighted that there is indeed a skills gap that requires addressing as confirmed by L004 who mentioned that: *“there is a gap that needs addressing, yes.....so do a skills gap analysis” (L004).*

The other participants emphasised the presence of the gap in skills and highlighted that the current training regime is focused mainly on generic executive leadership skills. This is confirmed by a leader who mentioned that:

*“I think right now the focus on equipping leaders with skills is on what it means to be an executive. So, if you look at our training program, it's pretty much focused on that. There's a gap.” (L009).*

Another participant acknowledged the need to determine the necessary skills to close the skills gap and further mentioned that it is not HR's sole responsibility to do this but it is a responsibility of both HR and the rest of the organisation.

*“I think HR are there to be able to put up an enabling environment for that transformation to happen, for that upskilling to happen. But I think it needs a team effort to identify the complete package of skills that are required. So yeah. I think the good thing is, HR is fully cognizant of the fact that transformation in terms of skills is going to happen. So, I think to me that's the first key issue. But for them to be able to successfully transform the workforce to the future workforce required, they need a complimented effort from the rest of the people, everybody else” (L015).*

### Acquisition of skills

Most of the participants highlighted that leaders can hire new skills to cater for the skills gap that may exist within their organisations as opposed to trying to develop those skills internally.

*“And you need to know the necessary skills that are needed to achieve that because then you can hire the necessary skills. You don't need to necessarily to go and study that yourself. As a leader your role is to put together a good team that can achieve the goal” (L001).*

One participant mentioned that digital skills not only have to be acquired at management level but at board level as well because the board has an oversight role they play and must be sufficiently knowledgeable to have board level discussions about digital transformation:

*“They have to also deliberately put skills on the board to assist in visualizing and having the discussion around it” (L009).*

### Formal training

Most of the participants highlighted the need for formal training to help equip leaders with the right skills. One participant emphasised the importance of training and mentioned:

*“I'm of the firm view that you cannot underestimate the value of re-skilling or giving people knowledge. Its things that you take so much for granted but once that individual has got the right knowledge, they make better decisions. Once they make better decisions the output is better” (L008).*

Formal training needs to be done but it must be customised to suit the specific needs of the organisations undergoing digital transformation as said by L010 who highlighted the need for innovation training and L013 who highlighted the need for data analytics training:

*“But I think what we have discussed that particularly if we target the innovation courses... and if it's a tailor-made package its better than a generic course which is trying to capture various industries. If it is just technology in mining or digitalisation in mining then we should just have digitalisation in mining” (L010).*

*“Yeah, that is of no doubt, we obviously need to do more and more training particularly in data analytics that's a new area so yeah, so there is need for that training yeah” (L013.)*

On the other hand, one participant highlighted that although they are trained as leaders the effectiveness of such training is in question due to the fact that there are continuous distractions from day to day operational responsibilities.

*“People get a chance to be trained but I think because of our, by nature we are in the mining industry, production has to also be happening in as much as you’ll be trying to implement certain things. There’s a discord in terms of actually people then those trainings being effective. Because most often people will be also be trying to push production, so they don’t get enough time and chance to be able to really grasp the concepts. So, at the end of the day it just happens, it’s just trainings which do happen just to fulfill paperwork rather than to then be effective in terms of bringing in change” (L006).*

#### Shift in mindset/Growth mindset

Of the participants, two mentioned the need to have a change in mindset and to move to a growth mindset:

*“I think your leaders should be able to cultivate a growth mindset” (L006).*

*“I believe that what is being done now is able to change the mindset towards technology, towards the digital transformation. What is currently being done is enough evidence of how the company is pushing the technology agenda. But like in any process, yes more can still be done” (L009).*

#### HR strategic and structural change

Several participants highlighted the need for their HR strategy and structure to change to prepare their HR function to better equip the leaders with skills required for the digital age.

*“The current HR structure and its form has to change completely, and if it doesn't change then it becomes irrelevant. So, it's a key component of this whole transformation because you are dealing with a different thing with a different set of skills, if it doesn't transform them, it becomes very irrelevant, so it's a very key component of that transformation” (L001).*

*“I think the human capital side of things also has got to undergo a significant transformation. So that the best skills are going to be matched with the requirements*

*of the new normal that we would have created. So, I'm quite aware. I'm quite alive to what it looks like and what we need to do on the human capital to make sure that we are ready for that" (L015).*

Contrary to the views mentioned above, some of the participants highlighted that there was no need for leaders to learn new skills:

*"I don't think you need to learn new skills as a leader because it is not about rolling up your sleeves and actually implementing the plan. As a leader you need to know strategically what needs to be done and what needs to be achieved...you don't need to necessarily to go and study that yourself" (L001).*

*"I think as a leader not necessary to learn new skills. I think you just need to be able to know that it can happen and to embrace it as it happens, and I should know there's a better way of me doing my work you know. I don't necessarily have to have the technical expertise to provide the answer, but I surely should be able to put in place resources that can be able to give me that solution...So, you don't necessarily need the technical knowledge of that particular area but you need to be able to embrace the output of that technology or you need to embrace the technology. Yeah" (L005).*

### Conclusion regarding sub-Question 3b

The participants highlighted that to be acquire the skills they viewed as necessary to successfully lead digital transformation, they needed to carry out a skills gap analysis. The participants mentioned that the skills leaders' need could be acquired through hiring new skills, formal training, developing a growth mindset and transforming the structure and strategy of the HR departments. Some participants, however, highlighted that leaders need not learn new skills.

### **5.11 Results for Research Question 4: What role do multinational corporations play in their subsidiaries undergoing digital transformation?**

This question aimed to explore participants' views regarding the extent to which their digital transformation is shaped by their parent company through technology spill overs. Technology spill overs involve the transfer of technology from a parent to a subsidiary which the subsidiary uses to create competitive advantage. The question explores the role that multinational parent companies play in the digital transformation of subsidiaries undergoing digital transformation.

Participants were specifically asked to describe the extent to which their digital transformation is shaped by the parent company or other alternatives. The participants' views are detailed below.

Table 12 below presents the data from the interview question and shows the frequency of each theme:

**Table 8: Driver of digital transformation mentions: MNE's and local subsidiaries**

Rank	Driver of digital transformation	Frequency
1	Local subsidiary shaped and driven	13
2	Combination of both	2
3	Parent company shaped and driven	1

Table 12 shows that the majority of participants (13 out of 16) concur that their digital transformation is locally shaped and driven. This is evidenced by a sample of leaders, one of whom mentioned:

*“The digital transformation agenda is more locally driven....when the parent company looked at the group companies they saw that we were ahead of the others and then they gave us that responsibility. So, as you can see that our management team was already saying that it needed digital transformation so I would say it is more internally driven than outside” (L002).*

Another participant affirms that digital transformation is locally driven and highlights that their parent company is using the subsidiary to benchmark digital transformation within the group:

*“But it’s definitely being driven from within, not necessarily at group. Like I said, group is almost benchmarking against us” (L005).*

One other participant confirms that digital transformation is locally driven and contrasts this with what they have witnessed in another mining organisation that they previously worked for:

*“In my previous company that I used to work for, the head office will come up with some technologies. And say yeah, this is what we want. They will go to some places*

*and see this and then they bring it all to mining operations, force it on our employees and people will say argh, why didn't you implement it at head office first? Why are you bringing it here? We have got our own problems. So, it was sort of resisted but obviously being head office, you have to adopt. Now this approach where they're saying you do it then bring it up to head office and say right, this is what we have tested, it works. Let's adopt it throughout the operations we have in other countries. It's a bit different" (L004).*

Another participant affirms that digital transformation is locally driven and provides an example of where an automated operations technological implementation across the group met differing levels of success between the parent and across subsidiaries:

*"Our organisation was being held back by the group.....one particular example I can give you is an automated [removed for confidentiality] for the furnaces. All the conceptual work was done at group level and decision taken at group level that this is the way we are all going to go. And all operations were then requested to then go and implement. It faced huge challenges at other operations in South Africa until it was actually dropped. To an extent where actually even some of the equipment that those operations had purchased under the instruction from the group had actually to be shipped to us because they said these things don't work.....we then used that automated [removed for confidentiality] without any problems. So because of that, we have actually been mandated by the group to spear head a couple of technology issues. To such an extent that a whole committee now called research and development has been established here with a clear mandate to push technology research and development" (L014).*

There were two other participants who confirmed what L014 mentioned and highlighted that the parent companies ordinarily encourage some of their staff to visit the subsidiary companies to observe certain practices:

*"Infact at group they encourage their people to come to our organisation and see what practices we have in place. The reality is, from a group point of view I think there's an acknowledgement that we are moving full steam ahead. And, yes we communicate and there's actually a committee that was recently formed where when we were sharing what we were doing, everybody was saying we actually need to come to Zimbabwe to have a look" (L008).*

*“The things that we do, they are locally driven because we have instances where the parent company, when they come here they say oh, we actually need to send guys here to come and see what you are doing. So, I think most of the things we are really ahead in the group” (L016).*

Contrary to the views of the majority of participants, one leader highlighted that their digital transformation is shaped by their parent company:

*“I think to a greater extent it’s actually shaped by our parent company outside the country. You know for a big reason that you’d find that this digital transformation is happening faster in those other countries than what is happening here. So, it’s easier for the parent companies to actually understand that digital transformation” (L015).*

On the other hand, two participants mentioned that their digital transformation was shaped by a combination of both the parent company and the subsidiary. The first of these two participants highlights that support function technologies are generally parent company driven while operations technologies are locally driven:

*“I will say some parts of it are driven by the parent company. From the HR perspective, for example we find that that is being integrated through the group so the performance appraisals, the records and everything is being done digitally as it is a system that is driven from the parent company. But you see that in terms of operations, that transformation is localized. So I will say from the operational aspect it is much been localized. If you look at the accounting system, the ICT system are group driven as well so I think it is just maybe coordinating this aspects because the whole system is integrated and there are no conflicts within the group” (L001).*

The second of the two participants highlights that:

*“Well it’s a collaboration of both and we also shape the parent companies as well. But first are our ideas and then we take them to the next level. So, we consolidate but it’s both, it’s a cocktail of both” (L009).*

#### Conclusion regarding Question 4

The vast majority of the participants confirmed that their digital transformation is locally shaped and driven. The participants highlighted that their multinational parent companies use them as

benchmarks within their groups and they encourage their staff to visit their Zimbabwean operations to observe certain technological practices.

### **5.12 Other themes that emerged from the findings**

From posing all the interview questions that were derived from literature, two themes emerged that were highlighted as factors to the successful implementation of digital transformation. One was the importance of culture and the other was related to culture.

#### Culture

Although it was not a specific area of focus and there was no specific question on it, culture emerged as an important theme. The participants highlighted the need for leaders to have the ability to cultivate a culture that is conducive for digital transformation to happen successfully. Participants described the right culture as being one that allows innovation to thrive.

*“You must also be a leader who drives the culture. You must be able to modify the culture at an organization to be able to lead technological transformation...promote the right culture because we need a new culture in the organisation, to be able to drive digital transformation and you want a culture that is built around innovation. So, leadership is there now to allow, provide and ensure that new culture is born within the organization so those are your key success factors in transforming the organisation.”*  
**(L006)**

Some of the participants mentioned that culture plays a significant role in assisting a leader to drive a transformational agenda. Culture also impacts organisational norms and how people react in certain situations:

*“Then obviously there’s the overall supporting culture in the organization would play a huge role in assisting the leader to transform. If I’m in an organization where the moment I walk out of the office I’m told I should do things a certain way and there’s no other way then no matter how visionary I am, I would quickly throw that and conform because that’s the right thing because you’re judged according to in the organisation inspector”* **(L012)**.

One participant described the culture that they believe should be in place to support successful digital transformation as one that supports innovation, trust and leveraging data.

*“Yes, so it’s a culture of innovation, it’s a culture of trust because you now have people working remotely from sites. In the mining industry the belief used to be you are working. You can only say an employee is working when you are seeing what he is*

*physically doing. What we think of what their inputs are into what they are doing, and you are physically checking and seeing. So that's going away. We now have part or most of the work force that will be remote working. So, a culture of being fast is required for you to believe that once you have given the guys the objectives and the performance standards they are supposed to have, they are doing what they are supposed to do. So, culture of innovation, culture of trust, a culture where data is seen as an asset, because data it's an asset in the traditional mining world, it was physical you know, and all those other things. We now have a new access that's coming which is data, so you need yeah. That culture built in where then data is preserved, people see data as an asset, they preserve it and learn from it" (L013).*

### People skills

People skills were identified as an additional important theme. Most of the participants highlighted the need for leaders to have the ability to work with people and have the right people within their teams. The participants mentioned that leaders need to have strong people skills because despite technology being a significant component of digital transformation, its implementation is driven through people.

One leader underscored the importance of people skills by mentioning: *"He must be able to have social intelligence skills, knowing how to work with people" (L004).*

Leaders believe that the ability to deal with people is an important facet of effective digital leadership as mentioned by the same participant:

*"What's the point of having technical skills when you can't deal with people? You've seen leaders, I won't mention names, who are so technically astute, but they are terrible at leading people. Terrible, terrible" (L004).*

Participants emphasised that a leader in a digital age must have strong people skills.

*"So as a digital age leader, you must have very strong people skills. Because for you to drive that technology, you need to drive it through people. So, you need to be able to identify the people's needs in terms of development...and you need to also to make your people future ready" (L014).*

Another key factor that was identified by the participants was the importance of leaders being able to allay the job loss fears that employees would have as a result of digital transformation. Participants highlighted the need for leaders to reskill and redeploy employees whose jobs were affected by digital transformation. One highlighted this through this example:

*“For instance, when we introduced mobile devices for work management, the clerks who would capture job cards were not happy at all. But it was simply because we had not made plans for them. Then we changed tactic and said all planners, all clerks will join learnership programs so that we transform their skills to something else that we wanted. Some of them ended up being, some of them who did not have the right education were the people who were now getting samples in the plant, oil samples. Its changed but it’s still aligned to the new requirement. Some of them who were good became planners, some of them became condition monitoring analysts, level ones. They would go all the way to become level three’s because we put a program in place. So, if you market it in such a way that you carry them along and you have got an alternative assignment for them, they will support the initiative” (L012).*

### Conclusion regarding the other themes that emerged from the findings

From these findings, culture emerged as key in the successful digital transformation. Participants concurred that leaders need to cultivate a culture that is conducive for digital transformation to happen successfully. Such culture was described as being one that supports innovation, builds trust, and leverages data across the organisation. The participants further highlighted another important factor, being the importance of a leader having strong people skills. Despite technology comprising a significant component of digital transformation, its implementation is done through people hence the importance of people skills.

### **5.13 Overall chapter conclusion**

The findings pertaining to the research questions were presented in this chapter. The overall chapter conclusions are shown below.

This study has shown that the majority of leaders understand the meaning of digital leadership and its impact on digital transformation. The participants underscored how it was about leading an organisation within a context driven by digital technologies. The importance of digital transformation to the PGM industry was confirmed as being vital to the long-term sustainability of mining. Digital transformation benefits for the industry were affirmed as an improvement in safety, increased productivity, increased operational efficiency, lower operational and capital expenditure costs, as well as a reduced headcount.

The leadership style in the PGM mining industry was confirmed as being predominantly hierarchical and autocratic although participants highlighted that a more collaborative leadership style would be suitable in future. Participants highlighted that a possible explanation of the leadership style to be the need to adhere to safety requirements, high regulation, and

the historically unskilled labour force in the mining industry. Situational leadership also emerged as a leadership style that some participants identified as a current leadership style.

Leadership was resoundingly confirmed as critical and as a pre-requisite for digital transformation to succeed. Participants identified leadership as key in setting the strategic direction and vision, displaying unwavering leadership commitment, determining an appropriate organizational structure, providing adequate resources, creating the right culture, driving change management and consulting when required. Participants were also clear on the vision of their organisations post digital transformation.

The key leader capabilities that leaders require were confirmed as being visionary, collaborative, innovative, agile, inspirational, open minded and insightful. Participants underscored the importance of leaders augmenting their existing skills through hiring new skills, formal training, developing a growth mindset and transforming the structure and strategy of HR departments.

The vast majority of participants confirmed that their digital transformation agenda is locally shaped and driven. The participants highlighted that their multinational parent companies leverage learnings from their digital transformation journeys and use them as benchmarks within their groups. They also encourage their staff to visit their Zimbabwean operations to observe certain technological practices.

In addition, culture and people skills emerged as important factors in the successful implementation of digital transformation. Participants concurred that leaders needed to cultivate a culture that is conducive for digital transformation to happen and to have strong people skills because the technologies that digital transformation brings are implemented by people.

The next chapter discusses the findings juxtaposed against the literature reviewed and shown in Chapter 2.

## CHAPTER 6: DISCUSSION OF RESULTS

### 6.1 Introduction

The purpose of this chapter is to discuss the findings from the previous chapter juxtaposed with extant literature derived from Chapter 2. These findings contribute to an enhanced understanding of the leader capabilities and characteristics required for the successful implementation of digital transformation. Furthermore, the study identified areas which need further exploration.

With evidence from the PGM industry in Zimbabwe, the study has shown that digital transformation is of critical importance to the long-term sustainability of the industry. Through it, the industry will realise key benefits that include a safer working environment, lower head count, lower costs and better ESG alignment. The study found that there were hierarchical and autocratic leadership styles in existence. It was considered that ambidextrous leadership practices could be an explanation of this. In addition, leadership was confirmed as critical and to be a pre-requisite to digital transformation success. Leaders who successfully lead digital transformation were found to be visionary, adaptable, agile, collaborative, innovative and open minded. Contrary to expectation, the study found that a technology reverse spill over possibly may be occurring in the PGM mining industry in Zimbabwe and this is worthy of further exploration. Various other differences between findings and literature were found meriting further research and exploration.

An initial conceptual framework in Chapter 2 was developed following the review of extant literature. Based on the comparison of the findings with the literature, an updated conceptual framework is presented in Chapter 7.

### 6.2 Discussion of Results for Research Question 1

***Results for Research Question 1: What do leaders understand by digital leadership as well as its importance in the digital transformation of the PGM mining industry?***

#### ***6.2.1 Question 1a: What do you understand the term digital leadership to mean?***

Research question 1a sought to assess participants' understanding of digital leadership within a context of digital transformation. According to Schrage et al. (2021), digital transformation requires digital leadership. The question sought to assess participants' understanding of digital leadership in view of the various definitions that were found in Chapter 2 from scholars such

as Kane et al. (2020), El Sawy et al. (2016) and Westerman et al. (2014). Interview question 1 asked participants to share what their understanding of digital leadership was.

The study found that participants' understanding of digital leadership varied although there were shared themes that emerged from the findings. Based on the findings, the main comprehension was that digital leadership is understood as being about leading in an environment that is more modern and technologically advanced. In terms of the literature, Kane et al. (2020) define digital leadership as "leading in a digital environment". This definition aligns with what the participants understand digital leadership to mean.

Other participants highlighted that digital leadership related to putting in place systems that enable an organisation to become digitally enabled in line with its strategy. El Sawy et al. (2016) define digital leadership as driving the strategic success of digitalisation through doing that which is right to achieve that strategic success. This definition emphasises the strategic success of digitalisation in the organisation. The participants' understanding of digital leadership as digitally enabling the organisation in line with its strategy, aligns with the literature as defined by El Sawy et al. (2016).

On the other hand, one participant highlighted that they believed that digital leadership as a concept was just a fad and more of a play on words that simply referred to leadership. While this was a contrary and unexpected view, it is not apparent from participant responses that this view is shared by the majority of the participants as only one out of 16 participants highlighted this. However, it was important to review literature to understand it further. Kane et al. (2017) highlight that a leader's limited understanding of digital trends and the lack of strategic direction may render measures to lead digital transformation ineffective. Accordingly, this finding aligns with existing literature.

#### Conclusive findings for research sub-question 1a

On the basis of the data collected from the study, digital leadership is well understood by the participants. The participants concurred that digital leadership is essentially about leading in a modern and technologically advanced environment. The definitions of digital leadership are well articulated in extant literature by several scholars and this understanding concurs with the understanding of the participants in this research. The findings for research sub-question 1a are therefore conclusive.

### **6.2.2 Question 1b: What in your view is the current leadership style in the platinum mining industry?**

Research question 1b sought to explore participants' views on the current leadership style in the PGM industry and its influences. Digital transformation requires strong leadership and certain types of leadership style to successfully implement. Interview question 2 therefore sought to understand participants' views on what the current leadership style actually is.

The study found that participants highlighted that several leadership styles existed in the PGM mining industry. The leadership styles mentioned in the PGM industry include hierarchical, autocratic, and situational leadership styles. In addressing question 1b, which sought to understand the current leadership style, the findings and literature will be discussed under the headings that follow.

#### Hierarchical leadership

Participants highlighted the current leadership style as being hierarchy driven and characterised by the need to respect the hierarchy, top-down oriented with little room for discussion or collaboration. The participants further highlighted that in their view the hierarchical style is not ideal for the PGM mining industry and should change to a style that allows more collaboration to happen so that the benefits of digital transformation can be fully realised.

According to literature by Ready et al. (2020) certain behavioural leadership practices that functioned previously are no longer effective resulting in "densely hierarchical" (p. 3) organisations. These organisations inadvertently are "holding onto leadership behaviours - such as command and control- that might have worked in the past but not stymie the talents of employees" (Ready et al., 2020 p.3). Scholars Chun, Yammarino, Dionne, Sosik and Moon (2009), state that a hierarchical leadership structure increases the distance between a leader and their followers. The authors argue that with a wide hierarchical gap there tends to be lower frequency of interaction among leaders and their followers thus creating a leader-follower distance. Kane et al. (2019) state that leading through hierarchy and taking a waterfall approach to managing is not ideal and creates unnecessary bottlenecks. Chun et al. (2009) further add that the leader-follower distance creates both "a perceived social distance stemming from differentials in hierarchy, status and power; and perceived interaction frequency reflecting the perceived degree to which a leader and followers interact with each other" (p. 690) thus stifling collaboration. Westerman et al. (2014) support this as they stress "digital transformation's need for cross-functional collaboration" (p. 163). Scholars Kane et al. (2018) add that digital transformation demands "collaboration beyond simple intra-organizational communication" (p. 15). Mukherjee (2020) sums this up well by mentioning that

leaders have to embrace the challenge of building collaborative teams that have trust in their leadership. The findings of this study align with existing literature.

### Autocratic leadership

Participants stated that the current leadership style is autocratic with authority vested in managers being used to influence decisions and run the organisation. The leaders' approach and decisions were noted as being straight jacketed with little room to engage or ask questions. The participants further added that in their view, the autocratic leadership style is not ideal for organisations in the PGM mining industry especially as they were undergoing digital transformation.

Participants further attributed several reasons that they believe influence the autocratic leadership style in the PGM mining industry. They highlighted that the safety culture within the PGM mining industry, the high prioritization of operational efficiency and Zimbabwe's high power distance score in the country influence the autocratic leadership style.

According to literature, a study by Harms, Wood, Landay, Lester and Lester (2018) sought to review approximately 70 years history of previous studies on autocratic leadership. These scholars found that lately autocratic leadership receives very little coverage in current leadership literature owing to the belief that it is no longer as prevalent as it once was. Harms et al. (2018) define autocratic leadership as "a particular style of leadership where power and authority are concentrated in the leader" (p.105). The scholars take a balanced view on autocratic leadership firstly by highlighting that as a leadership style it is susceptible to failure, and it is associated with more toxic leadership forms. Secondly, the scholars argue, on the other hand, that autocratic leadership is at times warranted and effective especially in circumstances "where efficiency is needed or where there is no time for discussion" (p.115) and in firms that operate in harsh economic environments. Nielsen, Skogstad, Matthiesen & Einarsen (2016) undertook a study to understand how the need for workplace safety influences both constructive and destructive leadership behaviours. Nielsen et al. (2016) found that workplace environments in which safety is a priority are anticipated to cause autocratic leadership behaviours. Harms et al. (2018) also found that high power distance environments were likely to enable autocratic leadership.

On the other hand, Ready et al. (2020) carried out a global study of more than 4 000 global leaders to understand how leaders should be leading in the digital economy. The study identified certain, "cultural and behavioural leadership norms" (Ready et al. 2020, p. 9) that served well historically but have ceased to be relevant and these include the reinforcement of command-and-control behaviours. This kind of behaviour was found to be detrimental to leading in a digital environment.

There is a curious dichotomy in what the participants are highlighting. On one hand, the participants identified the current leadership style as autocratic and hierarchical which is suggestive of leadership styles embedded in a fairly dated understanding of leadership. On the other hand, participants highlighted that the leadership style should change to a more collaborative leadership style that is conducive to realising the full benefits of digital transformation.

However, although not a focus of this study, in recent times the term ambidextrous leadership has emerged. Organisational ambidexterity theory involves organisations balancing the exploitation of their current capabilities or resources while at the same time exploring new competencies for the future (Uhl-Bien & Arena, 2018). While exploration requires adaptation, change and less formalised processes, exploitation on the other hand requires efficiency, control, and formalisation (Jansen, George, van den Bosch & Volberda, 2008). As such, ambidextrous leaders are able to leverage the structure, control and formalisation to produce results today while sustaining the long-term viability of an organisation by investing in new skills, technologies and competencies.

The findings in respect of the current leadership styles present a potential difference and this is worthy of further exploration in future.

Ambidextrous leadership was not a focus of this study. However, from the responses of the participants to research sub-question 1b, it was considered necessary to explore ambidextrous leadership as a possible explanation for the findings.

### Situational leadership

Some participants mentioned that the current leadership style is situational and adapts based on what is obtaining at the time. The leadership style applied at any given time was mentioned as being dependent on the context, who and what is being led.

Being an effective leader requires the ability to alter one's behaviour to changing situations. According to literature, adaptive leadership is concerned with the adaptations required by people to cope with changing circumstances (Northouse, 2016). Effective leaders assess situations and alter their behaviour (Yukl, 2013) to influence their followers to deal with challenges and flourish. As such an adaptable leader has to broaden their range of behaviours, plan better, consult, provide supervision and coaching (Yukl, 2013) to be able to alter their leadership behaviour based on the context or circumstances. Accordingly, this finding aligns with existing literature.

### Conclusive findings for research sub-question 1b

The study found that the leadership styles include hierarchical, autocratic, and situational leadership. Of the styles, two were unexpected and it was found necessary to understand the possible reasons thereof. From this exploration, it is worth contemplating that ambidextrous leadership is occurring. Ambidextrous leadership was not part of this study and as such not enough evidence was gathered to conclude whether or not it is occurring. Accordingly, the findings for this research question are inconclusive and are worthy of further exploration in future.

### ***6.2.3 Question 1c: How important in your view is digital transformation for the PGM mining industry?***

Research question 1c sought to understand participants' views on the importance of digital transformation for the PGM mining industry. The mining industry has historically been an unsafe and labour-intensive industry. From a digital transformation perspective, the mining industry has remained behind other sectors. Interview question 3 therefore sought to understand participants' views on the importance of digital transformation for the PGM mining industry.

In respect of the feedback, the study found that participants concur that digital transformation is critical within the PGM mining industry. The participants highlighted that digital transformation is a significant factor in the long-term sustainability of the PGM mining industry. One participant mentioned that digital transformation is not a matter of whether the industry needs to transform but was about when digital transformation needs to occur. This highlights the extent to which digital transformation is a key imperative for the PGM mining industry. In literature, Porfirio et al. (2020) as well as Lynch and Mors (2018) confirm this point stating that technology driven transformation is forcing organisations into important business adaptations for them to remain competitive. This reaffirms the importance of digital transformation for the PGM mining sector.

Another leader highlighted that with ore bodies becoming less rich and deeper to mine, mining companies have to find more efficient and cost-effective methods to be able to continue mining sustainably. The literature by Westerman et al. (2014) and Bharadwaj et al. (2013) confirms this by stating that the mining industry has had challenges in productivity and that it must use technology to transform itself to realise improved operational efficiency. It is important therefore for digital transformation to improve efficiency in the PGM industry.

Shareholder pressure to generate a greater return on investment despite the costly technological upgrades was identified by participants as another reason why digital transformation is important for the industry. As such, organisations are under pressure to successfully implement digital transformation and still deliver positive returns for their

shareholders. The literature by Doan (2021) affirms this point by stating that the global spend on digital transformation will be US\$6.8 trillion despite a 70% failure rate. Doan (2021) argues that executives are under pressure to recoup the significant digital transformation investment through operating profitably and delivering positive shareholder returns. This reiterates the importance of digital transformation delivering shareholder returns despite its cost.

Participants also shared the benefits of digital transformation for the PGM mining industry as shown in Table 7 in Chapter 5 and the key benefits are discussed in the paragraphs that follow.

#### *6.2.3.1 Benefits of digital transformation*

##### Improvement in safety

According to the findings, improvement in safety was highlighted by participants as a key benefit of digital transformation. Participants added that digital transformation would go a long way in improving safety as a result of having fewer people in dangerous underground conditions. The literature confirms this finding. Westerman et al. (2014) confirm that digital transformation helps mining companies produce safer working environments by reducing the number of personnel in high-risk work areas. This is supported by Young & Rogers (2019) who highlight that the automation of mining equipment will see the removal of humans from underground thus enhancing safety. Hence this confirms that safety improvement is a key benefit of digital transformation.

##### Improved productivity and operational efficiencies

The findings indicated that improved productivity and operational efficiencies were a key benefit of digital transformation. The participants highlighted that improved productivity and operational efficiencies would be brought about by the adoption of technologies that improve productive output per fixed unit of measure such as time or man hour. The literature affirms this finding as outlined by Bonnet & Westerman (2020) who state that digitally, transformation brings increased operational efficiency. This finding is further supported by Westerman et al. (2014) who affirm that the use of technologies in mining results in considerable increases in productivity. The literature therefore clearly confirms the benefit of digital transformation in improving productivity and operational efficiencies.

##### Reduction in operational costs

The reduction in operational costs, based on the findings, was highlighted as a benefit of digital transformation. Participants highlighted that digital transformation would benefit the industry through delivering reduction in operating costs. They further shared that the PGM mining industry is a price taker and as such it is in their interests to control their operational costs.

This finding is reinforced in literature by Young & Rogers (2019) who confirm that digital transformation brings results through lower organisational costs. The literature thus confirms the reduction of operational costs as a benefit of digital transformation.

### Reduction in headcount

The findings highlighted that the reduction in headcount was a benefit of digital transformation. Participants highlighted automation and the various technologies that digital transformation brings and argued that these will result in the elimination of certain roles as a result of digital transformation. One participant highlighted how the shift from a previously manually controlled and monitored processing plant to a remotely controlled and automated plant resulted in a head count reduction of approximately 30 people. According to literature, Dengler & Matthes (2018) confirm that digital transformation will put certain jobs at risk especially in sectors related with production technology. These scholars estimated that in such sectors an average of 65% of jobs are at risk of substitution because of digital transformation related technologies that render certain routine tasks unnecessary. A similar view was shared by Frey & Osborne (2017) who highlighted that with digital transformation, the availability of “more sophisticated software technologies is disrupting labour markets by making workers redundant” (p. 255). The literature therefore confirms the reduction in headcount as a consequence of digital transformation and something that organisations would stand to benefit from.

### Other benefits

Participants identified other lower ranked benefits of digital transformation which include environmental benefits and reduction in capital expenditure costs. Some participants stated that digital transformation will reduce the overall environmental impact that mining companies have including areas such as environmental degradation and environmental pollution. The literature by Young & Rogers (2019) argues that digital transformation helps mining organisations by “reducing environmental impacts” (p. 694) through leveraging intelligent mining methods, autonomous mining equipment and connected devices. Westerman et al. (2014) support this by mentioning that “technology, from robots to diagnostics to workflow management, can outperform human workers along dimensions ranging from cost to quality to safety to environmental protection” (p. 51).

Another benefit that was mentioned is related to the reduction in capital expenditure costs. Some participants mentioned that digital transformation will leverage better capital efficiency to reduce capital expenditure costs. The participants further added that replacement interval on major mining equipment will increase as a result of automation bringing additional protection mechanisms such as sensors, speed control and predictive maintenance. The literature by Westerman et al. (2014) confirms this as they highlight that digitally transforming

mining operations using “human-free mining designs that are cheaper and faster to build, with implications for the economics” (p. 49) allowing mining companies to extend the useful life of their mines and allowing mines to “exploit huge caches of ore that are not economically feasible today” (p. 49). This confirms that the reduction of capital expenditure and reduction of environmental impacts are benefits of digital transformation.

### Shortcomings

On the other hand, some of the participants highlighted that digital transformation has shortcomings which leaders need to be aware of. These were the perception of job losses and the loss of employee privacy as a result of wearable technology. The participants stated that digital transformation brings with it a perception amongst employees that they will lose their jobs. The participants added that this will impact industrial relations and will be an issue that unions are concerned about. Leaders therefore have to communicate in a way that assures employees that although some of their jobs will be lost there are other job opportunities within their organisations. A review of literature by Frey & Osborne (2017) highlights this matter as they state that “the concern over technological unemployment is hardly a recent phenomenon. Throughout history, the process of creative destruction, following technological inventions, has created enormous wealth, but also undesired disruptions” (p. 256). These scholars argue that it is expected for employees to have concerns about new technologies because they perceive that the technologies will supersede their skills and make them permanently lose their earnings. Therefore, the balance between job loss concerns and technological advancement is one that needs to be carefully considered and managed by leaders. This position is supported by Westerman et al. (2014) who also mentioned this concern about employees and said that “some will remain sceptical about new technology” (p. 132). The scholars further state that despite the scepticism from employees “engaging the organization is not optional if you want to succeed with your digital transformation” (p. 132). The literature therefore confirms the existence of employee concerns about potential job losses as a result of digital transformation.

Another shortcoming was the concern around the loss of employee privacy as a result of wearable technology. Wearable technology generates data from tracking employees and one participant’s concern was that this is too invasive for the employees. This was an unexpected finding, and it was found necessary to review literature to establish whether this was covered. According to Young & Rogers (2019), wearable technology is used to access data generated by humans through, for example, tagging and tracking which remotely tracks the location of mine workers. As an example, Young & Rogers (2019) state that, “humans themselves may also be the object of data gathering at mines, for example, monitoring a haul truck driver’s

facial features to determine if their eyes are open” (p. 686). A review of top journals within this space highlighted the existence of wearables and their benefits. However, there seems to be no mention in literature regarding employee privacy concerns as a result of using wearable technologies in the mining industry. This element does not seem to be dealt with in literature and potentially highlights a point of difference from existing literature.

#### Conclusive findings for research sub-question 1c

On the basis of the findings and literature reviewed, it can be confirmed that digital transformation is critically important for the long-term sustainability of the PGM mining industry. It is critical to mining in an efficient and cost-effective manner that allows shareholder expectations to be met. It brings benefits to the PGM mining industry that include improvement in safety, increased productivity, and operational efficiency. Reduction in operational costs, capital expenditure costs and headcount will also benefit the PGM mining industry. On the environmental front, digital transformation will result in better ESG alignment and compliance. The findings regarding employee concerns about potential job losses were consistent with literature. On the other hand, the findings presented a potential point of difference from the literature regarding how the use of wearable technologies creates employee privacy concerns.

#### **6.2.4 Conclusive findings for RQ1**

Taken together, the findings and literature reviewed confirmed that most leaders understand what digital leadership is and that it is essentially about leading in a modern or technologically advanced environment as the literature states. The findings of this study confirmed that digital transformation is of critical importance to mining sustainably in an efficient and cost-effective manner. The study revealed that the benefits of digital transformation for the PGM mining industry include a safer working environment, reduction in operational and capital costs, better ESG alignment and a lower headcount. A potential point of difference from the literature arose regarding how the use of wearable technologies creates employee privacy concerns.

One unanticipated finding from this study was that the leadership style in the PGM mining industry is predominantly hierarchical and autocratic. The reason for this is not entirely clear. However, it was considered that the ambidextrous leadership practices could be an explanation although not enough evidence was gathered to conclude whether or not it is occurring. Although ambidextrous leadership was not part of this study, this finding presents a difference that is worthy of further exploration in future.

## 6.3 Discussion of Results for Research Question 2

### ***6.3.1 Question 2a: How essential is the role of leadership in ensuring a successful digital transformation in PGM mining?***

Research question 2a sought to understand participants' views on how essential the role of leadership in effective digital transformation for the PGM mining industry. The mining industry has historically been an unsafe and labour-intensive industry. From a digital transformation perspective, the mining industry has remained behind other sectors.

In respect of the feedback, the study found that participants concur that leadership plays a pivotal role and is critical for digital transformation to succeed. The participants shared that leadership is important in digital transformation and is more important than having the technologies themselves or knowing how to navigate them. The participants further shared aspects of digital transformation that leaders play a critical role in. These aspects are discussed below.

According to the literature, the critical nature of leadership in digital transformation is confirmed by Westerman et al. (2014), Porfirio et al. (2021) and Hitt et al. (2010) who agree that leadership is essential to deliver digital transformation. The finding regarding the critical nature of leadership in digital transformation is therefore consistent with the consensus of existing literature in this respect.

#### Strategic direction and vision

Participants indicated that leadership plays an important role in setting the organisation's strategic direction and vision during the digital transformation process. Leaders therefore must be able to outline their strategic direction and clearly articulate their vision to their followers. One participant stated that without leadership as well as without setting the vision and strategy nothing will happen.

According to Li (2020), in a digital environment, the definition of strategy is key, and it must be defined as an overall direction whose path to get there is frequently reviewed and modified after considering emerging information. Kane et al. (2019) supports this by mentioning that leaders have to communicate their strategic direction so that managers are informed and aligned with decisions. Westerman et al. (2014) confirm that successful digital transformation starts with a compelling vision of the future that must be communicated across the entire organisation. The authors state that without a compelling vision, many leaders are unable to achieve follower buy in. The findings are therefore in line with extant literature.

#### Structure

Several respondents mentioned that leadership plays a vital role to ensure that the organisational structure is appropriately adapted to cater for meeting the demands of running today's business while creating time to manage the digital transformation. Furthermore, the participants highlighted the need for leadership to put in place governance through oversight structures or committees to drive accountability and monitor the digital transformation process. A participant stated that the organisational structure needs to change and align to the demands that digital transformation brings.

The literature by Obwegeser et al. (2020) states that digital transformation projects need structure and governance over them. The structure that is needed is an adaptation of the pre-digital structure. These scholars further highlight that one of the challenges that leaders grapple with in digital transformation is how to adapt the organisational structure to cater for the digital transformation. The literature confirms that the findings relating to the need for adaptation of an organisational structure are aligned with existing academic literature.

### Resourcing

Several participants mentioned that a successful digital transformation needs resourcing, and it is the leaders' responsibility to allocate appropriate resources. Without the appropriate allocation of resources in the form of time and money, digital transformations are unlikely to succeed. One participant mentioned that not availing adequate resources to teams during digital transformation is akin to setting them up for failure.

A review of literature by Westerman et al. (2014) highlighted that digital transformation "requires significant investment and management attention" (p. 147). Kane et al. (2019) add to this by highlighting that it is important for leaders to commit adequate time, effort, and resources to achieve successful outcomes. These scholars therefore suggest that leaders need to adequately resource digital transformation. Kane et al. (2019) also mention that leaders at times assume that digital projects will be delivered in line with expectation without adequate funding and resourcing. The finding is therefore in line with existing literature.

### Leadership commitment

Many participants mentioned that without leadership demonstrating commitment to digital transformation, it was unlikely to succeed. Leadership commitment was highlighted as being important to signify to followers that the leadership was unequivocally devoted to the digital transformation.

Existing literature by Kane et al. (2019), El Sawy et al. (2016), and Westerman et al. (2014) confirms that the leaders need to own the digital transformation by showing and articulating deep involvement, support and commitment thus signalling it as a critical priority which helps

the followers to align to the digital transformation. The findings are therefore consistent with existing literature regarding the need for leadership commitment.

### Culture

Participants also highlighted the importance of leadership in creating the right culture for digital transformation to succeed. Leaders set the tone and through their behaviours influence the culture within an organisation and during the digital transformation process as well. One participant mentioned that leadership must promote a culture in which the digital transformation can thrive.

According to Westerman, Soule & Eswaran (2019), culture is a core responsibility of executives and for legacy organisations culture change represents one of the major obstacles. These scholars add that leaders have to build a culture that enables innovation. This is supported by Kane et al. (2019) who advocate that leaders should cultivate an experimentation culture to give employees the space to attempt new things, learn and adapt as necessary. The findings regarding culture are therefore supported by existing feedback.

### Change management

Some participants emphasised the importance of leadership driving the change management process that accompanies digital transformation. This was considered an important part of the leadership role during the digital transformation process.

According to the literature, Kane et al. (2019) affirm that leaders have to be change oriented in managing the digital transformation process. Doan (2021) supports this by highlighting that leadership teams' ability to integrate digital into day-to-day business operations is influenced by change management. This literature therefore supports the findings relating to change management.

### Consultative

Participants mentioned that being consultative and knowing when to ask for help and engage consultants was key. The participants emphasised that no leader can possibly know everything about digital transformation and that leaders need to ask for help when they are unsure or unclear.

Literature by Ready et al. (2021) affirms that when great leaders face challenges or predicaments, they take them head on and they consistently ask for help. These scholars further state that it is important for leaders to be humble and to transparently and authentically ask others to contribute their ideas whether internally or externally. This confirms that this finding is in line with academic literature.

### Conclusive findings for research sub-question 2a

Based on the findings and the literature reviewed, it has been established that leadership is vital for digital transformation and is a pre-requisite to its success. In addition, the importance of leaders who set the strategic direction, create the right culture and have strong people skills is essential. Adequate resourcing of the digital transformation (funding and employee time availability) is essential, supported by an appropriate organisational structure, strong change management as well as leadership commitment. These findings were found to be conclusive and they align with extant literature.

#### ***6.3.2 Question 2b: What organisational vision do leaders have regarding the digital transformation of their mining organisation?***

Research question 2b sought to explore participants' views on whether leaders have a vision of their mining organisation post digital transformation and whether they are able to articulate that vision. Having a vision that is clearly articulated helps leaders to create a picture of the future for their followers and it helps them not just understand the ultimate purpose of their work but also understand where they fit into that future.

Interview question 5 therefore sought to understand the participants' views on the organisational vision of their mining entity. Participants confirmed that they clearly understood the vision of their organisation's once the digital transformation journey was complete. The outlining of a clear vision is key when undergoing digital transformation because it paints a picture of what the destination looks like. Communication of the vision needs to be in a manner that the followers understand so that they can commit to achieving it.

Participants described the specific attributes of the vision of their future mining organisation. The elements they described included how their operations would be fully automated, an exponentially better safety record, a workforce of the future characterised by a shift to more multi-skilled workers, and efficient decision support systems that avail relevant information on a real-time basis. One participant highlighted that they were unclear on the vision while another highlighted that it was not possible to articulate a vision owing to the speed of change that happens under digital transformation.

Rafferty & Griffin (2004), Kane et al. (2015) and Kane et al. (2019) concur that having a vision is the most important dimension to have. Within the context of a digital transformation, these scholars posit that a strong and transformative vision is one that is forward-looking, optimistic, inspiring, and energising. Carton et al. (2014) concur and assert that a vision should be

articulated clearly using more imagery in a manner that followers can comprehend. If articulated clearly, Ng (2017) and El Sawy et al. (2016) assert that followers will buy-in and work towards achieving that same vision.

Scholars Westerman et al. (2014) as well as Young & Rogers (2019) indicate that digital transformation will impact the mining industry to create a future state characterised by automation or autonomous operations, big data from operational and human sources, multi-disciplinary teams, insight-based decision-making systems, increased efficiency and better mitigation of safety risks.

The literature regarding the importance and clarity of a vision aligns with the findings. In respect of the elements of the vision of the future mining organisation, the findings agree with the literature. Both sets of findings are conclusive as they are catered for in extant literature.

#### Conclusive findings for research sub-question 2b

It has been established that having a clear organisational vision is of critical importance to leading digital transformation. In addition, the elements of the vision of the future mining organisation align with extant mining literature. The findings from sub-question 2b were found to be conclusive and align with extant literature.

#### **6.3.3 Conclusive findings for RQ2**

Taken together, the findings and the reviewed literature confirmed that leadership is critical to digital transformation and is a pre-requisite for its success. In addition, the importance of leaders who set the strategic direction, create the right culture, and have strong people skills is essential. Adequate resourcing of the digital transformation (funding and employee time availability) is essential, supported by an appropriate organisational structure, strong change management and leadership commitment. These findings were found to be conclusive and align with extant literature. The findings also underscored the importance of having a clear organisational vision in line with current literature.

### **6.4 Discussion of Results for Research Question 3**

#### **6.4.1 Question 3a: What capabilities or characteristics does a leader require to lead a successful digital transformation? From your perspective, please rank the top five capabilities or characteristics in terms of importance.**

Research question 6 sought to understand participants' views on the capabilities or characteristics that leaders require to successfully implement digital transformation. Participants were then asked to rank the capabilities or characteristics in order of importance

by sharing their top five. Certain leadership capabilities are required for leaders to realise successful digital transformation.

### Visionary

Being visionary was ranked highest from a frequency of mentions with 14 out of 16 participants mentioning it. Table 13 below shows how the participants ranked being visionary in terms of importance.

**Table 9: Capability ranking in order of importance: Visionary**

Participants rank in terms of importance	Number of participants from the sample who prioritised it at this rank
1 <sup>st</sup> most important	6
2 <sup>nd</sup> most important	5
3 <sup>rd</sup> most important	1
4 <sup>th</sup> most important	1
5 <sup>th</sup> most important	1
<b>Total</b>	<b>14</b>

Source: Author's own compilation

As shown in Table 13, of the 14 mentions it received, 11 participants ranked being visionary as either their number one or the second most important leader capability that is needed to successfully implement digital transformation. This data potentially suggests that while being visionary received the most mentions, participants correspondingly ranked its importance highly.

The participants highlighted that leaders must be visionary to successfully lead digital transformation. The participants emphasised that a leader needs to understand the vision themselves and then clearly articulate the organisation's future in a manner that followers can understand and commit to.

Rafferty & Griffin (2004), Kane et al. (2015), Kane et al. (2018) and Kane et al. (2019) identify being visionary as the most important element that a leader leading a digital transformation needs to have. These scholars posit that a visionary leader must have a strategic vision that is accompanied by an ability to clearly communicate that vision. Carton et al. (2014) add to this by mentioning that the leader should clearly articulate the vision using more imagery in a manner that followers can comprehend. The findings in respect of being visionary are therefore consistent with extant literature.

## Collaborative

With 12 mentions out of 16 participants, being collaborative was identified as a critical capability that a leader should have by the majority of the participants. Table 14 below shows how participants ranked being collaborative in terms of importance.

**Table 10: Capability ranking in order of importance: Collaborative**

Participants rank in terms of importance	Number of participants from the sample who prioritised it at this rank
1 <sup>st</sup> most important	0
2 <sup>nd</sup> most important	2
3 <sup>rd</sup> most important	3
4 <sup>th</sup> most important	2
5 <sup>th</sup> most important	5
<b>Total</b>	<b>12</b>

Source: Author's own compilation

As shown in Table 14, of the 12 mentions it received, three participants ranked being collaborative as the third most important aspect, while five participants ranked it as the fifth most important leader capability that is needed to successfully implement digital transformation. This data potentially suggests that while being collaborative received a high number of mentions, participants did not rank its importance very highly.

Participants emphasised that collaboration is key to bringing people together, sharing skills, information and knowledge for a shared purpose. The leader must have an ability to bring all different perspectives together during the collaboration process. Of the 12 mentions, none of the 11 participants ranked being visionary as either their number one or second most important leader capability that is needed to successfully implement digital transformation

According to Westerman et al. (2014) and Kane et al. (2018), successful digital transformation requires collaboration that goes beyond basic internal communication. These scholars are supported by Mukherjee (2020) and Obwegeseer et al. (2020) who add that leaders need to adopt a collaborative approach, and this allows the proliferation of unanticipated strategic options and solutions amongst teams. Accordingly, the findings in respect of being collaborative are similar to extant literature.

## Innovative

With nine out of 16 mentions, participants identified an innovative leader as key in leading the digital transformation process. Table 15 below shows how participants ranked being innovative in terms of importance.

**Table 11: Capability ranking in order of importance: Innovative**

Participants rank in terms of importance	Number of participants from the sample who prioritised it at this rank
1 <sup>st</sup> most important	4
2 <sup>nd</sup> most important	3
3 <sup>rd</sup> most important	1
4 <sup>th</sup> most important	0
5 <sup>th</sup> most important	1
<b>Total</b>	<b>9</b>

Source: Author’s own compilation

As shown in Table 15, of the nine mentions it received, seven participants ranked being innovative as either their number one or the second most important leader capability that is needed to successfully implement digital transformation. This data potentially suggests that while being innovative received the third highest number of mentions, these participants ranked its importance highly.

Being innovative involves the generation of ideas focused on solving previously unknown problems including finding more efficient or effective ways to doing things. Innovation requires a leader to have an open mindset to allow ideas to emerge from teams irrespective of their levels within the organisation. Innovation requires a leader to have a demeanour that is open to learning and unlearning.

Ancona (2019) asserts that “leaders are the engine of innovation” (p. 4) and it is their responsibility to create an environment for innovation to occur. Mor (2021) adds to this and asserts that leaders should believe in innovation, and they must celebrate innovative successes no matter how small they are. Li (2020) states that leaders therefore have to be innovative to position their organisation to exploit digital innovations and adapt their strategic direction. Accordingly, the findings in respect of being innovative are similar to the literature.

A total of eight out of 16 participants highlighted agility as an important leader capability in the execution of digital transformation. Table 16 below shows how the participants ranked being agile in terms of importance.

**Table 12: Capability ranking in order of importance: Agile**

Participants rank in terms of importance	Number of participants from the sample who prioritised it at this rank
1 <sup>st</sup> most important	1
2 <sup>nd</sup> most important	1
3 <sup>rd</sup> most important	1
4 <sup>th</sup> most important	4
5 <sup>th</sup> most important	1
<b>Total</b>	<b>8</b>

Source: Author's own compilation

As shown in Table 16 of the eight mentions it received, half of these participants (four) ranked being agile as the fourth most important aspect, while one participant each ranked it first, second, third and as the fifth most important leader capability that is needed to successfully implement digital transformation. This data potentially suggests that while being agile received a sizable number of mentions, the majority of participants did not rank its importance very highly.

Leaders need to be adaptable in response to the frequently shifting context and circumstances in a digital world. A leader therefore needs agility to adjust to these changes. According to literature, Doan (2021) posits that to harness the full benefit of digital transformation, leaders must be agile. Kane et al. (2019) support this and add that being an agile leader allows one to adapt to a fluid environment. As further alluded to by Kane et al. (2021) leaders who are agile are able to respond to both internal and external changes should the situation merit it. Accordingly, the findings in respect of being an agile leader are similar to extant literature.

### Inspirational

Being inspirational was mentioned by seven out of 16 participants as a key leader capability to inspire confidence and motivate teams to deliver on set targets or goals. Table 17 below shows how participants ranked being inspirational in terms of importance.

**Table 13: Capability ranking in order of importance: Inspirational**

Participants rank in terms of importance	Number of participants from the sample who prioritised it at this rank
1 <sup>st</sup> most important	0
2 <sup>nd</sup> most important	2
3 <sup>rd</sup> most important	2
4 <sup>th</sup> most important	2
5 <sup>th</sup> most important	1
<b>Total</b>	<b>7</b>

Source: Author's own compilation

As shown in Table 17 of the seven mentions it received, two participants each ranked being agile as the second, third and fourth most important aspect, while one participant ranked it as the fifth most important leader capability that is needed to successfully implement digital transformation. This data potentially suggests that while being inspirational received a reasonable number of mentions, most participants ranked its importance as being between the second and fourth most important aspect.

Being inspirational is vital for leaders to solicit buy-ins from their followers and energise them towards achieving strategic priorities and objectives. In terms of literature, Rafferty & Griffin (2004) and Kane *et al.* (2018) assert that leaders need be inspirational to gain the support of followers using communication that is both motivating and energising. Yukl (2013) adds that an inspirational leader must appeal to followers' emotions and values by affirming them or their work, saying things they should be proud of and encouraging them to see opportunities as environments shift. Accordingly, the findings in respect of being an agile leader are similar to extant literature.

#### Open-minded

With seven out of 16 mentions, being open minded was highlighted as being an important characteristic for leaders to have as it is important for the leaders to be receptive to new ideas. The leaders must also be willing to explore new things or concepts and they must generally not be very risk averse. Table 18 below shows how the participants ranked being open-minded in terms of importance.

**Table 14: Capability ranking in order of importance: Open minded**

Participants rank in terms of importance	Number of participants from the sample who prioritised it at this rank
1 <sup>st</sup> most important	1
2 <sup>nd</sup> most important	0
3 <sup>rd</sup> most important	4
4 <sup>th</sup> most important	1
5 <sup>th</sup> most important	1
<b>Total</b>	<b>7</b>

Source: Author's own compilation

As shown in Table 18, of the seven mentions it received, one participant ranked being open minded as the most important quality, while four participants ranked it as the third most important, while two participants ranked it fourth and fifth respectively. This data potentially suggests that while being open minded received a reasonable number of mentions, these participants predominantly ranked its importance as third.

According to literature by Mukherjee (2020), leaders need to be open-minded and actively try to find other ideas that supplement or even question their own worldviews. These scholars posit that by leaders need to find ways to expand their horizons by placing themselves in unfamiliar situations. Kane et al. (2019) emphasise the need for an open mind amongst leaders and argue that leaders must be open minded to understanding the technologies involved in digital transformation to enable them to make more informed strategic decisions. The finding regarding being open-minded is therefore consistent with extant literature.

#### *6.4.1.1 Comparison between findings and literature: Leader capabilities or characteristics*

In comparing the findings in respect of leader capabilities or characteristics with literature, there were similarities and differences that were noted. These are summarised in Table 19 and discussed below it.

**Table 19: Comparison between findings and literature: Leader capabilities or characteristics**

	Similarities	Differences
<b>Leader capability or characteristic</b>	Visionary	
	Collaborative	
	Innovative	
	Agile	
	Inspirational	
		Open minded
		Influential

Source: Author’s own compilation

Table 19 shows that there were differences noted in the open-minded and influential leader capabilities. These are discussed further below.

Open minded

The current study found that that seven out of 16 participants mentioned being open minded as an important capability for leaders to possess in their quest to drive successful digital transformation. Based on the findings, being open minded ranked joint fifth overall in terms of frequency of mentions. A review of the literature in Chapter 2 in respect of the leader capabilities required to successfully lead digital transformation did not identify being open minded as an important capability. It is therefore interesting and noteworthy to mention this potential difference from the literature. This potential difference from literature may suggest that being an open-minded leader is more important than what was previously thought and is worthy of further exploration. It is, however, worth noting that geographical or socio-cultural differences could potentially be an explanation for this.

Influential

The results of the study show that only one out of 16 participants mentioned being influential as an important capability for leaders to possess in their quest to drive successful digital transformation. This finding was unexpected and seems to differ from the views of Kane et al. (2018) and Northouse (2016) who mention being influential as an important leader capability. Contrary to what the literature says, this potential difference may suggest that the sample group may have a different understanding of the importance of being influential and this is worthy of further exploration. It is, however, worth noting that although the participants might

not perceive being influential as important, it could be reasoned by virtue of their positions and the level of power they have, that they may be seen to be influential by their followers.

*6.4.1.2 Cross group and intra group comparison between findings and literature*

An analysis was done to compare the leader capability or characteristic findings within and across groups to determine whether there were similarities or differences. The two categories of groups were analysed and these are the operations/support leaders’ groups and the groups split between the executives, top managers and the senior managers.

*6.4.1.2.1 Operations and Support group differences*

Table 20 shows the comparison between the operations and the support function groups and it summarises the similarities and differences that were noted.

**Table 15: Comparison between findings and literature: Leader capabilities or characteristics**

	Similarities	Differences
<b>Leader capability or characteristic</b>	Visionary	
	Collaborative	
		Innovative
	Agile	
	Inspirational	
	Open minded	
	Influential	
		Insightful

Source: Author’s own compilation

Table 20 shows that there were differences that were noted in the innovative and insightful leader capabilities. These are explored further below.

Innovative

The current study found that being innovative was mentioned overall by nine out 16 participants. However, while eight out of the 10 participants in the support function group mentioned it as an important leader capability, only one out of the 6 participants in the operations group mentioned it as key. This finding for the operations group was unexpected and seems to differ from the views of Li (2020), Ancona (2019), Kane et al. (2018) and

Westerman et al. (2014) who place leaders at the front and at the centre of innovation. It is therefore interesting and noteworthy to mention this potential difference from the literature.

Insightful

The results of the study show that being insightful was mentioned overall by four out of 16 participants. However, while three out of ten participants in the support function group mentioned it as an important leader capability, only one out of the six participants in the operations group mentioned it as key. This finding for the operations group was unexpected and is therefore interesting and noteworthy to mention this potential difference.

6.4.1.2.2 Executives, top managers and senior managers group differences

Table 21 shows the comparison between the split between the executives, top managers and senior managers groups and summarises the similarities and the differences that were noted.

**Table 16: Cross group and intra group comparison between findings and literature: Executives, top managers and senior managers**

	Similarities	Differences
<b>Leader capability or characteristic</b>	Visionary	
		Collaborative
	Innovative	
	Agile	
		Inspirational
		Open minded
	Influential	

Source: Author’s own compilation

Table 21 shows that there were differences noted in the collaborative, inspirational and open-minded leader capabilities. These are explored further below.

Collaborative

The results of the study show that being collaborative was mentioned overall by 12 out of 16 participants. However, while all the four executives and six out of the eight top managers mentioned it as an important leader capability, only two out of the four senior managers mentioned it as key. This finding for the senior managers group was unexpected and was contrary to the literature by Kane et al. (2018) and Westerman et al. (2014). It is therefore

curious that this is the outcome, and this potential difference may be worthy of further exploration. It is worth noting that although the senior managers might not recognise the importance of being collaborative it could be argued that by virtue of their lower positions within the organisational hierarchy that cross functional collaboration may not be a capability that they are observing in practice and hence do not perceive to be important.

### Inspirational

The current study found that being inspirational was mentioned overall by seven out of 16 participants. However, while two out of the four senior managers and four out of the eight top managers mentioned it as an important leader capability, only one out of the four executives mentioned it as key. It was surprising somewhat that only one executive identified being inspirational as an important leader capability contrary to the literature by Kane et al. (2018) and Yukl (2013). This potential difference may be worthy of further exploration. It is, however, worth noting that although the executives might not recognise the importance of being inspirational, it could be reasoned that by virtue of their positions and the organisational success they have achieved, they may be seen to be inspirational by their followers.

### Open minded

The results of the study show that being open minded was mentioned overall by seven out of 16 participants. However, while three out of the four executives and four out of the eight top managers mentioned it as an important leader capability, none of the senior managers mentioned it as key. This finding was unanticipated and presents a potential difference worthy of exploration to understand this view amongst the senior managers group.

### Conclusive findings for research sub-question 3a

It has been established that successfully leading digital transformation requires certain capabilities and characteristics. The study identified the key leader capabilities and characteristics as being visionary, collaborative, innovative, agile, inspirational, open minded and insightful. Apart from being influential, these leader capabilities and characteristics were confirmed with extant literature and therefore the findings are conclusive and align.

Being influential was overall identified far less by leaders than what was anticipated based on the review of literature. This potentially represents a point of difference from the literature because in literature being influential is highlighted as being an important leader capability. However, it is noteworthy that by virtue of their positions and the power they have, they may be perceived as influential by others.

In addition, being open minded was identified by a higher proportion of leaders than anticipated due to its seeming lack of coverage in extant literature. This potentially represents a point of difference from the literature. There were also differences in the degree to which the leaders and groups of leaders highlighted specific leader capabilities or characteristics as important. However, it is worth noting that geographical or socio-cultural differences could potentially be an explanation for this.

On the basis of the analysis that was carried out, being innovative was identified proportionately less as a key leader capability or characteristic by the operations group than by the leaders in the support function group. This potentially represents a point of difference from the literature because the findings in literature are at a general level and do not consider the perspectives of specific functions within the organisations.

Based on the analysis that was carried out, being insightful was identified as a key leader capability or characteristic that is proportionately less by the operations group than by the leaders in the support function group. This potentially represents a point of difference from the literature because the findings in literature are at a general level and do not consider perspectives of specific functions within organisations.

On the basis of the analysis that was carried out, being collaborative was identified proportionately less as a key leader capability or characteristic by the senior managers group than leaders in the executives and in the top managers groups. This potentially represents a point of difference from the literature because the findings in literature are at a general level and do not consider the perspectives of specific tiers within organisations. However, it is noteworthy that although the senior managers might not recognise the importance of being collaborative, it could be reasoned that by virtue of their lower positions within the organisational hierarchy that cross functional collaboration may not be a capability that they perceive to be important or are observing in practice.

Based on the analysis that was carried out, being inspirational was identified proportionately less as a key leader capability or characteristic by the executives group than by the leaders in the top managers and the senior manager groups. This potentially represents a point of difference from the literature because the findings in literature are at a general level and do not consider the perspectives of specific tiers within organisations. However, it is noteworthy that although the executives might not recognise the importance of being inspirational, it could be contended that by virtue of their positions and the organisational success they have achieved, they may be seen to be inspirational by their followers.

In terms of the analysis that was carried out, being open minded was identified proportionately less as a key leader capability or characteristic by the senior manager group than leaders in

the executives and the top managers groups. This potentially represents a point of difference from the literature because the findings in literature are at a general level and do not consider the perspectives of specific tiers within organisations. However, it is once again worth noting that geographical or socio-cultural differences could potentially be an explanation for this.

#### ***6.4.2 Question 3b: How is your organization equipping leaders with skills to lead digital transformation?***

Research question 3b sought to understand the participants' views on how their organisation was equipping leaders with the skills to lead digital transformation. It is important for leaders to augment their existing skills to rise to the new leadership challenges that digital transformation brings. Interview question 7 therefore sought to understand participants' views on how they are being equipped with skills to lead digital transformation.

##### Skills gap

The participants highlighted they have several ways to enhance their skills to lead digital transformation but that the most important point to start from, either individually or as an organisation is to carry out a skills gap analysis to understand the nature and extent of the skills gap. A few leaders highlighted that the responsibility to equip leaders with new skills is not that of the HR department alone but that this needs to be co-created with the rest of the departments within the organisation. The HR department therefore needs to have a very good understanding of digital transformation itself so that they could understand the complete package of the required skills.

Kane et al. (2016) state that as the competition for digital skills intensifies, organisations that neglect to develop their digital talent will struggle. According to Westerman et al. (2014), the first step to building digital skills is "understanding what your skills gap is" (p. 227) and this is established by carrying out a skill inventory assessment. Westerman et al. (2014) further add that the skill inventory assessment should detail the skills that are in existence today, the skills that digital transformation needs and the skill gap that requires closing. The scholars further mention that HR needs to lead the process.

##### Acquisition of skills

Most participants mentioned that leaders have the option to hire new skills to augment its existing skills pool to better equip themselves to lead digital transformation. One leader mentioned that there was little point in trying to develop certain skills inhouse when the skills can be hired. Interestingly, another participant emphasised that the skills to equip leaders should not just be assessed at a management level but that the board of directors need to

have digital leadership skills as well to effectively execute their oversight role of digital transformation.

In terms of literature, Westerman et al. (2014) argue that augmenting digital leadership skills through external hiring is an effective way of bridging the skills gap. Ready et al. (2020) underscores that in recruiting new skills, leaders need to cease outdated hiring and promotion practices and start to look outside their industry boundaries and also utilise non-traditional means of scouting for talent such as social media. Weill, Apel, Woerner & Banner (2019) as well as Westerman et al. (2014) add that boards that are; digitally aware, digitally conversant, and digitally experienced are better able to help organisations to navigate digital transformation and are more likely achieve better financial results than organisations who do not.

### Formal training

Most participants highlighted that formal training is an alternative way for them to acquire the skills that are needed to lead digital transformation. One participant emphasised that digital transformation is specialised and that the formal training would need to be tailor made to be effective.

In terms of literature, Westerman et al. (2014), Kane et al. (2017) and Kane et al. (2019) state that formal training is key in growing digital leadership abilities from within the organisation. The formal training helps organisations train on specific technologies, improve digital awareness and to start mutual mentorship programs.

### Growth mindset

Some participants highlighted the need for leaders to develop growth mindsets not just in themselves but in the minds of their followers. Participants highlighted that having a growth mindset provided the foundation upon which leaders could be open to learning and developing new skills.

According to Kane et al. (2018) having a growth mindset is important to deliver digital transformation and the growth mindset helps them to learn, find the necessary new skills that are brought about by the endless changes from the digital world.

### Strategic and structural change

Several participants highlighted the need for the HR strategy and organisational structure to change to allow the HR function to better support the digital transformation and alter the structure to meet the new demands that digital transformation brings. One participant highlighted that there will be new jobs that will emerge, and these will be requiring completely

different skills to what had previously been accustomed to. This therefore requires a shift in the HR department to become an enabler of digital transformation.

According to Obwegeser et al. (2020), the digital transformation projects need a structure that is an adaptation of the pre-digital structure. One of the challenges that leaders have to contend with is how to adapt the organisational structure to cater for the digital transformation.

Overall, the literature and findings correlate regarding the various means through which leaders are equipping themselves with skills to successfully lead digital transformation.

#### Other results and insights

A small number of participants (12.5%) believed that leaders need not learn new skills. The participants highlighted that it is not necessary for a leader to learn new skills but that all they needed to have was strategic awareness and know the right skill to hire to execute that. This finding was unexpected and contrary to literature from Westerman et al. (2014), Kane et al. (2017) and Kane et al. (2019) that emphasise the importance of leaders enhancing and augmenting their skills to better lead digital transformation. Specifically, Ready et al. (2020) carried out a study of over 4 000 global leaders to understand how leaders should be leading in the digital economy. Their study found that only 9% of respondents agreed that leaders had the skills that were needed to lead in a digital environment and thus needed to enhance their deficient skills. The element of leaders not needing to enhance their skills does not seem to be dealt with in literature and potentially highlights a point of difference from existing literature.

#### Conclusive findings for research sub-question 3b

It can be confirmed that organisations are equipping leaders with skills through firstly carrying a skills gap analysis, hiring new skills, formal training, developing a growth mindset and transforming the structure and strategy of HR departments. These findings were found to be conclusive and align with extant literature. However, the findings presented a potential point of difference from the literature regarding the finding that leaders need not learn new skills.

#### **6.4.3 Conclusive findings for RQ3**

The results of this study and extant literature confirmed that successfully leading digital transformation requires leaders who are visionary, collaborative, innovative, agile, inspirational, open minded and insightful. There were, however, differences in the degree to which leaders mentioned specific leader capabilities or characteristics as important. With this in mind, being influential was mentioned by fewer leaders while being open minded was mentioned by more leaders despite the literature not identifying it as a key leader capability or characteristic. There were also differences in the degree to which leaders and groups of

leaders highlighted specific leader capabilities or characteristics as important. These inter group and intra group differences merit further research to gain a better understanding. Furthermore, it is noteworthy, and it could be argued that various reasons such as geographical or socio-cultural differences, and perceptions could influence some of the differences.

The findings of this study further confirmed that leaders are being equipped with skills through the initial identification of gaps through a skills gap analysis, hiring new skills, formal training, developing a growth mindset and transforming the HR structure and strategy. However, the findings presented a potential point of difference from the literature regarding the finding that leaders need not learn new skills.

## **6.5 Discussion of Results for Research Question 4**

This research question relates to interview question 8 that is contained in the interview guide.

### ***6.5.1 Results for Research Question 4: What role do multinational corporations play in their subsidiaries undergoing digital transformation?***

Research question 4 sought to understand the participants' views on the role that MNE's play in their subsidiaries' digital transformation journeys. All the participants who were interviewed work for PGM mining companies that are subsidiaries of MNE's. The research question intended to establish whether MNE's influence or shape the subsidiaries' digital transformation agenda and process via technology spill overs. Interview question 8 therefore sought to explore the role that the multinational parent companies play in the digital transformation of their subsidiaries undergoing digital transformation.

The study found that the majority (81%) of participants indicated that their digital transformation agenda is shaped and driven locally by the subsidiary, while a minority (12.5%) of participants indicated that it is a combination of being both MNE and subsidiary driven. A small number (6%) of participants indicated that their digital transformation agenda is shaped and driven by their MNE. The findings and literature will be discussed under the headings that follow.

#### **Local subsidiary shaped and driven**

A total of 81% of the participants, from both organisations sampled, emphasised that their digital transformation agenda is shaped and driven locally by the subsidiary PGM mining organisation that they work for. Some participants highlighted that unlike a situation where their parent company shapes and drives their digital transformation agenda, their organisation's digital transformation was locally driven and shaped. These participants

mentioned that their organisation is ahead of other subsidiaries and that their MNE benchmarks other subsidiaries against them.

One participant who had worked for another mining organisation in South Africa previously, highlighted that the situation at their current employer where the subsidiary shapes and drives the digital transformation agenda contrasts with what they observed at the mining company they used to work for where the MNE shaped and drove the agenda.

Another participant provided an example of their subsidiary organisation's technological aptitude within the group highlighting an instance where an MNE driven technology that was meant to automate furnaces across all group country operations was only successfully implemented in Zimbabwe with other subsidiaries having failed to implement it effectively.

Two other participants mentioned that their parent company encourages personnel either at head office or at other subsidiaries to visit the Zimbabwe subsidiaries to observe and learn certain practices.

The majority of participants alluded to the fact that their organisations had formed a Research and Development (R&D) team in one PGM mining organisation and a technology committee in another PGM mining organisation to spearhead various technology research and exploration. These participants highlighted that over and above using the output from these committees to explore technology, the output from the committees is also shared with the MNE for the benefit of the group.

The above findings appear to contradict the spill over effect literature by Marin & Bell (2006), Liedong et al., (2020) as well as Driffield and Love (2003) who contend that organisations in low-income countries are expected to have considerable technological or skill gaps and should be in a position to benefit from technology spill overs from their MNEs. Doh et al. (2017) allude to the existence of institutional voids that subsidiaries face and within a digital transformation context, organizations are expected to adapt and respond to these. Studies by Chindondondo (2020) and Hulme (2020) confirmed Zimbabwe to be a low-income country. As such it was found necessary to explore and identify the indications of evidence of the technology spill over effect based on what the various bodies of spill over literature outlined. The findings present a difference, and this is worthy of further exploration.

There is a curious dichotomy in what the participants are highlighting in the findings. The findings seem to talk to a phenomenon known as the reverse spill over effect. The reverse spill over effect is explained in the paragraph below.

The reverse spill over effect involves multinational enterprises accessing productivity or technology advantages from a host or subsidiary (Driffield & Love, 2003). This contrasts the

spill over effect where it is the host or subsidiary that benefits from the multinational enterprise's transfer of productivity or technology. Lichtenburg and van Pottelsberghe (2001) argue that various bodies of literature on the reverse spill over effect highlight that multinational enterprises can capture spill over effects from their host or subsidiary. Technology reverse spill overs are an example of domestic-to-foreign spill overs and they involve the exploitation of scientific and technological advancement in hosts or subsidiaries by multinational enterprises (Driffield & Love, 2003; Lichtenburg & van Pottelsberghe, 2001). In such instances, a multinational enterprise accesses and leverages the technological superiority of a host and applies the benefit to itself. The existing body of literature highlights that the reverse spill over effect is mainly prevalent in sectors where the R&D capability and investment of the host is greater than that of the multinational enterprise (Driffield & Love, 2003). This allows the multinational enterprise to leverage the technology specific advantages that R&D creates in the host or subsidiary (Lichtenburg & van Pottelsberghe, 2001). Pearce (1999) highlights that MNE's can establish their R&D capability in a subsidiary or host country to facilitate the development of ideas or concepts that will shape the long-term competitiveness of the MNE.

It is therefore worth contemplating that a technology reverse spill over may be occurring in the PGM mining industry in Zimbabwe. Conditions may exist that give rise to the technology reverse spill over effect such as the technological superiority of the subsidiary and a higher R&D capability of the subsidiary. The comments from the majority of the participants appear to evidence the local subsidiary technological superiority and the R&D capability in the form of the R&D and technology committees in place whose mandate is to explore new technologies.

#### Parent company shaped and driven

Only one participant highlighted that their digital transformation is shaped by their parent company and that this was largely due to the fact that the parent company has greater exposure to environments where digital transformation is happening.

According to literature Marin & Bell (2006), Liedong et al., (2020) as well as Driffield and Love (2003) allude to the fact that subsidiaries of MNE's in low-income countries are expected to have considerable technological or skill gaps and should be in a position to benefit from technology spill overs. This finding aligns with existing literature.

#### Combination of both

A minority of the participants highlighted that they believed that their digital transformations were shaped by a combination of both the parent company and their local company. One of these participants highlighted that different categories of technologies are supported by the group while others are supported by the subsidiary. The participant highlighted that the support

function technologies such as HR, and finance are group driven while the operational technologies are predominantly driven locally.

The literature that is already discussed above, caters for both spill overs (Marin & Bell, 2006; Liedong et al., 2020; Driffield & Love, 2003) and for reverse spill overs (Lichtenburg & van Pottelsberghe, 2001; Pearce, 1999). Therefore, this finding aligns with existing literature.

#### **6.5.2 Conclusive findings for RQ4**

Taken together, the findings and literature potentially suggest that a technology reverse spill over may be occurring in the PGM mining industry in Zimbabwe. Predicated on the findings and review of literature, the conditions that give rise to the technology reverse spill over effect potentially exist in the form of local subsidiary technological leadership, higher subsidiary R&D capability and the exploitation of technological advancement by the MNE. However, it is worth noting that the absence of technology spill over evidence alone cannot exclude the possibility of technology spill over happening. As such the findings for this research question are inconclusive and are worthy of further exploration in future.

#### **6.6 Other themes that emerged from the findings**

There were two themes which developed from these findings. These new themes are the importance of culture and strong people skills. Several participants highlighted that digital transformations happen within an organisational cultural context and therefore leaders need to cultivate a culture that is conducive for digital transformation to happen successfully.

According Ready et al. (2020) and Westerman et al. (2019), organizational culture is important in the digital transformation process, and it is one of the factors that can inhibit organisations from realising the full value of digital transformation. These scholars state that there are certain organisational behaviours and norms which may have been relevant in the past but are now detrimental to achieving the full value of digital transformation. Mor (2021) confirms the importance of leaders believing in innovation and the need for them to cultivate a culture that enables it to happen.

Most participants emphasised the importance of a leader having strong people skills to lead people effectively during digital transformation. The participants further emphasised that although technology is a significant component of digital transformation, it is implemented through people and leaders who have limited people skills will struggle.

In terms of literature, Westerman et al. (2019) affirm that most organisations focus on the technological element of digital transformation at the detriment of culture and people skills. Ancona (2019) affirms that to lead in a digital world, leaders must have the ability to bring people together, help them adapt to solving different problems and bring the best out of them

to facilitate innovation. The findings regarding culture and people skills align with extant literature.

## 6.7 Overall chapter conclusion

This chapter sought to establish whether the findings are aligned with the literature and if the research questions were addressed. Table 22 summarises the findings and literature comparisons from this study.

**Table 17: Overall conclusive findings**

Reference & Subject	Findings	Literature	Similarity
<b>RQ1a-</b> Understanding digital leadership	Digital leadership is essentially about leading in a modern and technologically advanced environment	Schrage et al. (2021), Kane et al. (2020), El Sawy et al. (2016) and Westerman et al. (2014).	<b>YES</b>
<b>RQ1b-</b> Current leadership style	Leadership styles include hierarchical, autocratic, and situational leadership styles.	Ready et al. (2020), Chun et al. (2009), Kane et al. (2018), Mukherjee (2020), Harms et al. (2018), Nielsen et al. (2016), Northouse (2016), and Yukl (2013).	<b>Inconclusive</b> Further exploration of difference recommended.
<b>RQ1c-</b> Importance of digital transformation	Critically important for the long-term sustainability of the PGM mining industry.	Porfirio et al. (2020), Lynch & Mors (2018), Westerman et al. (2014), Bharadwaj et al. (2013), Doan (2021), Bonnet & Westerman (2020), Young & Rogers (2019), Dengler & Matthes (2018), Frey & Osborne (2017),	<b>YES</b>
<b>RQ2a-</b> Role of leadership in digital transformation	Leadership is critical to digital transformation and is a pre-requisite to its success.	Westerman et al. (2014), Porfirio et al. (2021), Hitt et al. (2010), Li (2020), Kane et al. (2019),	<b>YES</b>

		Obwegeser et al. (2020), El Sawy et al. (2016), Westerman et al. (2019), Doan (2021) and Ready et al. (2021)	
<b>RQ2b-</b> Clarity of organisational vision	Having a clear organisational vision is of critical importance to leading digital transformation.	Rafferty & Griffin (2004), Kane et al. (2015), Kane et al. (2019), Carton et al. (2014), Ng (2017), El Sawy et al. (2016), Westerman et al. (2014) and Young & Rogers (2019).	<b>YES</b>
<b>RQ3a-</b> Capabilities or characteristics required to lead a successful digital transformation	Key leader capabilities and characteristics as being visionary, collaborative, innovative, agile, inspirational, open minded and insightful.	Rafferty & Griffin (2004), Kane et al. (2015), Kane et al. (2018), Kane et al. (2019), Carton et al. (2014), Westerman et al. (2014), Ancona (2019), Mor (2021), Li (2020), Mukherjee (2020), Doan (2021), Yukl (2013), Northouse (2016) and Obwegeser et al. (2020)	<b>YES</b> Intra group and cross group differences noted which have been recommended for further exploration
<b>RQ3b-</b> Equipping leaders with skills	Leaders are being equipped with skills through firstly carrying a skills gap analysis, hiring new skills, formal training, developing a growth mindset and transforming the structure and strategy of HR departments.	Kane et al. (2016), Westerman et al. (2014), Ready et al. (2020), Weill et al. (2019), Kane et al. (2017), Obwegeser et al. (2020), Ready et al. (2020) and Kane et al. (2019).	<b>YES</b> Potential point of difference recommended for further exploration
<b>RQ4-</b> Spill over influence on	Subsidiary digital transformation agenda	Marin & Bell (2006), Liedong et al., (2020),	<b>Inconclusive</b>

digital transformation	is shaped and driven locally by the subsidiary.	Doh et al. (2017), Chindondondo (2020), Lichtenburg & van Pottelsberghe (2001) and Driffield & Love (2003)	Technology reverse spill over effect potentially exists, further exploration required.
------------------------	---	--	--

Table 22 summarises the outcomes of this study. The outcomes of the study are discussed in the sections below:

### **6.7.1 Research question 1 overall conclusive findings**

The responses show that leaders understand what digital leadership is. The study unexpectedly found hierarchical and autocratic leadership styles in existence which was at variance with literature regarding conducive leadership styles for digital transformation to occur. Subsequently, it was considered that ambidextrous leadership practices could be an explanation of the approach taken by the above-mentioned leaders and worthy of further exploration in future. These results must be interpreted with caution and as such this sub-research question has been categorised as inconclusive. The study has shown that digital transformation is of critical importance to the long-term sustainability of the industry. Through it, the industry will realise key benefits that include a safer working environment, lower head count, lower costs and better ESG alignment.

### **6.7.2 Research question 2 overall conclusive findings**

Leadership was found to be critical and a pre-requisite to digital transformation success. In addition, organisational imperatives such as leaders who set the strategic direction, drive culture and have strong people skills emerged as important. Adequate resourcing of the digital transformation through funding and employee time availability emerged as key in addition to strong change management and leadership commitment.

### **6.7.3 Research question 3 overall conclusive findings**

Leaders who lead successful digital transformation were found to be visionary, adaptable, agile, collaborative, innovative and open minded. The study, however, found five potential differences regarding the perspectives of executives, top managers and senior managers on one hand, and the perspectives of operational and support function leaders on the other. Each of these differences are discussed below:

#### 6.7.3.1 *Open Minded*

Open-mindedness was found to be a key leader capability in this research. However, existing literature does not seem to consider this as a critical leader capability for successfully leading digital transformation. This difference from literature may suggest that being an open-minded leader is more important than what was previously thought and is worthy of further exploration. It is, however, worth noting that geographical or socio-cultural differences could potentially be an explanation for this.

From a cross group perspective, none amongst the senior managers group found being open minded to be of importance. This finding presents a potential difference and is worthy of further exploration to understand the reasons why senior managers hold different views on the importance of being open-minded as a key leader capability. This difference could benefit from future research. These findings potentially refine the thinking of scholars in respect of existing literature.

#### 6.7.3.2 *Influential*

Having influence was identified in literature as a key capability to lead successful digital transformation (Kane *et al.*, 2018; Northouse, 2016). However, the study concluded that being influential may not be as important as initially thought due to a very small portion of the sample acknowledging its importance. This is contrary to existing literature and this difference is worthy of further exploration. This potentially refines scholars' thinking around the existing literature in this regard. It is, however, worth noting that although the participants might not recognise the importance of being influential it could be argued by virtue of their positions and the level of power they have, they may be seen to be influential by their followers.

#### 6.7.3.3 *Innovative*

Being innovative was identified in literature as a key capability to lead successful digital transformation (Li, 2020; Ancona, 2019; Kane *et al.*, 2018; Westerman *et al.*, 2014). However, from a cross group perspective, only a minority of the operations leader group acknowledged its importance. This finding presents a potential difference and is worthy of further exploration to understand the reasons why operations leaders hold a different view on the importance of being innovative. This potentially refines the thinking of scholars in respect of existing literature.

#### 6.7.3.4 *Inspirational*

Being inspirational was identified in literature as a key capability to lead successful digital transformation (Kane *et al.*, 2018; Yukl, 2013). However, from a cross group perspective, only a minority of the executives group acknowledged its importance. This finding presents a

potential difference and is worthy of further exploration to understand the reasons why executives hold a different view on the importance of being inspirational. This potentially refines the thinking of scholars in respect of existing literature in this regard. It is, however, worth noting that although the executives might not recognise the importance of being inspirational, it could be argued by virtue of their positions and the organisational success they have achieved, they may be seen to be inspirational by their followers.

#### *6.7.3.5 Collaborative*

Being collaborative was identified in literature as a key capability to lead successful digital transformation (Kane et al., 2018; Westerman et al., 2014). However, from a cross group perspective, a lower proportion of the senior managers group acknowledged its importance. This finding presents a potential difference and is worthy of further exploration to understand the reasons why the senior managers hold a different view on the importance of being collaborative. This potentially refines the thinking of scholars in respect of the existing literature in this regard. It is worth noting that although the senior managers might not recognise the importance of being collaborative, it could be argued that by virtue of their lower positions within the organisational structure that cross functional collaboration may not be a capability that they perceive to be important or are observing in practice.

#### **6.7.4 Research question 4 overall conclusive findings**

Contrary to expectation, this study did not find evidence of a technology spill over. It is noteworthy that this alone, however, cannot exclude the possibility of a technology spill over occurring. On the other hand, the study suggested that a technology reverse spill over may possibly be occurring. In the absence of evidence to exclude the possibility of technology spill over happening, the findings for this research question are inconclusive and are worthy of further exploration in future.

This study extends the body of knowledge on digital leadership and also refines existing literature in the area of spill overs. It has identified several areas recommended for further investigation. The areas of proposed future research are derived from this chapter and are outlined in Chapter 7.

## **CHAPTER 7: CONCLUSION AND RECOMMENDATIONS**

### **7.1 Introduction**

Rapid advances in technology are redefining markets and customer expectations thereby accelerating the pressure on organisations to embark on digital transformations to remain competitive and to guarantee their long-term sustainability (Vial, 2019; Porfirio et al., 2021). This has brought digital transformation at the top of most organisations' strategic agendas as organisations and their leaders seek to make a success of it and deliver the differentiated competitive positioning it should bring (Porfirio et al., 2021). Despite this, digital transformations continue to have a 70% failure rate and are largely not meeting expectations nor delivering their intended value (Doan, 2021; Ready et al., 2020; Obwegeser et al., 2020). To successfully lead digital transformation and manage the transition to an organisation's future state, specific leader capabilities are required (Kane et al., 2015; Li, 2020; Appio et al., 2021).

The main aim of this study was therefore, to determine leader capabilities required by leaders to successfully deliver digital transformations and realise its intended benefits in a developing world country such as Zimbabwe with a focus on the PGM mining industry where digital transformation is a key business imperative currently. Coupled with this, the research sought to determine the importance of leadership in successful digital transformation. The study also determined how leaders can be equipped with digital leadership skills and lastly it sought to determine whether MNE's played any role in the digital transformation journey of their subsidiaries through spill overs. This study, thus, presented an opportunity to enhance the existing body of knowledge on leading digital transformation, specifically within a developing country context.

This chapter therefore concludes the study and summarises the research question answers. The research contribution, recommendations for managers, research limitations and suggestions for further research are outlined in the rest of this chapter.

### **7.2 Conclusions on research questions**

The principal conclusions on the each of the research questions are presented in this section. They ultimately contribute to answering the overall research question.

#### ***7.2.1 Conclusions on research question 1***

**RQ1: What do leaders understand by digital leadership as well as its importance in the digital transformation of the PGM mining industry?**

This research question was aimed at establishing the extent of leaders' understanding of digital leadership, their perspective on the importance of digital transformation and to establish the current leadership style in the PGM industry. The findings suggest that leaders understand what digital leadership is and its necessity to lead in a technologically advanced environment. Digital transformation was confirmed as being of critical importance to the long-term sustainability of the PGM mining industry. The benefits of digital transformation for the PGM mining industry were revealed and these aligned with literature (Westerman et al., 2014; Bonnet & Westerman, 2020; Young & Rogers, 2019; Dengler & Matthes, 2018). Accordingly, the study aligns with the consensus of existing literature in this respect.

One of the unanticipated findings is that the leadership style in the PGM mining industry in Zimbabwe is predominantly hierarchical and autocratic. This is at variance with literature regarding the leadership styles aligned with successful digital transformation. It was considered that ambidextrous leadership practices could be an explanation of the approach taken by the above-mentioned leaders. Accordingly, the study potentially refines existing literature in this respect and further research is recommended.

### ***7.2.2 Conclusions on research question 2***

**RQ2: How essential is the role of leadership in ensuring a successful digital transformation?**

This research question aimed to establish the extent of leaders understanding of the importance of leadership in digital transformation within the PGM mining industry and whether the leaders have a clear vision of their future mining organisation. The findings revealed that leadership is critical to digital transformation and is a pre-requisite for its success. In addition, the importance of leaders who set the strategic direction, drive culture, and have strong people skills is essential. Adequate resourcing of the digital transformation (funding and employee time availability) is essential, supported by strong change management as well as leadership commitment.

The study also confirmed that leaders largely have a clear organisational vision and understand its importance, in line with current literature. Accordingly, the study aligns with the consensus of existing literature in this respect.

### ***7.2.3 Conclusions on research question 3***

**RQ3: What capabilities or characteristics does a leader require to lead successful digital transformation?**

Research question 3 was aimed at establishing the capabilities or characteristics that leaders require to successfully implement a digital transformation and how leaders are being equipped with the necessary skills to successfully lead digital transformation. The findings confirmed that leading successful digital transformation requires leaders who are visionary, collaborative, innovative, agile, inspirational, open minded and insightful.

Overall, the capabilities and factors were found to be aligned with literature by Westerman et al. (2014), Kane et al. (2015), Kane et al. (2018), Kane et al. (2019), Kane et al. (2021) and Ancona (2019). However, the study found five potential differences. Each of these were discussed in Section 6.7 in Chapter 6 and are recapped below.

#### *7.2.3.1 Open Minded*

Although not considered a key capability in existing literature, open-mindedness was found to be a key leader capability in this research. Notably, this difference could be influenced by geographical or socio-cultural differences and requires further exploration.

From a cross group perspective, no leaders in the senior managers group found being open minded to be of importance, demonstrating their differing views on the importance of being open-minded as a key leader capability. This difference is worthy of further exploration and could benefit from future research. These findings potentially refine the thinking of scholars in respect of existing literature.

#### *7.2.3.2 Influential*

Contrary to extant literature identifying being influential as a key leader capability, the study found that it may not be as important as initially thought due to a very small portion of the sample acknowledging its importance. Notably, by virtue of the participants positions and the power they have, they may be perceived as influential. This potentially refines scholars' thinking around the existing literature in this regard.

#### *7.2.3.3 Innovative*

Contrary to existing literature identifying being innovative as a key leader capability, the study found that only a minority of the operations leader group acknowledged its importance signifying their different views on the importance of being innovative. This difference is worthy of further exploration as it potentially refines the thinking of scholars in respect of existing literature.

#### *7.2.3.4 Inspirational*

Contrary to current literature identifying being inspirational as a vital leader capability, the study found that only a minority of the executives group acknowledged its importance thereby

signifying their dissimilar views on the importance of being inspirational. Notably, by virtue of their positions and the organisational success they have achieved, the executives may be perceived to be inspirational by their followers. This difference is worthy of further exploration potentially as it refines the thinking of scholars in respect of existing literature.

#### *7.2.3.5 Collaborative*

Contrary to the literature identifying being collaborative as a crucial leader capability, the study found that only a lower proportion of the senior managers group acknowledged its importance thereby signifying their different views on the importance of collaboration. Notably, it could be argued that by virtue of their lower positions within the organisational structure that cross functional collaboration may not be a capability that they perceive to be important or are observing in practice. This difference is worthy of further exploration as it potentially refines the thinking of scholars in respect of existing literature.

Regarding the equipping of leaders with skills, the study confirmed that leaders are being equipped through initial skills gap assessments, formal training, hiring of new skills, cultivation of a growth mindset and through the transformation of HR structures and strategies. Accordingly, the study aligns with the consensus of existing literature in this respect.

#### **7.2.4 Conclusions on research question 4**

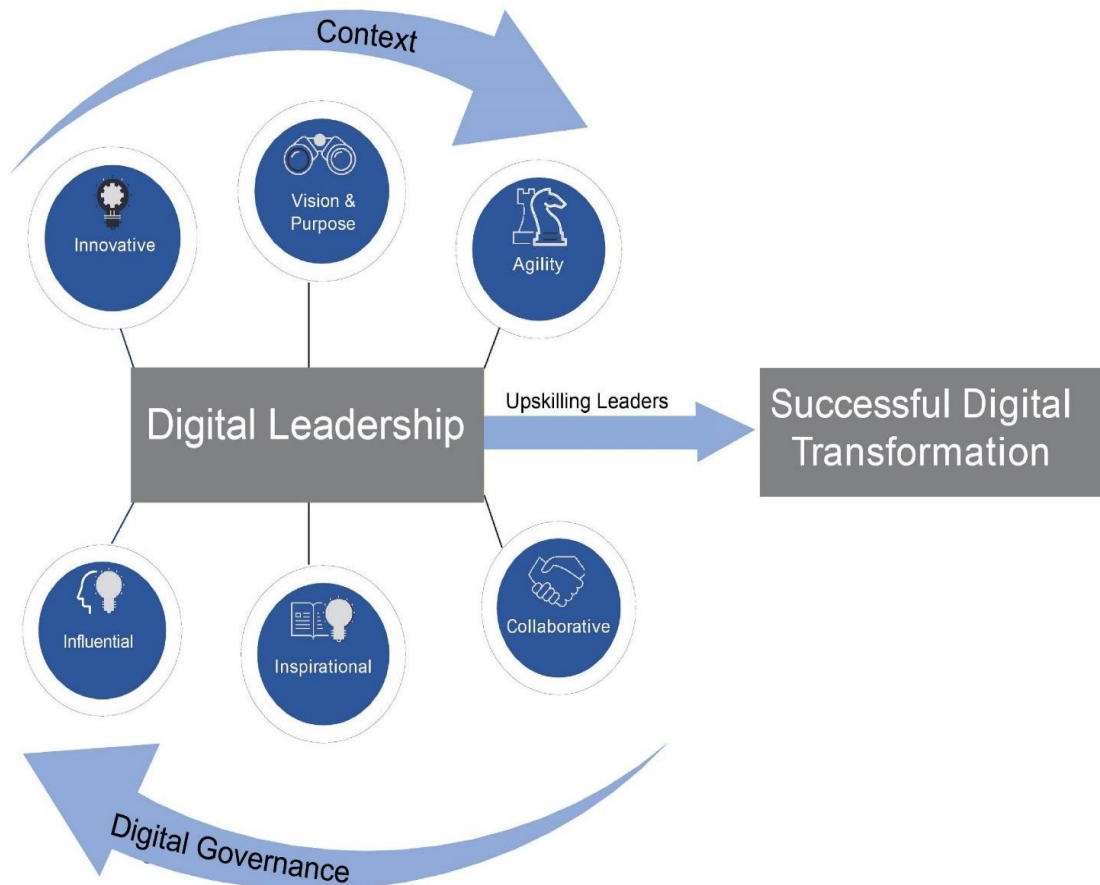
##### **RQ4: What role do Multinational Corporations (MNE's) play in their subsidiaries undergoing digital transformation?**

Research question 4 was aimed at establishing the extent to which subsidiary digital transformations are influenced or shaped by the MNE through technology spill overs. Contrary to expectation, this study did not find evidence of technology spill overs from MNEs to the subsidiary entities as the literature by Marin & Bell (2006), Liedong et al., (2020) as well as Driffield & Love (2003) had outlined. It is worth noting that this alone cannot exclude the possibility of technology spill over happening.

However, the study suggested that a technology reverse spill over may potentially be occurring in the PGM mining industry in Zimbabwe following the observation of local subsidiary technological leadership, higher subsidiary R&D capability and the exploitation of subsidiary technological advancement by the MNEs. These observed conditions that potentially give rise to technology reverse spill overs were found to be in alignment with the literature on reverse spill overs by Lichtenburg & van Pottelsberghe (2001). In the absence of evidence to exclude the possibility of technology spill over happening, the findings for this research question are inconclusive and are worthy of further exploration in future. Accordingly, the study potentially refines existing literature in this respect.

### 7.2.5 Conclusions on conceptual framework

The Digital Leadership Conceptual Framework was derived following the updating of the proposed conceptual framework in Chapter 2. The proposed conceptual framework in Chapter 2 was derived following a review of extant literature on the various elements of digital leadership that addressed the research questions. The proposed conceptual framework is shown in Figure 10 below.



**Figure 10: Proposed conceptual framework derived from the literature review**

Source: Author's own compilation

Drawing on the findings, discussion, and the conclusions in Sections 7.2.1 to 7.2.4, the following additional elements have been identified as possibly refining the conceptual framework further.

### *7.2.5.1 Personal Leader capabilities and characteristics*

#### People skills

Strong people skills were identified as important for leaders to lead successful digital transformation. While technology comprises of a substantial portion of digital transformation, its implementation was emphasised as being done through people and therefore leaders need strong people skills to navigate this aspect.

#### Open-mindedness

Open-mindedness was found to be a key leader capability in this research. However, existing literature did not seem to consider this as a critical leader capability for successfully leading digital transformation. For this reason, it has been found prudent to add it to the conceptual model.

#### Influential

The proposed conceptual framework included being influential as a key leadership capability. This study, however, concluded that being influential may not be as important as outlined in literature due to a very small portion of the sample recognising its importance. While this may be the case, this alone does not constitute adequate evidence to conclude that being influential is not a key leader capability. As such, being influential remains in the conceptual framework although it is greyed out for emphasis.

### *7.2.5.2 Functional activities*

#### Resourcing

The need to adequately resource digital transformation emerged as a key functional activity for successful digital transformation to occur. Without adequate resourcing in the form of funding and employee time availability, digital transformation may be constrained.

#### Change management

As a result of digital transformation's sometimes long and drawn-out nature, the study found that it was important for leaders to sufficiently drive the change management process. Leaders need to be sufficiently change-oriented and sustain this throughout the digital transformation process.

### 7.2.5.3 Organisational imperatives

#### Culture

Culture emerged as a key organisational imperative for digital transformation to succeed. Leaders set the cultural tone through their behaviours and must promote a culture in which digital transformation can thrive.

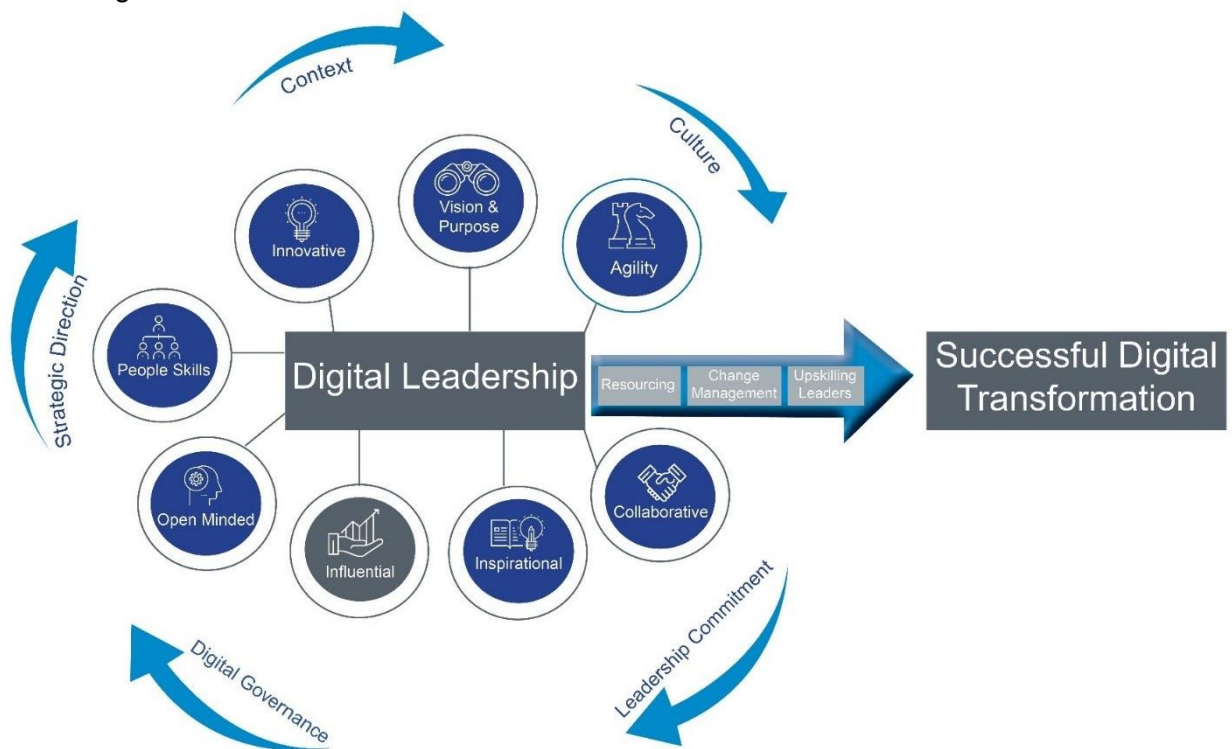
#### Leadership commitment

Leadership commitment emerged as key in signifying leaders' unequivocal commitment to digital transformation throughout its journey. Commitment was identified as key throughout all the successes and setbacks that emerge throughout the duration of the digital transformation process.

#### Strategic direction

Strategic direction emerged as an important leader imperative during digital transformation. It is important for leaders to clearly outline the strategic direction during the digital transformation process.

After taking these into account, a refined Digital Leadership Conceptual Framework is proposed in Figure 11



**Figure 9: Updated Digital Leadership conceptual framework**

Source: Author's own compilation

### 7.3 Research contribution

This study sought to enhance the existing body of knowledge on leading digital transformation through understanding the leadership capabilities required for its successful implementation in the PGM mining industry of a developing world country. Despite increased academic interest in digital transformation, a lack of conceptual clarity and inconsistencies exist with the literature pointing toward a need to understand the influence that leadership capabilities have in enabling its successful implementation (Porfirio et al., 2020).

This study has contributed to the emergent discourse on digital leadership as follows:

- This study provides insight into leadership capabilities necessary for the successful digital transformation in the PGM mining industry of a developing country such as Zimbabwe. The bulk of previous studies into this area have been in developed country contexts and therefore this study refines the existing body of literature to a component of an industry and developing country context.
- This study provided an insight into the leadership styles in the PGM mining industry as being predominantly hierarchical and autocratic, contrary to extant literature on leadership styles that are conducive for digital transformation. It was considered that ambidextrous leadership practices could be occurring as characterised by simultaneous exploitation and exploration (Uhl-Bien & Arena, 2018). This study potentially refines existing literature in this respect.
- This study contributes to the area of technology reverse spill overs where the findings unexpectedly suggest that a technology reverse spill over may occur in the PGM mining industry in Zimbabwe. This, however, does not preclude the possibility that technology spill over is also present notwithstanding that no evidence was uncovered to support it. This represents a potential refinement of existing literature in this respect.
- The study found differences between the perspectives of the executives, top managers and senior managers regarding the importance of specific leader capabilities. This represents a potential refinement of existing literature in this respect.
- The study found differences between the perspectives of operational and support function leaders regarding the importance of specific leader capabilities. This represents a potential refinement of existing literature in this respect.

#### **7.4 Implications for managers and other stakeholders**

The study showed that to be effective in a digital era, leaders need to embrace the leader capabilities this study found and to further acquire new skills. The mining industry has been slow to embrace digital transformation and is considered to be tracking behind other sectors. In Zimbabwe, the PGM mining sector faces challenges that include operational productivity, employee safety, availability of foreign currency and access to secure power. Digital transformation presents an opportunity to overcome some of these challenges through enhancing operational efficiency through automation, increasing employee safety through collision avoidance technologies, and leveraging technology for better environmental protection.

This study can be used by management and other stakeholders as follows:

- The Platinum Producers Association, and the management in the PGM mining sector could use this study to identify and potentially troubleshoot any bottlenecks that they may face in their digital transformation journeys through being aware of leader capabilities necessary for the successful implementation of digital transformation.
- The Chamber of Mines of Zimbabwe could use this study to disseminate pertinent digital leadership insights to management of other mining companies within Zimbabwe through their various workshops and bulletins.
- 
- The universities and tertiary institutions could use the findings from this study to incorporate digital leadership modules in their learning so that graduates from these institutions have a theoretical foundation of digital leadership when they enter the realm of the business world.
- The Ministry of Mines and Mining Development could use the identified leader capabilities and factors to enhance the development of skills at mining specific institutions of learning such as the School of Mines.
- -The study could be used by the government's mining specific research arm, the Institute of Mining Research, to contribute to the mining industry's policy which affects all mining companies in Zimbabwe.
- The HR departments could use this study to help them understand digital transformation, digital leadership, acquiring new talent, modifying organisational structures to cater for digital transformation and transforming their HR strategies.

## **7.5 Limitations of the research**

Bell et al., (2019) argue that qualitative research inherently has flaws or common criticisms. Over and above these, further limitations have been identified and they include:

- The research was limited to a sample of 16 leaders in the PGM mining industry in Zimbabwe. Therefore, not the entire mining industry was covered nor were other industries or sectors in Zimbabwe.
- The study was limited to leaders in the PGM mining industry. It does not include the views of employees that were impacted by digital transformation.
- The study focused on digital leadership and did not examine any technological elements of digital transformation.
- The study was geographically limited to the PGM mining industry that is mainly located in Harare and parts of the Great Dyke. As such a geographic bias could apply.
- The study was carried out in Zimbabwe and could be impacted by geographical or socio-cultural differences.
- The study was carried out based on a sample of 16 interviews in one industry. This could impact the generalisability of the findings of the study.

## **7.6 Suggestions for further research**

This research suggests topics that could benefit from future research. The findings of this study potentially can be explored further and as such the following should be considered for further research:

- The literature by Nielsen et al. (2016) suggests that autocratic leadership could be appropriate in places where workplace safety is a concern and efficiency is needed. Therefore, further research in the PGM mining industry in Zimbabwe in this regard could be beneficial.
- The emergence of the possibility of ambidextrous leadership behaviour observed in the leaders in the sample in this study suggests that further research into ambidextrous leadership might be valuable.

- A concern was raised by some participants regarding employee privacy and the use of wearable technologies in the workplace. This suggests that further research in this regard might be warranted.
- Further research might be warranted to examine more closely the potential technology reverse spill over effect happening in the PGM mining industry in Zimbabwe.
- This research could be replicated across the rest of the mining sector, and other sectors across the Zimbabwean economy or in other developing countries to widen the sample group.

## **7.7 Conclusion**

Digital transformation needs effective leaders to make it a success and realise the potential benefits that it brings. This study found that leadership is critical and a necessity for digital transformation success. The aim of this study was to bring to the fore the capabilities that leaders need to have and develop to help them successfully implement digital transformations. The findings and literature found that, to successfully lead digital transformation, leaders need to be visionary, adaptable, agile, collaborative, innovative and open minded. Furthermore, they need to ensure that they create the right culture for digital transformation to thrive. They also need to improve their skills, show commitment, resource the digital transformation process appropriately and have strong people skills. The study further suggested that a technology reverse spill over may be occurring in the PGM mining industry in Zimbabwe. The findings, which culminated from a sample of 16 leaders, resulted in the conception of a Digital Leadership Conceptual Framework.

From a research perspective, the study has contributed to the emergent discourse on digital leadership by outlining the leader capabilities required to successfully implement digital transformation. From a management perspective, the use of the Digital Leadership Conceptual Framework will help leaders, ministries, government bodies and tertiary institutions to enhance their digital leadership knowledge and acquire new skills.

We reaffirm Rosalynn Carter's proclamation that, "great leaders take people where they don't necessarily want to go, but ought to be". We are therefore reminded that digital leaders bear the burden of navigating through digital transformation, complexity and have the responsibility of steering of their organisations in a more digitally connected world.

## REFERENCE LIST

- Ancona, D. (2019) Five rules for leading in a digital world. *MIT Sloan Management Review*, 61(1), 1-4.
- Andriole, S. J. (2017). Five myths about digital transformation. *MIT Sloan Management Review*, 58(3), 20-22.
- Antonakis, J., & House, R.J. (2014). Instrumental leadership: Measurement and extension of transformational-transactional leadership theory. *Leadership Quarterly*, 25(4), 746-771. <https://doi.org/10.1016/j.leaqua.2014.04.005>
- Appio, F., Frattini, F., Petruzzelli, A., & Neirotti, P. (2021). Digital transformation and innovation management: A synthesis of existing research and an agenda for future studies. *Journal of Product Innovation Management*. DOI: 10.1111/jpim.12562
- Baiyere, A., Salmela, H., & Tapanainen, T. (2020). Digital transformation and the new logics of business process management. *European Journal of Information Systems*. <https://doi.org/10.1080/0960085X.2020.1718007>
- Bass, B. (1999). Two decades of research and development in transformational leadership. *European Journal of Work and Organisational Psychology*, 8(1), 9-32. <https://doi.org/10.1080/135943299398410>
- Bednall, T. C., Rafferty, A. E., Shipton, H., Sanders, K., & Jackson, C. J. (2018). Innovative behaviour: How much transformational leadership do you need? *British Journal Of Management*, 29(4), 796-816. DOI: 10.1111/1467-8551.12275
- Bell, E., Bryman, A., & Harley, B. (2019). *Business Research Methods* (5<sup>th</sup> ed.). Oxford University Press.
- Bennis, W. (2013). Leadership in a digital world: Embracing transparency and adaptive capacity. *MIS Quarterly*, 37(2), 635-636.
- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights. *MIS Quarterly*, 37(2), 471-482.
- Bolden, R., & O'Regan, N. (2016). Digital disruption and the future of leadership: An interview with Rick Haythornthwaite, Chairman of Centrica and MasterCard. *Journal of Management Inquiry*, 25(4), 438–446. <https://doi.org/10.1177/1056492616638173>
- Bonnet, D., & Westerman, G. (2020). The new elements of digital transformation. *MIT Sloan Management Review*, 62(2), 82-89.

- Bono, J. E., & McNamara, G. (2011). Publishing in AMJ—part 2: Research design. *Academy of Management Journal*, 54(4), 657-660. <https://doi.org/10.5465/AMJ.2011.64869103>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <http://dx.doi.org/10.1191/1478088706qp063oa>
- Carreiro, H., & Oliveira, T. (2019). Impact of transformational leadership on the diffusion of innovation in firms: Application to mobile cloud computing. *Computers in Industry*, 107, 104-113. <https://doi.org/10.1016/j.compind.2019.02.006>
- Carton, A., Murphy, C., & Clark, J. (2014). A (blurry) vision of the future: How leader rhetoric about ultimate goals influences performance. *Academy of Management Journal*, 57(6), 1544-1570. <http://dx.doi.org/10.5465/amj.2012.0101>
- Creswell, J. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2<sup>nd</sup> ed.). Los Angeles: SAGE Publications.
- Creswell, J. (2017). *Qualitative Inquiry & Research Design: Choosing Among Five Approaches* (4th Ed.). Los Angeles: SAGE Publications.
- Chamber of Mines of Zimbabwe (2021). State of the mining industry report. Prospects for 2021. Retrieved from <https://www.chamberofminesofzimbabwe.com/index.php/en/2020-mining-bulletins>
- Chindondondo, B. (2020). *Revisiting spillovers through the lens of resource dependence theory: The role of access relationships in low income countries rife with institutional voids* (Doctoral thesis, Gordon Institute of Business Science, University of Pretoria, Pretoria, South Africa). Retrieved from <http://hdl.handle.net/2263/79767>
- Chun, J. U., Yammarino, F. J., Dionne, S.D., Sosik J. J., & Moon, H. K. (2009). Leadership across hierarchical levels: Multiple levels of management and multiple levels of analysis. *The Leadership Quarterly*, 20, 689–707. <http://dx.doi.org/10.1016/j.leaqua.2009.06.003>
- Deloitte (2018). *Tracking the trends 2018. The top 10 issues shaping mining in the year ahead*. Retrieved from <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-er-ttt-report-2018.pdf>

- Deloitte (2019a). *Tech Trends 2019: Beyond the digital frontier*. Retrieved from <https://www2.deloitte.com/lu/en/pages/technology/articles/tech-trends-2019-beyond-digital-frontier.html>
- Deloitte (2019b). *Pivoting to digital maturity: Seven capabilities central to digital transformation*. Retrieved from <https://www2.deloitte.com/br/en/pages/technology-media-and-telecommunications/articles/impulsionando-maturidade-digital.html>
- Deloitte (2020). *Tracking the trends 2020. Leading from the front*. <https://www2.deloitte.com/global/en/pages/energy-and-resources/articles/tracking-the-trends.html>
- Dengler, K., & Matthes, B. (2018). The impacts of digital transformation on the labour market: Substitution potentials of occupations in Germany. *Technological Forecasting & Social Change*, 137, 304-316. <https://doi.org/10.1016/j.techfore.2018.09.024>
- Driffield, N., & Love, J. (2003). Foreign direct investment, technology sourcing and reverse spillovers. *The Manchester School*, 71(6), 659–672.
- Doan, M. (2021). Don't let digital obsession destroy your organization. *MIT Sloan Management Review*.
- Doh, J., Rodrigues, S., Delmohout, A., & Makhija, M. (2017). International business responses to institutional voids. *Journal of International Business Studies*, 48(4), 293–307.
- Eden, L. (2009). Letter from the Editor-in-chief: FDI spillovers and linkages. *Journal of International Business Studies*, 40(7), 1065–1069.
- Eisenhardt, K. M., Graebner, M. E., & Sonenshein, S. (2016). Grand challenges and Inductive Methods: Rigour without rigor mortis. *Academy of Management Journal*, 59(4), 1113-1123. <https://doi.org/10.5465/amj.2016.4004>
- El Sawy, O. A., Amsinck, H., Kræmmergaard, P., & Vinther, A. L. (2016). How LEGO built the foundations and enterprise capabilities for digital leadership. *MIS Quarterly Executive*, 15(2), 141–166.
- Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting & Social Change*, 114, 254–280. <http://dx.doi.org/10.1016/j.techfore.2016.08.019>
- Gioia, D., Corley K., & Hamilton, A. (2012). Seeking qualitative rigour in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 16(1), 15-31. <https://doi.org/10.1177/1094428112452151>

- Government of Zimbabwe (2018). Transitional stabilisation programme. Reforms agenda October 2018- December 2020. Retrieved from [http://www.zim.gov.zw/index.php/en/government-documents/category/2-transitional-stabilisation-plan?download=2:transitional\\_stabilisation\\_programme](http://www.zim.gov.zw/index.php/en/government-documents/category/2-transitional-stabilisation-plan?download=2:transitional_stabilisation_programme)
- Government of Zimbabwe (2020). National development strategy 1. Towards a prosperous & empowered upper middle-income society by 2030. Retrieved from [http://www.zimtreasury.gov.zw/index.php?option=com\\_phocadownload&view=category&download=335:national-development-strategy-1-2021-2025&id=64:national-development-strategy-1&Itemid=789](http://www.zimtreasury.gov.zw/index.php?option=com_phocadownload&view=category&download=335:national-development-strategy-1-2021-2025&id=64:national-development-strategy-1&Itemid=789)
- Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough?: An experiment with data saturation and variability. *Field Methods*, 18(1), 59-82. <https://doi-org.uplib.idm.oclc.org/10.1177/1525822X05279903>
- Hanelt, A., Bohnsack, R., Marz, D., & Marante, C. (2020). A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change. *Journal of Management Studies*. <https://doi-org.uplib.idm.oclc.org/10.1111/joms.12639>
- Harms, P. D., Wood, D., Landay, K., Lester, P. B., & Lester, G. V. (2018). Autocratic leaders and authoritarian followers revisited: A review and agenda for the future. *The Leadership Quarterly*, 29, 105-122. <https://doi.org/10.1016/j.leaqua.2017.12.007>
- Harris, R. (2009). Spillover and backward linkage effects of FDI: Empirical evidence for the UK. *Spatial Economics Research Centre*, 1–29.
- Hitt, M. A., Haynes, K. T., & Serpa, R. (2010). Strategic leadership for the 21st century. *Business Horizons*, 53, 437-444.
- Hulme, J. (2020). *How host country institutional environments influence the digital transformation objectives of multinational subsidiaries operating in emerging markets* (Master's thesis, Gordon Institute of Business Science, University of Pretoria, Pretoria, South Africa). Retrieved from <http://hdl.handle.net/2263/80444>
- Ireland, R. D., & Hitt, M. A. (1999). Achieving and maintaining strategic competitiveness in the 21st century: The role of strategic leadership. *Academy of Management Perspectives*, 13(1), 43-57.
- Jansen, J. J., George, G., van den Bosch, F. A., & Volberda, H. W. (2008). Senior team attributes and organizational ambidexterity: The moderating role of transformational leadership. *Journal of Management Studies*, 45(5), 982-1007.

- Josselson, R. (2013). *Interviewing for Qualitative Inquiry: A Relational Approach*. New York: The Guilford Press.
- Kane, G., Palmer, D., Phillips, A., Kiron, D., & Buckley, N. (2015). Strategy, not technology, Drives digital transformation; *MIT Sloan Management Review and Deloitte University Press*, 14, 1-25.
- Kane, G., Palmer, D., Phillips, A., Kiron, D., & Buckley, N. (2016). Aligning the organisation for its digital future. *MIT Sloan Management Review*, 58(1).
- Kane, G., Palmer, D., Phillips, A., Kiron, D., & Buckley, N. (2017). Achieving digital maturity: Adapting your company to a changing world. *MIT Sloan Management Review and Deloitte University Press*, 59(1).
- Kane, G., Palmer, D., Phillips, A., Kiron, D., & Buckley, N. (2018). Coming of age digitally: Learning, leadership and legacy. *MIT Sloan Management Review and Deloitte Insights*.
- Kane, G., Phillips, A., Copulsky, J., & Andrus, G. (2019). How Digital Leadership Is(n't) Different. *MIT Sloan Management Review*, 60(3), 34-39.
- Kane, G., Nanda, R., Phillips, A., & Copulsky, J. (2021). The digital superpowers you need to thrive. *MIT Sloan Management Review*, 63(1), 1-6.
- Koh, D., Lee, K., & Joshi, K. (2019). Transformational leadership and creativity: A meta-analytic review and identification of an integrated model. *Journal of Organizational Behaviour*, 40(6), 625-650. <https://doi.org/10.1002/job.2355>
- Kotter, J. P. (2007). Leading change: Why transformation efforts fail. *Harvard Business Review*, 85(1), 96-103.
- Kunaka, K. (2019). *Leadership competencies for digital transformation in a telecommunications organisation* (Master's thesis, Gordon Institute of Business Science, University of Pretoria, Pretoria, South Africa). Retrieved from <http://hdl.handle.net/2263/73976>
- Li, F. (2020). Leading Digital Transformation: Three emerging approaches for managing the transition. *International Journal of Operations & Production Management*, 40(6), 809-817. <https://doi.org/10.1108/IJOPM-04-2020-0202>
- Lichtenberg, F., & van Pottelsberghe, B. (2001). Does foreign direct investment transfer technology across borders? *Review of Economics and Statistics*, 83(3), 490-497. <https://doi.org/10.1162/00346530152480135>

- Liedong, T., Peprah, A., Amartey, A., & Rajwani, T. (2020). Institutional voids and firms' resource commitment in emerging markets: A review and future research agenda. *Journal of International Management*, 1-21.
- Lynch, S., & Mors, M. (2018). Strategy implementation and organizational change: How formal reorganization affects professional networks. *Long Range Planning*, 52(2), 255-270. <https://doi.org/10.1016/j.lrp.2018.02.003>
- Marin, A., & Bell, M. (2006). Technology spillovers from foreign direct investment (FDI): The Active role of MNC subsidiaries in Argentina in the 1990s. *Journal of Developmental Studies*, 42(4), 678–697.
- Martin, J., & Eisenhardt, K. (2010). Rewiring; Cross-Business-Unit Collaborations In Multibusiness Organisations. *Academy of Management Journal*, 53(2), 265-301. <https://doi.org/10.5465/AMJ.2010.49388795>
- Maxwell, J. A. (2009). Designing a qualitative study. In J. Maxwell, *The SAGE handbook of applied social research methods* (2nd ed., pp. 214-253). SAGE Publications. doi:<https://www.doi.org/10.4135/9781483348858>
- Mor, O. (2021). Three steps to building a learning culture that delivers innovation. *MIT Sloan Management Review*.
- Morakanyane, R., Grace, A., & O'Reilly, P. (2017) Conceptualizing Digital Transformation in Business Organisations: A Systematic Review of Literature. *Bled eConference*, 21. <https://doi.org/10.18690/978-961-286-043-1.30>
- Mukherjee, A. (2020). 5 Musts for next-gen leaders. *MIT Sloan Management Review*, 61(3), 1-4.
- Mumford, T. V., Campion, M. A., & Morgeson, F. P. (2007). The leadership skills strataplex: Leadership skill requirements across organizational levels. *Leadership Quarterly*, 18(2), 154–166. <https://doi.org/10.1016/j.leaqua.2007.01.005>
- Mumford, M. D., Zaccaro, S. J., Harding, F. D., Jacobs, T. O., & Fleishman, E. A. (2000). Leadership skills for a changing world: Solving complex social problems. *The Leadership Quarterly*, 11(1), 11-35. [https://doi.org/10.1016/S1048-9843\(99\)00041-7](https://doi.org/10.1016/S1048-9843(99)00041-7)
- Ng, T. W. H. (2017). Transformational leadership and performance outcomes: Analyses of multiple mediation pathways. *Leadership Quarterly*, 28(3), 385-417. <http://dx.doi.org/10.1016/j.leaqua.2016.11.008>

- Nielsen, M. B., Skogstad, A., Matthiesen, S. B., & Einarsen, S. (2016). The importance of a multidimensional and temporal design in research on leadership and workplace safety. *The Leadership Quarterly*, 27, 142-155. <http://dx.doi.org/10.1016/j.leaqua.2015.08.003>
- Northouse, P. G. (2016). *Leadership: Theory and practice* (7<sup>th</sup> Ed.). Thousand Oaks, CA: Sage Publications.
- Obwegeser, N., Yokoi, T., Wade, M., & Voskes, T. (2020). 7 Key principles to govern digital initiatives. *MIT Sloan Management Review*, 61(3), 1-9.
- O'Reilly, C. A. & Chatman, J. A. (2020). Transformational leader or narcissist? How grandiose narcissists can create and destroy organizations and institutions. *California Management Review*, 62(3), 5-27. <https://doi.org/10.1177/0008125620914989>
- Pillay, A. (2020). *Understanding digital leadership competencies to enhance collaboration in South African banks* (Master's thesis, Gordon Institute of Business Science, University of Pretoria, Pretoria, South Africa). Retrieved from <http://hdl.handle.net/2263/79640>
- Pearce, R. (1999). Decentralised R&D and strategic competitiveness: Globalised approaches to generation and use of technology in multinational enterprises (MNEs). *Research Policy*, 28(2-3), 157-78. [https://doi.org/10.1016/S0048-7333\(98\)00115-2](https://doi.org/10.1016/S0048-7333(98)00115-2)
- Porfirio, J., Carrilho, T., Felicio, J., & Jardim, J. (2021). Leadership characteristics and digital transformation: *Journal of Business Research*, 124, 610-619. <https://doi.org/10.1016/j.jbusres.2020.10.058>
- PwC. (2020a). *Move beyond digital transformation — and improve your ROI*. Retrieved from <https://www.strategy-business.com/blog/Move-beyond-digital-transformation-and-improve-your-ROI>
- PwC. (2020b). *Mine 2020. Resilient and resourceful*. Retrieved from <https://www.pwc.com/gx/en/industries/energy-utilities-resources/publications/mine-2020.html>
- Rafferty, A. E., & Griffin, M. A. (2004). Dimensions of transformational leadership: Conceptual and empirical extensions. *Leadership Quarterly*, 15(3), 329-354. <https://doi.org/10.1016/j.leaqua.2004.02.009>
- Ready, D., Cohen, C., Kiron, D., & Pring, B. (2020). The new leadership playbook for the digital age. *MIT Sloan Management Review*.

- Saldana, J., (2013). *The coding manual for qualitative researchers*. (2<sup>nd</sup> ed.) Thousand Oaks, CA: SAGE Publications.
- Schrage, M., Pring, B., Kiron, D., & Dickerson, D. (2021). Leadership's digital transformation: Leading purposefully in an era of context collapse. *MIT Sloan Management Review*.
- Uhl-Bien, M., & Arena, M. (2018). Leadership for organizational adaptability: A theoretical synthesis and integrative framework. *Leadership Quarterly*, 28, 89-104. <https://doi.org/10.1016/j.leaqua.2017.12.009>
- Verhoef, P., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J., Fabian, N., & Haenlein, M. (2019). Digital transformation: A multi-disciplinary reflection and research agenda. *Journal of Business Research*, 122, 889-901. <https://doi.org/10.1016/j.jbusres.2019.09.022>
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems*, 28(2019), 118-144. <https://doi.org/10.1016/j.jsis.2019.01.003>
- Warner, K., & Wager, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long Range Planning*, 52(2019), 326-349. <https://doi.org/10.1016/j.lrp.2018.12.001>
- Weill, P., Apel, P., Woerner, S., & Banner, J. (2019). It pays to have a digital savvy board. *MIT Sloan Management Review*, 60(3), 41–45.
- Weill, P., & Woerner, S. (2018). Is your company ready for a digital future? *MIT Sloan Management Review*, 59(2), 21–25.
- Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital: Turning technology into business transformation*. Boston: Harvard Business Press.
- Westerman, G., Soule, D., & Eswaran, A. (2019) Building digital-ready culture in traditional organizations: *MIT Sloan Management Review*, 60(4), 59-68.
- World Economic Forum (2016). *Digital transformation of industries: Demystifying digital and securing \$100 trillion for society and industry by 2025*. Retrieved from <https://reports.weforum.org/digital-transformation/wp-content/blogs.dir/94/mp/files/pages/files/wef1601-digitaltransformation-1401.pdf>
- World Economic Forum (2017). *Digital transformation initiative: Mining and metals industry*. Retrieved from <https://reports.weforum.org/digital-transformation/wp-content/blogs.dir/94/mp/files/pages/files/wef-dti-mining-and-metals-white-paper.pdf>

- World Economic Forum (2020). *Digital transformation: Powering the great reset*. Retrieved from [https://www3.weforum.org/docs/WEF\\_Digital\\_Transformation\\_Powering\\_the\\_Great\\_Reset\\_2020.pdf](https://www3.weforum.org/docs/WEF_Digital_Transformation_Powering_the_Great_Reset_2020.pdf)
- Young, A., & Rogers, P. (2019). A review of digital transformation in mining. *Mining, Metallurgy & Exploration*, 36, 683-699. <https://doi.org/10.1007/s42461-019-00103-w>
- Yukl, G. (2013). *Leadership in Organizations* (8th global Ed.). Edinburgh Gate, Harlow, England: Pearson Education Limited.
- Zaccaro, S. J., Kemp, C., & Bader, P. (2004). Leader traits and attributes. *The Nature Of Leadership*, 101, 124.
- Zhang, X., Li, N., Ullrich, J., & van Dick, R. (2015). Getting Everyone on Board: The Effect of Differentiated Transformational Leadership by CEOs on Top Management Team Effectiveness and Leader-Rated Firm Performance. *Journal of Management*, 41(7), 1898-1933. <https://doi.org/10.1177/0149206312471387>

## APPENDIX 1: INVITATION LETTER

Dear Sir/Madam,

I am a Master of Philosophy (MPhil) in Corporate Strategy student at the Gordon Institute of Business Science (GIBS) which is part of the University of Pretoria. I am conducting research exploring “**the influence of leadership capabilities on the successful implementation of digital transformation in the Zimbabwean PGM mining industry**”.

Digital transformation is expected to be a force of transformational change within the mining sector presenting an opportunity to increase safety, increase productivity, reduce cost and minimise carbon footprint. The research aims to identify the specific leadership capabilities that are key in making digital transformation as a success and delivering on its intended benefits resulting in a differentiated competitive advantage. This research will be conducted under the supervision of Dr Keith Fairhurst.

**The interview is voluntary and is expected to last approximately one hour.** All data from the interviews will be reported and stored without any identifiers thus ensuring full confidentiality is maintained.

No advance preparation is necessary as I would like to tap into your insights, thoughts and experiences related to the topic. This will help to understand what specific leadership capabilities need to be cultivated to result in successful digital transformation in the PGM industry.

Please could you electronically sign and return the attached Consent form that I require to evidence that I have your consent to carry out the interview.

If you require any further information, please do not hesitate to contact me on [20820012@mygibs.co.za](mailto:20820012@mygibs.co.za) or +263 772 292 163.

I look forward to meeting with you.

Kind regards

[Name removed]

## **APPENDIX 2: INTERVIEW GUIDE**

Name:

Organisation:

Start Time:

End Time:

Job Title:

Gender:

Age:

Thank you for accepting to do this interview. Your time and input into my research is greatly appreciated.

Digital transformation is expected to be a force of transformational change within the mining sector presenting an opportunity to increase safety, increase productivity, reduce cost and minimise carbon footprint.

As this phenomenon unfolds in the mining industry, limited academic research on the critical leadership capabilities that enable successful digital transformation is available. This study aims to identify and explore these critical leadership capabilities that are key in making digital transformation a success and delivering on its intended benefits across mining, processing and support functions.

You can be certain that the information you share will remain confidential and you will remain anonymous. You are free to withdraw at any time without penalty.

Before we start, I will take you through the interview consent form. I would also like to request your permission to record this interview, as well as take notes during the interview.

### **RQ1**

1. What do you understand the term digital leadership to mean in the mining industry?
2. What in your view is the current leadership style in the PGM mining industry? What influences that kind of style?
3. How important, in your view, is digital transformation for the PGM mining industry?

### **RQ2**

4. Based on your experience, how essential is the role of leadership in ensuring a successful digital transformation?
5. Could you describe attributes of what a digitally transformed version (or vision) of your organisation would look like in the future?

### **RQ3**

6. What capabilities or characteristics does a leader require to lead successful digital transformation? From your perspective, please rank the top 5 capabilities or characteristics in terms of importance.
7. How is your organization equipping leaders with skills to lead digital transformation?

### **RQ4**

8. Could you describe the extent to which your digital transformation agenda is shaped by your parent company strategy and decisions? (In other words, is it locally designed or a spill over from group?)

### APPENDIX 3: CONSISTENCY MATRIX

RESEARCH QUESTIONS	UNIT OF ANALYSIS	LITERATURE REVIEW (including specific paragraph number)	DATA COLLECTION TOOL (Semi Structured interview questions)	DATA ANALYSIS
<b>Research Question 1</b> What do leaders understand by digital leadership as well as the importance of digital transformation in the PGM mining industry?	Individual	2.3 Digital transformation 2.3.2 Importance of digital transformation 2.3.3 Benefits of digital transformation 2.4.4 Digital leadership	Questions 1-3 in questionnaire	Thematic analysis Categorisation Coding
<b>Research Question 2</b> How essential is the role of leadership in ensuring a successful digital transformation?	Individual	2.4.2 Leadership theory 2.4.3 Transformational leadership theory	Questions 4-5 in questionnaire	Frequency analysis Thematic analysis Categorisation Coding
<b>Research Question 3</b> What capabilities or characteristics does a leader require to lead successful digital transformation?	Individual	2.4.3 Transformational leadership 2.4.6 Leadership capabilities 2.4.7 Capabilities of the best digital leaders 2.4.8 Upskilling leaders	Questions 6-7 in questionnaire	Frequency analysis Thematic analysis Categorisation Coding
<b>Research Question 4</b> What role do multinational corporations play in their subsidiaries undergoing digital transformation?	Individual	2.5 Spillover perspective	Question 8 in questionnaire	Frequency analysis Thematic analysis Categorisation Coding

#### **APPENDIX 4: CODE BOOK FROM ATLAS.TI**

A blend or a combination of an authoritative and a collaborative leader

A conceptual thinker

A game changer

A proactive leadership has got a vision for understanding the kind of organization that it would want to run in the future

A strategic imperative

Ability to work with new concepts

Able to influence

Accountable for day-to-day operations

Achieving the right balance between digitally transforming operations and support functions

Adapt to new technologies

Adapt to the needs of the new workforce

Adaptable leader

Agility

Agility of our corporate, of corporates is now a key focus in terms of managing sustainability of our operations

Allow others to come in and assist

Articulate

Artificial intelligence, in terms of digital twinning

Authoritative

Authoritative and autocratic way of life is becoming less fashionable and accepted

Autocratic

Automated operations

Autonomous mining

Benchmarking

Benefits of digital transformation

Better decision making

Built in intelligent algorithms

Business value chain

Capacitate the vision as a leader

Capital cost reduction  
Capital management  
Chain of command driven- Leadership style  
Change management  
Change or die  
Chasing tails for another 5-10 years  
Collaborative  
Collaborative leader  
Communication  
Consult experts on your digital transformation journey  
Cost is what makes or breaks us  
Cost reduction  
Create time for implementing the digital technologies  
Curiosity  
Data analytics  
decisive leader  
Defaulting back to comfort zones  
Deliberately put digital skills on the board  
Dependable- Leadership trait  
Determination  
Digital assets  
Digital courses  
Digital leadership  
Digital skills  
Digital technologies  
Digital transformation  
Digital transformation agenda  
Digital transformation awareness  
Digital world  
Discussion at a leadership board level  
Do as I tell you  
Drive the organization towards adopting digital technologies

Drive your costs way down so that you remain competitive

Drives culture

Drives execution or implementation

Dynamic leader

Easier decision making

Embrace digital technology

Enhance skills so that people don't necessarily lose their jobs

Entrepreneurial leader

Environmental benefit of digital transformation

ESG

Exponential changes in technology adoption

Exposure of leaders to have an industry view of mining

Exposure to other operations and technologies

Extent and quality of the collaboration

Focus on operations

Focus on support functions

Gap that needs addressing

Go through formal training

Governed by specific law

Growth mindset

Hard wired kind of leadership

Have social intelligence skills

Helicopter or holistic view

High costs of new technologically advanced equipment

High level of education

Higher-level skill required

Highly collaborative

High-risk environment

Holistic- Leadership trait

Identifying an external partner who has already done it before

If metal prices go downward and you're not prepared then you won't survive

If you injure people or you kill people, you'll lose your license to o

If you're not empathetic you'll close the door on people coming in with ideas

Implemented technologies

Importance of digital transformation

Improve efficiencies

Improve productivity

Improve safety

Inclusive kind of leadership

Incremental implementation of digital transformation

Industrial relations challenges as a result of fear of redundancy

Initiative -leader trait

Innovative

Insightful

Inspirational

Integrate and then analyze all that information

Integration of digital technologies

Intelligent software's that are able to do your data analytics

Internet Age type of leader

Introduce new technology

It does not allow bottom-up discussions, it creates fear

It's the very survival of your business

Its top-down, it's very hierarchy centered

Just equipment and very few people underground

Keen to learn and unlearn

Knowing how to work with people

Lead in the adoption of digital technologies

Leader does not have to acquire new skills

Leader traits

Leaders have to develop new skills

Leaders need to lead by example

Leadership

leadership and the management has got to be bolstered

Leadership development

Leadership has got to be leading from the front  
Leadership is now realizing that they've to start to be proactive  
Leadership is still hierarchical  
Leadership of the future  
Leadership ownership of the urgency around the digital world that we see ourselves in  
Leadership skills  
Leadership starts at a board level  
Leadership style  
Leadership style influences  
Leadership that fully understands what you want to do  
Leadership traits  
Listening skills  
Locally shaped digital transformation agenda  
Longer asset or equipment life  
Low level of education  
Lower management levels  
LTE technology which will allow the communication backbone  
Malleability  
Managing in the digital era  
Managing the operations  
Managing tools  
Metal prices are market driven  
Military approach  
Millennials  
Mine design  
Mine planning  
Minimum qualification  
Mining software  
Mining value chain  
Modernizing your organization  
More efficient  
New concepts

OEMs

Open minded

Operations will be controlled from surface

Organizational structure

Parent company driven

People skills

People will feel threatened that their jobs are going

Persistence

Piecemeal approach versus big bang approach to digital transformation

Predictive maintenance becomes key

Process optimization and process automation

Production down time as result of safety incidents

Productivity leader

Put is as part of a KPI on our corporate scorecard

Real business value

Reduce human error

Reduced headcount

Reduced maintenance cost

Reduced property or asset damage

Reduced tolerance for safety injuries

Reduction in capital expenditure costs

Reduction in operating costs

Remain in the lower cost quartile

Remote operation of mining fleets

Remove human interface

Research and development committee to drive digital transformation agenda

Resilience- Leadership traits

Resourcing or funding the vision

Retraining and training of new technologies or operators for them to be able to run the particular technology

Return on investment

Rigidity

Risk management in the mining industry

Risk-taking ability has to be high

Robotics

Rock cutting technology

Sabotage the change process

Safety

Second industrial revolution type of era with the quality and status of our technology

Seeing way above the clouds

Self-awareness- Leadership trait

Self-confident

Should be tolerant

Single man bolter

Skill sets

Skills development approach has to change

Skills gap analysis

Slow technological adoption by mining industry

Sociable

Social licence to operate

Social-intelligence

Someone who can easily bend, someone who can easily stretch

Stakeholder management ability

Stakes are so high

Structured approach to digital transformation

Support functions

Sustainability of the PGM industry

Systems thinking ability

Tagging and tracking

Technical skills

Technological assets

Technological teething problems

Technology is now front and center of everything that we do

Technology reliability

Tenacity- leadership trait

The market is changing

The more digitized mines are profitable

There is no choice

Top-down type of management style

Traditional leadership style

Transact in the modern world

Transactional leadership

Transformational change

Transformational leader

Transformational leadership

Transformative leadership style

Trustworthy

Uncoordinated

Use it to approve documents

Versatile leader

very few leaders who don't understand that technology is here to stay

Very little educational background

Very strong relationship between the tech services arm and the mining arm

Viable technologies

Vision

Vision of the future mining organisation

Visionary

Visionary leader

Volatility of metal prices in this era that we are in

VUCA environment

Whole load and haul cycle has been turned autonomous

Willingness to change

You can have the best technology but if the human being is not being trained adequately, it's still going to fail sorry

You can substitute platinum with palladium

You can't run a mine without those technical services technologies

You must have the right mix of skills

You need to be able to conceptualize

You will now need a higher skill set even for supervision

You would want conceptual skills

You've got to be an absolutely amazing communicator