

**Big data analytics as a dynamic capability to enhance customer value
management for sustainable competitive advantage**

Abongile Qwabe

13405170

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 Business Administration

01 December 2020

Abstract

Big data analytics is unlocking business value by allowing data-driven decision making and enhanced responsiveness. Moreover, competencies in big data analytics are considered important in understanding market behaviour and adding to differentiation. However, despite this promise, it is still uncertain how big data analytics competency can be utilised as a dynamic capability to address an ever-changing environment. Absent is the strategic alignment, full embedment of the big data analytics competence in a manner appropriate to adapt, integrate, and reconfigure internal and external organisational skills, resources, and functional competencies to match the requirements of a changing environment.

This study set out to uncover how big data analytics can be leveraged as a dynamic capability to enhance customer value management for a sustainable competitive advantage. Data was gathered through 15 semi-structured interviews with subject matter experts from South Africa's four major mobile network operators. Analysis of the qualitative interview data provided insights into how mobile network operators are embedding big data analytics competencies to enhance customer value management, the factors contributing to the effectiveness of big data analytics competencies as a dynamic capability, and how big data analytics is used for differentiation and competitive advantage. This research confirmed that there is a deep understanding of the value big data analytics competencies holds for MNOs, however, human capital assets are also key to harnessing these competencies for competitive advantage. Interestingly, though, it was evident that the technology itself is ineffective and a key role is played by the human capital that handles this data to realise its value as a dynamic capability.

Keywords

Dynamic capabilities, big data analytics, customer value management, maturity, targeted propositions, competitive advantage

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 Business Administration 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.

Abongile Qwabe

01 December 2020

Table of Contents

Abstract	ii
Keywords	ii
Declaration.....	iii
List of Abbreviations.....	x
List of Figures	xi
List of Tables	xii
Chapter 1: Introduction to the Research Problem.....	1
1.1 Background	1
1.2 Description of the research problem	3
1.3 Purpose of the research	4
1.4 Relevance and motivation for the research.....	5
1.5 Scope of the research.....	5
1.6 Conclusion.....	6
Chapter 2: Literature Review.....	8
2.1 Introduction.....	8
2.2 MNOs in South Africa	9
2.3 Dynamic capabilities	10
2.4 Customer value management.....	11
2.5 Sustainable competitive advantage	14

2.6	Big data analytics	15
2.6.1	Big data analytics as a dynamic capability	16
2.6.2	Big data analytics and customer value management	17
2.6.3	Big data analytics and competitive advantage	18
2.6.4	Big data analytics and strategic decision making	19
2.6.5	Big data analytics and the human element	20
2.6.6	Big data analytics in understanding customer behaviour	21
2.6.7	Big data analytics and the changing business environments	22
2.6.8	Maturity of big data analytics.....	23
2.7	Conclusion.....	24
Chapter 3:	Research Questions.....	25
Chapter 4:	Research Methodology	27
4.1	Introduction.....	27
4.2	Research methodology and design	27
4.3	Population.....	29
4.4	Unit of analysis	29
4.5	Sampling method and sample size	30
4.6	Measurement instrument	30
4.7	Data collection and analysis	32
4.8	Data storage	34

4.9	Quality controls	34
4.10	Research limitations	36
4.11	Conclusion	36
Chapter 5:	Presentation of Results	37
5.1	Introduction.....	37
5.2	Description of the sample	37
5.3	Description of the interviews	39
5.4	Data collection and measurement	40
5.5	Findings for research question 1.....	41
5.5.1	Organisation’s big data analytics competence	42
5.5.2	How big data analytics competence enhances customer value management	43
5.5.2	Summary of findings for research question 1	45
5.6	Findings for research question 2.....	46
5.6.1	Big data analytics competencies for opportunity realisation in customer value management	47
5.6.2	Using big data analytics for long-term competitive advantage	51
5.6.3	How big data analytics competence tackles the rapidly evolving environment.....	54
5.6.4	Summary of findings for research question 2	56
5.7	Findings for research question 3.....	57

5.7.1	Value delivered to the customer through big data analytics competency	58
5.7.2	How big data analytics competence is embedded within the organisation.....	62
5.7.3	Differentiation through big data analytics competence	65
5.7.4	Ease of replication of big data analytics competencies by competitors 67	
5.7.5	Summary of the findings for research question 3.....	70
5.8	Conclusion.....	72
Chapter 6:	Discussion of Results	73
6.1	Introduction.....	73
6.2	Discussion of results for research question 1	73
6.2.1	Organisation’s big data analytics competence	73
6.2.2	Targeted propositions	74
6.2.3	Personalisation and understanding customer behaviour.....	75
6.2.4	Summary of discussion for research question 1.....	75
6.3	Discussion of results for research question 2	76
6.3.1	Big data analytics competencies in realising opportunities for customer value management.....	76
6.3.2	The long-term competitive advantage using big data analytics capabilities.....	79
6.3.3	Big data analytics competencies tacking the rapidly evolving environment.....	80

6.3.4	Summary of discussion for research question 2.....	82
6.4	Discussion of results for research question 3	82
6.4.1	Customer value proposition	83
6.4.2	Organisational resources and capabilities.....	84
6.4.3	Unique big data competencies.....	85
6.4.4	Replicability of big data competencies	86
6.4.5	Summary of discussions for research question 3.....	86
6.5	Conclusion.....	87
Chapter 7:	Conclusion and Recommendations.....	88
7.1	Introduction.....	88
7.2	Principal findings	88
7.2.1	Big data analytics competencies for customer value management ...	88
7.2.2	Harnessing big data analytics competencies as a dynamic capability 89	
7.2.3	Embedding big data analytics for sustainable competitive advantage 89	
7.3	Proposed framework.....	90
7.4	Recommendations for managers.....	91
7.5	Recommendations for future research.....	92
7.6	Limitations of the research.....	92
7.7	Conclusion.....	93

Reference List	94
Appendices.....	107
Appendix 1: Interview consent form	107
Appendix 2: Ethics approval	108
Appendix 3: Invitation email to participate in the study.....	109
Appendix 4: Non-disclosure agreement proforma	110
Appendix 5: Consistency matrix.....	111
Appendix 6: Atlas.ti codebook.....	112

List of Abbreviations

BDA	Big Data Analytics
CRM	Customer Relationship Management
CRO	Conversion Rate Optimisation
CVM	Customer Value Management
MNOs	Mobile Network Operators
OTT	Over the Top
Telcos	Telecommunications
VUCA	Volatility, Uncertainty, Complexity, Ambiguity

List of Figures

Figure 1: Evolving relationship between data and strategy.....	20
Figure 2: Big data analytics competency in enhancing customer value management	42
Figure 3: How big data analytics competencies enhance customer value management	43
Figure 4: Graphical summary of the findings of research question 1	46
Figure 5: Big data analytics competencies enabling opportunity realisation for customer value management	47
Figure 6: Long-term competitive advantage brought about by big data analytics competencies	51
Figure 7: How big data analytics competence tackles the rapidly changing environment	54
Figure 8: Graphical summary of the findings of research question 2	57
Figure 9: Value delivered to customers by big data analytics competencies	58
Figure 10: Themes of big data analytics uses and how they are embedded in the organisation.....	63
Figure 11: Themes influencing organisational differentiation	66
Figure 12: Key themes on how easily big data competencies can be replicated by competitors.....	68
Figure 13: Graphical summary of the findings of research question 3	71
Figure 14: Big data analytics as a dynamic capability model	91

List of Tables

Table 1: Differences between customer value management and customer relationship management	12
Table 2: Mapping of the research questions with interview questions	31
Table 3: Participant information and context	38
Table 4: Overview of big data analytics maturity levels	43
Table 5: Overview of how big data analytics capabilities enhance customer value management	44
Table 6: Overview of themes of how big data analytics enables opportunity realisation for customer value management	48
Table 7: Overview of themes identified for how big data analytics competencies bring about long-term competitive advantage	51
Table 8: Overview of how big data analytics competence tackles the rapidly changing environment	54
Table 9: Overview of how big data analytics competencies drive value	58
Table 10: Overview of factors influencing embedding of big data analytics competencies	63
Table 11: Overview of themes on how big data analytics competencies allow differentiation	66
Table 12: Overview of how easily big data competencies can be replicated by competitors	68

Chapter 1: Introduction to the Research Problem

1.1 Background

The future will require mobile network operators (MNOs) to digitally transform and use big data analytics to enable proactive interventions (Baroudy, Kishore, Nair, & Patel, 2018; Chen, Preston, & Swink, 2015; Hung, Yen, & Wang, 2006). MNOs will also have to adjust automatically as demand changes (Frisiani, Jubas, Lajous, & Nattermann, 2017). Currently, MNOs have large amounts of data available to them, allowing analysis of big data to be used as a tool that aids CVM. Sustainable competitive advantage is achieved when an organisation creates economic value that is greater than that of peripheral organisations within the sector (Chen et al., 2015; Kitchens, Dobolyi, Li, & Abbasi, 2018; Vidgen, Shaw, & Grant, 2017). Kitchens et al. (2018) suggest that market dominance is accomplished by executing competitive strategies that empower organisations to gain and maintain a sustainable competitive advantage.

It is believed that organisations which carry on exclusively using traditional business tools and strategies cannot keep up with developments in rapidly changing environments (Mazzei & Noble, 2017; Tsai, Lai, Chao, & Vasilakos, 2015). According to Mdluli and Makhupe (2017), volatility, uncertainty, complexity, and ambiguity are experienced within the business environment, also referred to as the 'VUCA vortex' (p.5). Beer, Voelpel, Leibold and Tekie (2005) also suggest that the contemporary environment of business is characterised by rapid changes (p. 5). This 'vortex', as termed by Mdluli and Makhupe (2017) has eliminated more than half of the Fortune 500 organisations since the year 2000, while the surviving organisations have been identified to leverage off big data analytics (Millar, Groth, & Mahon, 2018). Erevelles, Fukawa and Swayne (2016) confirm that big data analytics is a form of capital. It creates a competitive advantage as it facilitates decisions based on data, allowing managers to align strategies to the market. Additionally, successful organisations base decisions on data-driven through rigorous analytics (Lavelle, Hopkins, Lesser, Shockley, & Kruschwitz, 2010).

Big data analytics has emerged as a tool which can be utilised to enable and enhance customer value management (CVM) using customer analytics. MNOs have drafted

visionary plans to implement big data analytics as a digital transformation strategy to gain a better sustainable competitive advantage (Schoemaker, Heaton, & Teece, 2018), especially since MNOs share customers among themselves with differentiating factors being service quality and customer value offered (Asghari, Yousefi, Niyato, Min, & Wan, 2017; Ghezzi, Cortimiglia, & Frank, 2015).

Interestingly, resource allocation has resulted in big data analytics being deployed to infrastructure improvement (Henke & Kaka, 2018). However, little has been done in integrating the analytics of big data as a customer analytics tool for CVM (Fiedler, Grobmab, Roth, & Vetvik, 2016). Customer analytics has been reported to be decreasing over the years in the context of CVM (Fiedler et al., 2016). Some authors have found this to be disconcerting as CVM has proved to be generating a lot of user data that can be harnessed for better service differentiation (Chaudhry & Tewari, 2006; Verhoef & Lemon, 2013). Gandomi and Haider (2015), Sheng, Amankwah-Amoah, and Wang (2017) indicate that sensing and sorting data has been a major challenge for many MNOs, and big data analytics deployment within CVM is purported as less important and not worth prioritising (Fiedler et al., 2016). This seems to be the case despite big data analytics being perceived as a tool that can sort data faster, easier, and more efficiently than using mere mathematical models (Aluri, Price, & McIntyre, 2019; Najafabadi et al., 2015). Consequently, some of South Africa's MNOs are struggling to maintain a competitive advantage even though their strategic goals are geared towards becoming customer-centric businesses.

Theoretically, many MNOs can successfully exploit big data analytics, given the amount and quality of data at their disposal, to enhance their CVM (Côte-real, Ruivo, & Oliveira, 2019). Verhoef and Lemon (2013) suggest that organisations which adopt a customer-centric approach to their CVM and are willing to invest in big data analytics have gained a sustainable competitive advantage. Big data analytics is a tool that can place the customer as the co-creator of value, knowledge, and competencies (Landroquez, Castro, & Cepeda-Carrión, 2011). Considering both the theoretical advantages big data analytics can provide organisations with, and the challenges experienced by many MNOs, there is a need to understand how to harness big data analytics efficiently as a dynamic capability to enhance CVM for sustainable competitive advantage.

1.2 Description of the research problem

Maynes and Rawson (2016) highlight the impact big data analytics can have on CVM. However, the reality is that big data analytics, concerning CVM, is not prioritised by many organisations. This results in a CVM process that is tedious and has a large inventory of unsorted data. It also does not address the potential of a major and positive impact on having an effective process that makes achieving sustainable competitive advantage easier, whereby most business units can make unilateral decisions, which can automatically be beneficial to organisational profitability and sustainable competitive advantage.

However, Chen et al. (2015) suggest that CVM utilises more often the omnichannel approach of data gathering, which needs the collaboration of various business units within the organisation and takes the form of more segmented decision-making. This makes using conventional tools restrictive, making big data analytics necessary for integrating all functions of the organisation and continuous development. Currently, big data analytics is viewed as a key differentiator between well-performing and underperforming organisations and also improving sustainable competitive advantage (Wamba et al., 2017). Carroll and Guzman (2015) also note how a big data analytics tool can make customer analytics easier. While CVM is viewed as an organisation's source of sustainable competitive advantage, the big data analytics tool is not fully utilised as a dynamic capability within MNOs. Traditional analytical methods such as data mining and warehousing are still being used widely (Hung et al., 2006; Tsai et al., 2015). It has been evidenced from existing studies that big data analytics, as a dynamic capability, could enhance sustainable competitive advantage, but such literature is still scarce (Mikalef, Krogstie, Pappas, & Pavlou, 2020).

From a theoretical perspective, there still is a lack of understanding within organisations on how big data analytics can be leveraged as a capability to generate sustainable competitive advantage, specifically within MNOs (Johnson et al., 2017; Martens et al., 2016). Thus, there was a need for a further hermetic process of correlating themes such as dynamic capabilities, big data analytics, and CVM to justify integration as a method of realising sustainable competitive advantage. From a business perspective, it has been identified that the use of big data analytics allows

data-driven decision capabilities which improve organisational performance and that organisations are more willing to take non-traditional routes through analytics (Mazzei & Noble, 2017) however, there is still concern on how big data analytics competencies can be integrated into organisations effectively. Also, measuring client perceptions of business operations has become a vital tool for appropriate product development and refinement. Therefore, there is a need for MNOs to understand how to effectively incorporate big data analytics into their customer-based businesses, and thereby enhance their competitive advantage.

This study adds value to the existing body of knowledge regarding two specific aspects: (1) big data analytics has been recognised as a dynamic capability that enhances CVM; and (2) CVM is identified as a method of enhancing the organisational sustainable competitive advantage.

Dynamic capability can act as a capacity to renew big data analytics competencies in order achieve congruence with the changing business environment; certain innovative responses are required when time-to-market and timing are critical, the rate of technological change is rapid, and the nature of future competition and markets difficult to determine in the MNOs (Bitencourt, de Oliveira Santini, Ladeira, Santos, & Teixeira, 2020).

1.3 Purpose of the research

This research focuses on understanding the role of big data analytics as a dynamic capability and how it can be utilised to enhance CVM for the sustainable competitive advantage of South African MNOs. Hence, this study aimed to understand the role of big data analytics as a dynamic capability to enhance CVM for sustainable competitive advantage. The following research questions were formulated for this study:

Research question 1: How do MNOs use their big data analytics competence to enhance customer value management?

Research question 2: How do MNOs turn big data analytics competence into a dynamic capability?

Research question 3: How do MNOs embed big data analytics competence to lead a sustainable competitive?

1.4 Relevance and motivation for the research

MNOs within South Africa is transforming rapidly, and with increased competition among each other, they are continuously having to keep up with customer switching behaviour (Esselaar, Gillwald, & Stork, 2006; Morgan & Govender, 2017). CVM is becoming increasingly important for MNOs (Di & Hoon, 2016) as a foundation for attaining and retaining a sustainable competitive advantage, customer retention, loyalty and improved business performance. New markets have also been identified to emerge from investing in customer value (Balboni & Terho, 2016). New markets are being created by organisations being able to offer differentiated product ranges. To achieve such product differentiation and ensure customer value, MNOs require real-time documentation and analysis of user data to ease their decision-making (Banerjee, 2013a). This can be achieved using big data analytics to leverage and exploit customer data, which becomes a key for sustainable competitive advantage (Banerjee, 2013b). However, while big data analytics is correctly viewed as a tool used for attaining a sustainable competitive advantage, there is still a knowledge gap within organisations regarding their challenge as to the manner in which to effectively exploit the medium (Martens et al., 2016). Hence, there is a need for research to establish how big data analytics, as a dynamic capability, can enhance CVM, enabling MNOs to gain a sustainable competitive advantage, and establish a more data-driven culture to leverage big data analytical capabilities (Gupta & George, 2016).

This study is of significance to South African MNOs in that it offers insights into the potentially beneficial dynamic capability of big data analytics for CVM. After the successful deployment of big data analytics, MNOs should then be able to enhance their CVM in such a way that allows them to achieve sustainable competitive advantage.

1.5 Scope of the research

This study considers the South African Telecommunications (Telcos) sector, exploring management's perceptions regarding the utilisation of big data analytics to

enhance CVM, and increasing the learnings about integrating big data analytics into CVM practices for enhanced customer value. As discussed above, big data analytics remains a tool that is underutilised in customer analytics and if exploited fully, it should enable organisations to attain and retain a competitive advantage. This sector was selected based on a few considerations:

- a) The perceived high use of digital technology, which makes it a suitable artificial intelligence (AI) adopting sector (Banerjee, 2013a; Henke & Kaka, 2018);
- b) The high merits, if recognising the importance of customer-centricity as the centre of focus driving business strategies in rapidly changing economies (Mdluli & Makhupe, 2017; Millar et al., 2018; Rust & Zahorik, 1993; Schoemaker et al., 2018);
- c) The realisation of a rapidly changing environment is a potentially detrimental phenomenon, which may lead to the loss of market share and value (Chaudhry & Tewari, 2006; Verhoef & Lemon, 2013);
- d) The efforts to implement dynamic capabilities throughout business units, as well as being a sector with a treasure trove of structured and unstructured customer data that can be used to gain a competitive advantage (Banerjee, 2013a).

Collectively, this study offers MNOs beneficial information on both realised and yet unrealised capabilities of big data analytics. Additionally, it guides the implementation strategies of big data analytics that may need reconfiguration. The scope is ring-fenced around management's perceptions of selected industries and mostly speaks to endogenous factors that govern MNO business operations.

1.6 Conclusion

It is evidenced in the literature that dynamic capabilities offer the organisations the ability to adapt and compete in a volatile environment. Based on findings from Carroll and Guzman (2015) big data analytics tool can make customer analytics easier, hence MNOs are looking to big data analytics as a means to enhance CVM. However, there is still limited knowledge of how big data analytics can be used as a dynamic capability to enhance CVM. Given the research problem and literature studied, gaining a deeper understanding of how MNOs can use big data analytics competencies as a dynamic capability can advance their operational performance.

Findings obtained from this research could potentially offer deeper insights on how organisations can embed big data analytics competencies, and how to use these competencies as a dynamic capability to enhance customer CVM and sustainable competitive advantage.

This dissertation is arranged as follows: Chapter 2 presents the relevant theory relating to dynamic capabilities, big data analytics, CVM and sustainable competitive advantage. Chapter 3 describes the research questions that this study aims to answer, while Chapter 4 details the research methodology used in this research project, methodology choice, population, sample method and size, unit of analysis, data gathering process as well as the limitations of the study. The findings of this study are presented in Chapter 5 and discussed in Chapter 6 in relation to literature. Finally, Chapter 7 elaborates on the conclusive findings of the study and also provides recommendations for future research.

Chapter 2: Literature Review

2.1 Introduction

Over the past few decades, organisational strategies have been shifting from a product-centric point of view to a customer-centric view (Verhoef & Lemon, 2013). To respond to and leverage customer satisfaction, experience, and retention, efficient CVM processes have to be created to purposefully enhance operations through the use of customer input (Chaudhry & Tewari, 2006; Verhoef & Lemon, 2013). The onset of digital transformation and big data analytics has affected how the various processes, systems, or strategies are used (Schuchmann & Seufert, 2015). Additionally, the launch of big data analytics has made organisations realise that it is a vital dynamic capability to be adopted and deployed into its functionality and operationality (Landroquez, Castro, & Cepeda-Carrión, 2011). As a consequence, many MNOs that hold or have access to a lot of customer data, have deployed big data analytics within their various business units, including finance and expenditure, and most importantly, CVM (Chen et al., 2015; Mikalef, Krogstie, & Giannakos, 2018; Wamba et al., 2017). MNOs have also started to embark on CVM projects, and some have deployed big data analytics within their operations (Asghari et al., 2017; Ghezzi et al., 2015).

However, significantly more insight on combining big data analytics as a possible dynamic capability, and the impact on CVM is needed. This defined the gap in the literature and the need for this study. Interestingly, although some MNOs embark on customer-centric strategies and funding CVM, their big data analytics has been poorly integrated into CVM. This exists despite the big data analytics being regarded as a powerful sensing and analysing tool with faster turnaround times than analogue and manual tools (Fiedler et al., 2016).

In this study, dynamic capability theory is the underpinning theory utilised for the context of this study. The review defines and explores three main areas of concern, namely big data analytics, dynamic capabilities (Helfat & Peteraf, 2015; Teece, Pisano, & AMY Shuen, 1997; C. Wang & Ahmed, 2007; Winter, 2003; Zahra, Sapienza, & Davidsson, 2006), CVM (Chaudhry & Tewari, 2006; Verhoef et al., 2007), and sustainable competitive advantage (Kitchens et al., 2018; Kotler, 2017; Payne & Holt, 2001), based on the research problem and goal outlined in Chapter 1,

and their relevance to theoretical themes, their linkages, and their integration as a foundation for this study.

2.2 MNOs in South Africa

MNOs in South Africa survive in an oligopolistic market (Theron & Boshoff, 2006). The sector is highly competitive and dominated by four major operators. This is a significant achievement as there is a notion that reaching four or five operators in a national market is rare due to the high level of competition involved. Amongst these four major competitors, there is a continuous ‘tug of war’ to scout for new customers and achieve customer loyalty, while at the same time, gateways to access have been eased (Sutherland, 2011). Oligopolistic markets have structures that enable to synchronised effects, aiding operators to be cognisant of similar interests and allowing them to predict the behaviour of others (Theron & Boshoff, 2006). From data extracted in annual reports of such MNOs, market share has been shared by the four major MNOs, with a potential threat for some MNOs that they will be decreasing their market share over time, while other MNOs may increase their market share (ICASA, 2019). Over the top, (OTT) operations have emerged as a huge threat to the survival of MNOs in South Africa as well as across the globe (Shanapinda, 2019). Within South Africa, the protection of personal information act has added significantly to the challenges experienced by MNOs and the even more competitive landscape they operate in (Esselaar et al., 2006; Morgan & Govender, 2017; Shanapinda, 2019).

Due to the increased competitiveness, South African MNOs have been moving towards the digital economy as a means of gaining better and more sustainable competitive advantage (Shanapinda, 2019). MNOs are focusing on providing the best customer experience, and growth of their market share, through data and digital means to provide a range of innovative and reliable products and services. However, MNOs face challenges in evaluating the effectiveness of big data analytics as there is no ‘one-size-fits-all’ approach (Walker and Brown, 2019). Different customer-oriented strategies are seen among MNOs (Malaka & Brown, 2015). Additionally, CVM is becoming a more important measure of sustainable competitive advantage, as seen by the emergence and growth in the number of job posts related to CVM. At the same time, however, seemingly it is only recently that these organisations are embracing data-driven strategies and using big data analytics. Although all the major

South African MNOs have implemented a customer-focused strategy, the effective integration of big data analytics with CVM to enhance a sustainable competitive advantage is still lacking.

2.3 Dynamic capabilities

The current business environment has been described as being fast-paced, volatile, and unpredictable (Mdluli & Makhupe, 2017; Beer, Voelpel, Leibold, & Tekie, 2005), requiring organisations to possess dynamic analytic capabilities, and several postulates of dynamic capabilities have been made (Eisenhardt & Martin, 2000; Helfat & Peteraf, 2015; Pisano, 2017; Teece et al., 1997; Wang & Ahmed, 2007). Pisano (2017) broadly defines an organisation's dynamic capabilities as the "capacity to reconfigure and extend their competencies" (p. 748), referring to the ability of an organisation to respond to environmental changes (Erevelles et al., 2016). Erevelles et al. (2016) point out that organisations that leverage customer insights, utilising big data to understand and respond to changing consumer needs, enhance their dynamic capability.

There also has been growing interest growing in understanding and predicting the connection between dynamic capabilities and competitive advantage. Many studies show that dynamic capabilities contribute to organisational performance and sustainable competitive advantage, especially in volatile environments (Li & Liu, 2014; Lin & Wu, 2014; Osioma, Nzewi, & Mgbemena, 2016; Wu, 2010). Dynamic capabilities oppose the philosophy of resource-based view that markets are stagnant (Teece et al., 1997). Teece (2007) explained that dynamic capabilities can explain the sources of competitive advantage over time and can adapt to changing technology and customers. Also, Li and Liu (2014) regarded the role of sense-making, real-time decision-making and management of change as capabilities that are essential for competitive advantage and performance. According to Teece (2007), this can be achieved by:

- a) Sensing and shaping threats and opportunities by exploring markets and technologies;
- b) Seizing opportunities through integration and interpretation of information, and

- c) Transforming and maintaining a competitive advantage through the creation, renewal, or reconfiguration of the organisation's capabilities in alignment with organisational strategies.

Teece et al. (1993) suggested that a competitive advantage can be achieved through organisational resources and the growth of these resources by identifying new opportunities. Furthermore, the capability of the organisation to effectively respond to opportunities, and in doing so, create new value (Erevelles et al., 2016) is necessary when aiming to achieve sustainable competitive advantage. Additionally, it can be asserted that dynamic capabilities are a principle cause of outstanding performance and future initiatives.

According to Teece (2007), some researchers view dynamic capabilities as an extension of resource-based theory while others view it as a stand-alone model. This research aligns with the notion that dynamic capability accentuates the value derived from resources such as big data analytics, hence is an extension of resource-based theory.

MNOs in South Africa operate in a dynamic business environment, which is influenced by customer needs and technological adaptation. Given that MNOs compete in a highly competitive and saturated market (Millar et al., 2018), this opens up an avenue for profit margins to decrease as a result of increased competition. The dynamic capability (as a source of competitive advantage) construct is thus of particular relevance to this study especially because the Telcos industry is dominated by ever-changing customer needs and markets.

2.4 Customer value management

Every organisation in today's business environment is focusing on the customer. However, what's lacking are useful ways to capture customer needs. CVM and Customer Relationship Management (CRM) are two customer-focused concepts adopted by organisations for enhancing sustainable competitive advantage and customer satisfaction. Though used interchangeably sometimes, CVM is distinctively different from Customer Relationship Management. Verhoef, Doorn, and Dorotic (2007) defined CVM as the optimisation of an organisation's customer-base value by analysis of individual data on prospects and customers. The focus, approach,

customer expectation, type of service offered and metric are different as outlined in Table 1.

Table 1: Differences between customer value management and customer relationship management

	CVM	CRM
Focus	Profitability via targeted product proliferation (Kotler, 2017; Mccarthy, Fader, & Hardie, 2017)	Customer retention via increased relationship building with the customer (Jelonek, 2015)
Metric	Product/service offers (Kotler, 2017; Payne, Frow, & Eggert, 2017)	Customer feedback (Jelonek, 2015)
Strategic approach	Data-driven (Chaudhry & Tewari, 2006; Verhoef & Lemon, 2013)	Data-driven, face to face interaction, digital interaction, telephonic (Jelonek, 2015)
Customer expectation	Enhanced customer value	Enhanced customer experience

According to Verhoef et al. (2007), customers should be considered as assets of an organisation that can be “cultivated and activated” (p. 52). Nearly all organisations in today's business environment are focusing on their customers. However, most of these organisations do not possess useful ways to capture customer needs. CVM can be considered as a learning system to improve customer strategies, which will elevate their existing strategies. Through the use of effective CVM, organisations can enhance their customer value (Verhoef et al., 2007). As organisations adopt CVM, several new opportunities are enabled for them to (1) satisfy existing customers with personalised end-user experiences; (2) retain existing and reclaim lost customers; (3) explore new markets and options that will attract new end-users, and (4) leverage on their gained sustainable competitive advantage within their sector.

In response to the fast-changing customer demands, MNOs in the digital world, customer value, and customer focus have all expanded beyond the original face-to-

face marketing of products, and now encompass additional customer-driven incentives, from the creation of customer-driven services to product proliferation (Mdluli & Makhupe, 2017; Millar et al., 2018; Schoemaker et al., 2018). Combined with the high usage of mobile devices and increasing data traffic, the gathered and analysed customer data is an important asset from which organisations stand to be able to extract innovative ideas to create sustainable competitive advantage. Many MNOs are evolving their business models to enable them to utilise this data and enhance the customer experience and value (Asghari et al., 2017; Baroudy et al., 2018; Ghezzi et al., 2015). Studies such as the research conducted by Fiedler et al. (2016) indicate that investments into customer analytics infrastructure introduce promising insights into a critical decision-making tool.

In the frontline of pioneering customer data analysis is CVM. CVM not only creates a new paradigm upon which organisational strategies can be founded but also comes as an effective decision-making tool for managers (Chaudhry & Tewari, 2006; Verhoef & Lemon, 2013). Verhoef et al. (2007) outlined a conceptual framework, which established that an organisation's value is enhanced through its customer value. The framework indicated that organisational strategies for a customer-centric business are derived from extensive customer data and the analysis thereof, a possible indication of the inclusion of big data analytics as a capability within organisations allows the customer to value-add – a possible reason for sustainable competitive advantage.

Also, organisations need to develop a set of key performance indicators that suit their strategy to maintain a competitive edge in the field of creating consumer value. It may be a source of competitive advantage to have consumer insight, but the company may also be at considerable risk. Within CVM, silos are the major deterrents to competitiveness (Kitchens et al., 2018) and CVM is made unsuccessful without a structured means of managing comprehensive customer information and accessing the data (Kitchens et al., 2018; Verhoef & Lemon, 2013). Consumer information lies in various segments that preclude MNOs from getting a holistic perspective, hence big data analytics was described as an enabler of competitive advantage. This phenomenon would be explored in detail under section 2.6.

2.5 Sustainable competitive advantage

Today's business environment has become very competitive (Mdluli & Makhupe, 2017; Schoemaker et al., 2018). MNOs are placed within a sector wherein some organisations offer similar products, hence need niche adjustments to win customers (Millar et al., 2018). The uniformity of services offered by MNOs makes standing out amongst other organisations a challenge. Differentiation among organisations is created by designing sustainable competitive advantage strategies that are unique to the organisation and which cannot be duplicated (Kitchens et al., 2018; Ostrander, 2018).

According to Kotler (2017), Payne and Holt (2001), CVM can be used as a tool to gain a sustainable competitive advantage. CVM is designed to accurately pinpoint the factors that drive and influence customer value by using comparative and thematic methods of analysis of both the target market and as well as competitors. The realisation of sustainable competitive advantage within an organisation enhances the costs, value and focus of the organisation (Ostrander, 2018). Under costs, businesses compete for customers based on pricing. While Maynes and Rawson (2016) provide the notion that customer-targeted services are identified by customers to be of superior value, superior value is created by co-creation and co-development of products and services using customer input (Landroquez et al., 2011; Maynes & Rawson, 2016; Payne & Holt, 2001) – which could be linked through big data analytics. Throughout, it has been recognised that customer-centric focused strategies are gaining more sustainable competitive advantage (Maynes & Rawson, 2016; Schoemaker et al., 2018; Schuchmann & Seufert, 2015; Verhoef & Lemon, 2013).

First-mover or fast-follower strategies, which aims to gain market domination and create customer value have also become key for a competitive advantage over recent years (Chen, Reilly, & Lynn, 2005). Speed-to-market plays an integral role in realising CVM opportunities and to attain competitive advantage. According to Chen et al. (2005) the capability of an organisation to move from ideas to the actual delivery of products or services in the market place increases competitive advantage and customer retention.

Among some MNOs, two strategies are identified to exist that ensure a sustainable competitive advantage after customer focus is implemented to realise value. The first strategy refers to the organisation having a dominant market share, based on its organisational reputation and maturity; while the second strategy refers to market movers who dominate the market by utilising cost strategies, for example, reduced costs to captivate more customers. Another source of a sustainable competitive advantage besides CVM is the use of big data analytics (Kitchens et al., 2018; Mikalef et al., 2020; Opresnik & Taisch, 2015a).

2.6 Big data analytics

The formal definition, provided by Mikalef et al. (2020), is that big data analytics is “a new generation of technologies and architectures, designed to economically extract value from very large volumes of a wide variety of data, by enabling high-velocity capture, discovery and/or analysis” (p. 2). Similarly, Wamba et al. (2017) define big data analytics as a holistic approach to managing, processing and analysing volume, variety, velocity, veracity and value to create actionable ideas for delivering sustained value, measuring performance and establishing competitive advantages (Wamba et al., 2017). The sentiment is shared by Chen et al. (2015); Mikalef et al. (2018); and Sheng et al. (2017) which state that big data analytics is a complex tool that is adopted to uncover valuable information, through the use of a structured and unstructured data by uncovering hidden patterns (Gandomi & Haider, 2015; Lee, 2017; Najafabadi et al., 2015). Hence, big data analytics is increasingly being adopted by organisations for the sole purposes of making operations and decision-making processes simpler and faster. Driven by complex software and algorithms, big data analytics offers various organisational benefits like:

- a) New revenue options (Banerjee, 2013a)
- b) Robust and effective marketing (Kitchens et al., 2018; Sheng et al., 2017)
- c) Better customer service and real-time capabilities (Aluri et al., 2019; Hung et al., 2006; Paulus & Lester, 2016)
- d) Enhanced functional efficiency (Wamba et al., 2017)
- e) Sustainable competitive advantage over competitors (Chen et al., 2015; Kitchens et al., 2018; Mikalef, Krogstie, et al., 2018; Opresnik & Taisch, 2015b).

The use of big data analytics for compelling organisational strategies has attracted attention over the past number of years (Mikalef et al., 2020), however, there are few studies conducted on the competitive potential that big data analytics can offer.

2.6.1 Big data analytics as a dynamic capability

Big data analytics is considered a key differentiator between firms that perform well and those that underperform (Mikalef et al., 2020), especially since it improves efficiency and effectiveness, because of its high operational and strategic potential (Wamba et al., 2017). Studies such as those conducted by (Hung et al., 2006; Tsai et al., 2015; Vidgen et al., 2017; Wamba et al., 2017), show that the use of big data analytics as dynamic capability enables managers, statisticians, trend analysts, among other professionals, to systematically analyse rapidly incoming data. Capabilities “facilitate the most efficient, effective, and competitive use of an organisation’s assets, whether tangible or intangible” (Mikalef et al., 2020, p. 3). The study further indicates that capabilities operate differently from organisation to organisation; hence, they result in varying levels of sustainable competitive advantage. However, from this definition, it is apparent that dynamic capabilities are needed to create value.

In the current business environment, MNOs collect large volumes of data from calling records, server logs, bills, customer interaction data, and social networks as well as location-based information. Thus, the use of big data analytics to make sense of such vast amounts of data can help organisations ‘reconfigure’ their strategies based on observed trends, within their competitive environment, and thereby improve their competitive advantage (Mikalef et al., 2020). Furthermore, even though there is sufficient potential for big data analytics as a source of sustainable competitive advantage (Chen et al., 2015; Mikalef et al., 2020; Verhoef & Lemon, 2013; Wamba et al., 2017), there are indications that this could prove futile without the needed organisational capabilities. Hence, big data analytics as a capability could enable organisations to realign themselves in changing business environments to address customer needs (Mikalef et al., 2020).

2.6.2 Big data analytics and customer value management

According to Teece and Leih (2016), effective CVM reduces uncertainty in the market as products and services that are on-demand are the ones produced. In established markets, a lot of organisations have decided to differentiate by creating methods of discovering the value in their customers. This segmentation is useful in the MNO industry as markets are saturated and face fierce competition from competitors, both established and upcoming (Ghezzi et al., 2015; Teece, Pisano, & Shuen, 1997; Teece & Leih, 2016). Furthermore, as customers become more knowledgeable about what they want, they seek a more personalised customer experience which is challenging to achieve for MNOs that have a lot of customers (Chen & Popovich, 2003). Additionally, Hinterhuber (2008) indicates that CVM improves customer loyalty, relationship and trust.

Verhoef, Doorn and Dorotic (2007) indicate that Telcos need new business models to create value, and that big data analytics can be employed to achieve value integration. Big data analytics can be applied to extract valuable information that occurs across the company. Doyle (2008) also emphasises this sentiment by stating that big data analytics play an important role in improving CVM, as analytics has the potential to improve churn prediction and measurement and improve up-sell campaign performance. Thus, it can be recommended that by using big data analytics, customer value can be enhanced. In addition, seeing CVM as a customer-driven strategy with big data analytics integrated can allow a competitive advantage to be leveraged.

The use of big data analytics to create predictive models which can present what is likely to happen in the future is also creating a window for CVM opportunities (Kumari, Patil, & Jeble, 2016). Through using data, algorithms, and machine learning methods to forecast potential patterns based on factual data, predictive analytics enable MNOs to provide proper results (Diaz-Aviles et al., 2015). Cloud computing and predictive analytics converge to provide MNOs with large volumes of data to leverage and draw conclusions from (Fiedler et al., 2016). This means that MNOs can use data-driven analytics to screen the status of hardware, predict pattern-based loss, and proactively address communication infrastructure issues, such as cellular networks (Moe & Kallin, 2011). Integrating network integration and big data analytics

would enable deeper identification of root causes and problem forecasting. These innovations will promote more competitive strategies that pursue customer-centred industry in the long term, such as building customer value and forging a deeper brand recognition in the long run.

Hence, if dynamic capabilities are better suited for competitive, volatile environments (Teece & Leih, 2016), then the likelihood of assuming big data analytics as a dynamic capability is high since CVM is seen to operate effectively when big data analytics is embedded in it. This study uses this notion as a basis to understand how exactly big data analytics can be embedded as a dynamic capability for CVM.

2.6.3 Big data analytics and competitive advantage

According to studies, the use of big data analytics as dynamic capability enables managers, software developers, statisticians, trend analysts among other professionals to systematically analyse rapidly incoming data, plus other types of data that traditional data mining and data warehousing systems may overlook or may not have the capability to scrutinise (Fosso Wamba, Akter, Edwards, Chopin, & Gnanzou, 2015; Hung et al., 2006; Tsai et al., 2015; Vidgen et al., 2017). This includes both a mix of semi-structured and unstructured data - for example, customer queries, customer logs, surveys, mobile phone records, and social media review which are censored and connected to the internet of things (Baroudy et al., 2018; Lee, 2017; Meukel, Schwarz, & Winter, 2016). MNOs today collect huge amounts of data from call detail records, active devices, server logs, billing records, customer interaction data and social networks to location-based information, hence enabling big data analytics as a dynamic capability could prove beneficial.

In fact, according to Mikalef et al. (2020), the use of big data analytics to make sense of vast amounts of data can help organisations 'reconfigure' their strategies based on observed trends, within their competitive environment – providing a source of competitive advantage. The study also notes that big data analytics is the major differentiator between high performing and low performing firms (Mikalef et al., 2020). Also, through the use of data analytics, it has also become possible for organisations to enhance conversion rates (Saleem et al., 2019).

Big data analytics, according to Wamba et al. (2017), is thus, considered a game-changer, enabling improved efficiency and effectiveness because of its high operational and strategic potential – potential sustainable competitive advantage. Hence, the combination of an inherently competitive environment, the overwhelming abundance of data and the urgent need to remain at the pinnacle of competitiveness have prompted the need to uncover how using analytics can be used to drive competitive advantage.

2.6.4 Big data analytics and strategic decision making

Through the use of big data analytics, there has been a shift in strategy (Mazzei & Noble, 2017). Organisations are now more willing to take on non-traditional markets by leveraging data and data analytics resources (Mazzei & Noble, 2017).

Big data emergence has enabled organisations an opportunity to extract data that can contribute to improved organisational performance (Elgendy & Elragal, 2016; Gandomi & Haider, 2015; Grossman & Siegel, 2014; Kościelniak & Puto, 2015). In the pursuit of competitive advantages, this leads organisations to invest in big data analytics (Grossman & Siegel, 2014; Helfat & Peteraf, 2015; Waller & Fawcett, 2013). With the hope of collecting useful knowledge from customers, MNOs have invested in big data analytics. Instead of questioning consumers, organisations are being data-driven (Gill, Borden, & Hallgren, 2014; McAfee & Brynjolfsson, 2012; Vidgen et al., 2017). In many markets, this modern accessibility to gathering insights from big data analytics is arguably transforming the competitive nature and conventional corporate decision-making.

Decision making has been defined by decision-makers' intuition and experience, but it can progress to better-informed decisions when integrated with data-driven decision-making (Anderson, 2015; El Houari, Rhanoui, & El Asri, 2015; Schoemaker et al., 2018). This can be effectively summarised as depicted in Figure 1 (Mazzei & Noble, 2017).

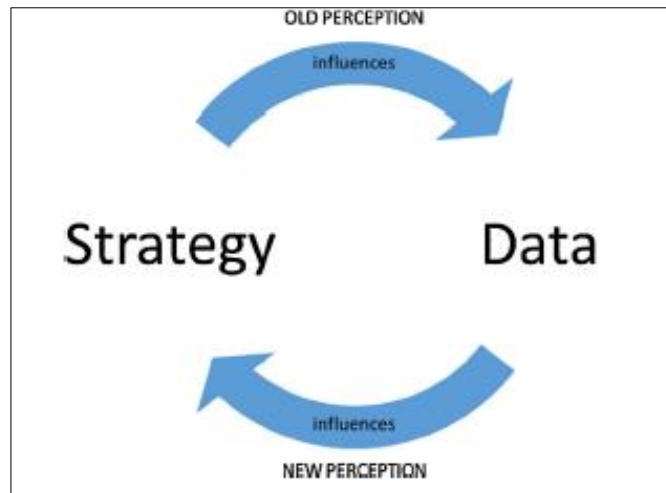


Figure 1: Evolving relationship between data and strategy

Source: Mazzei and Noble (2017)

El Houari et al. (2015) argue that big data enables a new way of generating organisational information. Organisations today have an opportunity to excel if they can make use of this recently founded information effectively and thus derive value from big data analytics. In many industries, being able to make this change would differentiate the customer-driven organisations from product-driven organisations (Henke & Kaka, 2018; Schoemaker et al., 2018; Verhoef & Lemon, 2013).

How data is being used is changing as data helps to discern what markets to explore and how customer trends and behaviour change. The use of data analytics can drive these determinations in real-time. Nevertheless, it is not enough to merely implement a data analysis, it must be functional. Disseminating gained insights to the members in the organisation for it to impact decisions making is critical. Therefore, placing data at the core of the decision-making processes instead of intuition is needed (Elgendy & Elragal, 2016; McAfee & Brynjolfsson, 2012; Schoemaker et al., 2018). It is mostly about getting the right knowledge, the right customers, at the right moment to make better decisions (Schrage, 2016).

2.6.5 Big data analytics and the human element

There is an increasing need for big data analytics skillset as a result of the increasing use of big data and analytics thereof (Mikalef, Giannakos, Pappas, & Krogstie, 2018).

Many organisations are still struggling to effectively leverage the data they own to improve their operational performance and competitive advantage (Mikalef, Giannakos, et al., 2018). Although there is sufficient potential for big data analytics as a source of sustainable competitive advantage, there are indications that this could prove futile without the needed organisational capabilities (Mikalef, Krogstie, et al., 2018; Verhoef & Lemon, 2013; Wamba et al., 2017).

Bitencourt et al. (2020) classify human capital under the resource's antecedents for dynamic capabilities. Despite the potential to use big data analytics competencies, the major problem in leveraging this technology is to find human capital or employees with the required skillsets. In fact, Mikalef et al. (2018) emphasise that even if data, software and all the infrastructure required is in place, it would fail to provide any value if there is a lack of appropriate skills and knowledge to put it into action. This implies that an organisation with the best big data analytics competencies could still underperform if they do not have the needed human resources with the needed skills to provide insights. Hence there is a compelling reason to investigate the role of human capital in effectively harnessing big data analytics competencies as a dynamic capability.

2.6.6 Big data analytics in understanding customer behaviour

Verhoef et al. (2007), suggests that customers should be considered as assets of an organisation that can be cultivated and activated. Big data analytics can be used to foster closer personalised and targeted propositions to customers. Big data analytics is significantly changing the way organisations are utilising customer behaviour and transforming it into valuable insights (Khade, 2016). Yoon (2009) asserts that understanding customer behaviour using analytics is viewed as the umbrella for creating customer value. Consequently, by understanding customer behaviour, organisations can improve their sales, enlarge and optimise their markets, and realise opportunities for CVM (Khade, 2016).

Churn behaviours and preference (Doyle, 2008; Hung et al., 2006) can also be used for consumer profiling allowing an effective way for organisations to establish target markets. Such segmentation can be used to align customers with identical behaviours and characteristics in similar classes (Bayer, 2010). This grouping will

assist in improving campaign management and targeted propositions to customers. This will allow organisations to market to their customers what they want when they want it (Mdluli & Makhupe, 2017; Millar et al., 2018). This ability to use customer feedback to influence services and solutions allows organisations to offer their best offerings to the customer. Hence, there is a need to establish how an organisation's understanding of its customers ensures competitive advantage and the needs of the changing markets (Hung et al., 2006; Pisano, 2017).

2.6.7 Big data analytics and the changing business environments

Literature suggests that dynamic capabilities contribute to organisational performance and sustainable competitive advantage in a VUCA environments environment (Li & Liu, 2014; Lin & Wu, 2014; Osioma et al., 2016; Wu, 2010). Lee (2004) indicates that organisations are building into agility to respond to sudden and unexpected changes in the market. However, challenges affecting real-time and effective implementation deter an organisation's ability to achieve agility.

Adapting sentiments by Davis and Eisenhardt (2011), volatile economic and technological trends suggest that organisations cannot be competitive without knowledge of competitor's strategy. Competitive pressure and insufficient knowledge base play a critical role in determining agility and gaining competitive advantage. Furthermore, the lack of flexibility to change also present risks of becoming irrelevant. Therefore, an alternative approach to managing innovation proposes that organisations respond to changing environments by allowing innovation and adaptation of new ideas across the company while combining data sensing, product development and innovation processes (Chesbrough, Appleyard, Chesbrough, & Appleyard, 2007; Foss, Laursen, & Pedersen, 2011; Helfat & Peteraf, 2015).

Interest has been growing in developing an understanding in ways organisations can respond to unexpected change and predicting the connection between dynamic capabilities and sustainable competitive advantage with most researches proposing capabilities influencing strategies (Pisano, 2017; Teece et al., 1997). It has been identified that big data analytics provides extraction of valuable insights from data via creation and distribution of reports, building and deploying statistical and data-mining models, exploration and visualisation data, sense-making and other related

techniques timely (Grossman & Siegel, 2014). With this notion in mind, big data analytics could be used as a powerful tool that offers prompt data extraction and data-driven decision making (Srinivasan & Swink, 2018). With this in mind, big data analytics can act as a dynamic capability if it is integrated across the firm in a way that enables effective responses to constantly changing environments (Helfat & Peteraf, 2003). To appreciate the full advantages of big data analytics within the organisation, the extent to which big data analysis is implemented within the business must first be established.

2.6.8 Maturity of big data analytics

In the context of emerging markets and big data analytics capabilities, maturity is defined as a condition of being ready and flexible (Nda & Hamid, 2020). As suggested by Al-Sai et al.(2019) maturity levels indicate an organisation's current capabilities and the desirable state. What should be noted is that not every MNO is equal in data maturity terms (Oliver et al., 2020).

Big data uses innovative and cost-efficient technologies to solve problems through computing environments (Nda & Hamid, 2020). This explosion of data has driven organisations to look into information processing and analysis. Al-Sai, Abdullah and Husin (2019) indicate that an organisations' ability to be competitive depends on its level of big data maturity. While it is well understood that big data analytics has an enormous potential to generate value for business organisations, there is still vagueness around the exploitation of value from big data and in particular big data analytic maturity is still an unanswered question (Comuzzi & Patel, 2016).

The implementation and adoption of big data analytics is a comparatively recent domain and is not yet mature (Björkman, Franco, & Caesarius, 2017; Chen et al., 2015). From a knowledge management viewpoint, Millar et al. (2018) suggest leadership plays a role in building big data analytics awareness and maturity by promoting agility, strength, versatility, and flexibility to navigate VUCA environments, improving resources and capabilities frequently (Millar et al., 2018). Interestingly, there is a notion that the easier it is to understand big data analytics, the more likely the chances of its adoption (Beer, Voelpel, Leibod, & Tekie, 2005; Kitchens et al., 2018; Theron & Boshoff, 2006). However, the difficulty in adoption lies in the lack of

maturity of big data models and the absence of skilled experts (Oliveira, Thomas, & Espadanal, 2014).

2.7 Conclusion

The research utilised dynamic capabilities theory (Teece, 2007) as a theoretical framework. Mikalef et al. (2020) mention that big data analytics are seen to be a means of a tactical advantage as it could be used to reconfigure business strategies to obtain deeper consumer preferences information and to facilitate data-driven decision-making, thereby encouraging profitable operations. Efficient decision-making allows data-driven organisations to be resilient and adaptive in coping with business dynamics that are rapidly changing.

Extant research shows that in unpredictable environments, there is a lack of awareness of how companies should harness big data analytics to achieve competitive advantage. Also, there is a general lack of understanding of how organisations can leverage big data analytics as a dynamic capability (Tsai et al., 2015; Verhoef et al., 2007). Although a large number of organisations are planning to invest in, or have already invested in big data analytics, there is little known about how to go about building this as a dynamic capability (Gupta & George, 2016). Furthermore, even though CVM is viewed as an organisation's source of sustainable competitive advantage, the big data analytics tool is not being fully utilised as a dynamic capability within MNOs, and traditional analytical methods such as data mining and warehousing are still being used widely (Hung et al., 2006; Tsai et al., 2015)

Based on the above, this chapter presented the relevant literature on big data analytics, dynamic capabilities, CVM, and sustainable competitive advantage. Investments are inadequate to enable competitive advantage, rather big data analytics competencies should be harnessed to achieve CVM for sustainable competitive advantage. Also, MNOs are embarking on customer-centric strategies and funding CVM, while at the same time big data analytics has been poorly integrated into CVM, despite it being regarded as a powerful sensing and analysing tool with faster turnaround times than analogue and manual tools (Fiedler et al., 2016). Consequently, data-driven decisions bolster company sustainable competitive.

Chapter 3: Research Questions

This study aimed to find answers to the three research questions identified below.

Research question 1: How do MNOs use its big data analytics competence to enhance customer value management?

According to Teece and Leih (2016), effective CVM reduces uncertainty in the market as products and services that are on-demand are the ones produced. Furthermore, as customers become more knowledgeable about what they want, they seek a more personalised customer experience which is challenging to achieve for MNOs that have a lot of customers (Chen & Popovich, 2003). Using big data analytics is creating a window for CVM opportunities, however, the use of big data analytics is still a relatively new field, and there is limited knowledge on how big data competence enhances CVM. Following from the above, research question 1 aims to understand the role of big data analytics in enhancing CVM.

Research question 2: How do MNOs turn big data analytics competence into a dynamic capability?

MNOs exist in a fast-changing environment, hence there is an added advantage in using big data analytics as a dynamic capability. The use of big data analytics is considered a dynamic capability that enables organisations to systematically analyse rapidly incoming data (Hung et al., 2006; Tsai et al., 2015; Vidgen et al., 2017; Wamba et al., 2017). Also, as a capability, big data analytics could enable organisations to realign themselves to changing business environments. However, as noted in (Mikalef et al., 2020), there is still uncertainty as to how big data analytics can be turned into a dynamic capability. Hence this research question aims to uncover how MNOs turn their big data competencies into a dynamic capability that could be used to address volatile environments and enhance CVM for competitive advantage.

Research question 3: How do MNOs embed big data analytics competence to lead a sustainable competitive?

Organisations have access to huge amounts of data (Mikalef et al., 2020; Wang, 2014), and the use of big data analytics competencies to make sense of this data could help organisations reconfigure their strategies, providing a source of competitive advantage. Competitive advantage is sought after organisations, especially those operating for the same target markets (Wamba et al., 2017). Research question 3 sought to understand how MNOs can embed their big data analytics competence to enhance its sustainable competitive advantage.

Chapter 4: Research Methodology

4.1 Introduction

This chapter introduces the justification behind the researcher's choice of the research methodology, which was utilised in the study. This chapter is explained in the following sections the population, unit of analysis, choice of sampling method, sample size and the measuring instrument utilised in the study. This chapter further articulates the data gathering process, the analysis approach, and the quality controls. This chapter concludes by listing the identified limitations of the study. Data was collected utilising semi-structured interviews with subject matter experts from the mobile network operator's industry.

4.2 Research methodology and design

An exploratory research methodology is suggested by Saunders and Lewis (2018) for a study where the researcher intends to pursue new insights, by asking a set of questions, evaluating the topic in a new light. Interpretivism was adopted as the research philosophy in this research. According to Vidgen et al. (2017), this philosophy is deeply embedded in hermeneutics or interpretation and mainly focusses on human experiences and the description thereof. Heit and Rotello (2010) suggest that interpretivism provides value, making it adequate for the study because of the type of questions posed. The researcher's main aim was to deeply understand the themes established and the data generated to provide additional insight and interpretation (Morgan & Govender, 2017). The choice of methodology was also informed by the researcher's objectives in seeking to provide South African MNOs with the value from the findings of the study of how to best leverage big data analytics as a dynamic capability to enhance CVM.

This study is qualitative and grounded by the literature presented in Chapter 2. This was deemed appropriate because qualitative studies aim to provide rich data, rather than seeking to prove validity. Hence, this research made use of an inductive reasoning approach. This together with an exploratory process which tapped into current literature allowed the researcher to find similar themes, in an area where there is little known about the subject (Kumar,2011). Additionally, employing an inductive reasoning approach allowed the study to add to the existing body of

knowledge through the use of current literature (Saunders and Lewis, 2018). This added to the knowledge required to address the research gap. Furthermore, use of inductive reasoning is common in exploratory studies as it allows the researcher to gain an understanding of human experiences attached to events (Saunders & Lewis, 2018), which is what this study aimed to do. However, since an exploratory, inductive approach was used, the integrity and credibility of the study were also verified to validate the data collected (Morgan & Govender, 2017).

A cross-sectional methodology was applied in this research; since only a cross-section of the population were identified for interviews (Kumar, 2011) to provide an overall picture (Saunders & Lewis, 2018) of how MNOs can use big data analytics competence as a dynamic capability to enhance CVM for sustainable competitive advantage. Due to time constraints, this methodology proved more suited than a longitudinal study. In line with the context of exploratory studies, this research aimed to ask 'how' type of propositions to gain insights into the subject at hand by making use of the main research question and related interview questions. This method allowed the researcher to ask additional follow-up questions when deemed necessary. The cross-sectional method also allowed the participants to expand further on their answers to provide a further understanding of the topic. Semi-structured interviews were conducted, using the Zoom platform, to discuss the study objectives and research questions raised for MNOs in South Africa, to gain insight into the subject at hand. This method was in line with the nature of qualitative studies (Saunders & Lewis, 2018). The research questions in this study were developed and positioned to seek new insights into how big data analytics competence, as a dynamic capability, can enhance CVM for sustainable competitive advantage, allowing the researcher to ask new questions assess the themes in a new light.

A phenomenological strategy was employed. This strategy was useful in gaining the essence (Sanders, 1982) of the themes under investigation. Consistent with the findings by Saunders and Lewis (2018), this approach is reliable with interpretivism and studies that are qualitative in nature, wherein the researcher aims to add to the knowledge base by utilising various data sources. Sanders (1982) suggested that a case study strategy should be applied when a researcher aims to address "what", "how" or "why" questions. Hence, to substantiate what is known and not known, the

researcher also conducted a literature study within this field of study which is discussed in detail in Chapter 2.

4.3 Population

A population is defined as a complete set of group members (Saunders, Lewis, Thornhill, & Bristow, 2015), which not only includes people but places and organisations that the researcher can access. MTN, Vodacom, Telkom, and Cell C, make up the four major MNOs in a highly competitive South African mobile network environment (Côrte-Real, Ruivo, Oliveira, & Popovič, 2019). Hence, the population of interest for this research included key identified senior managers, executives, and industry experts working for, or providing strategic service to, the four main mobile network operators mentioned above. The population comprised of CVM senior management, executives, and industry experts responsible for defining, driving, and influencing CVM strategies and big data analytics competence within the mobile network operator firms. The selection criteria for participants included: (1) work experience of at least three years in MNOs; (2) senior management with over three years of experience and knowledge of CVM and big data analytics competence; (3) senior executives who are strategist and advisors for MNOs in South Africa and abroad.

4.4 Unit of analysis

The 'what' or object of the study which was investigated is referred to as the unit of analysis (Babbie & Mouton, 2001). For this study, and in alignment with the guidelines in Babbie and Mouton (2001), the unit of analysis comprised of individuals who hold senior management, executive, or strategic positions within the four MNOs, who have more than three years of experience in the relevant fields. These individuals, as described in section 4.3, are accountable and responsible for, big data analytics, and customer value strategy and implementation within MNOs, to understand how big data analytics competence as a dynamic capability is currently utilised to enhance CVM for a sustainable competitive advantage.

4.5 Sampling method and sample size

Aligned to the nature of qualitative studies, the sampling process will stop once a point of theoretical saturation is reached. This implies that no further insights or contributions emerge from participants during the interviews, and analysis of data collected reveals no new emerging themes (Côte-real et al., 2019). According to Christensen, Johnson and Rigby (2002), 12 interviews will prove adequate to achieve data saturation when conducting in-depth interviews. A sample size of 15 was deemed appropriate for the study as the researcher believed that this sample size would provide an adequate representation of the key constructs that the researcher sought to explore and to ensure saturation was reached.

4.6 Measurement instrument

Marshall and Rossman (2014) suggest that good interview guides are mindful of the human social interactions that affect participant responses. In this study, a semi-structured interview guide was used as a measurement. Such an interview proved beneficial because the researcher intended to gain a deeper understanding of the topic under investigation (Saunders & Lewis, 2018). The interview guide consisted of nine interview questions as described in Table 2, derived from the three research questions. The research questions were structured to allow the interviewer to probe further, seek clarity, and gain deeper insights. Because this study aimed to derive factors from three themes, questions needed to be phrased for each theme to eliminate any misunderstanding that may occur, resulting in distortion of data. Furthermore, the following screening sample questions were utilised by the researcher to determine the relevance of the potential interview.

- a) Does your organisation use big data analytics as competence and if so, would you be able to describe it?
- b) Do you have a minimum of three years of experience working in the MNOs?
- c) Are you accountable or responsible for big data analytics strategy development and implementation within your organisation?
- d) Do you consider big data analytics, as a competence, enhances customer value management for sustainable competitive advantage?

If the answer was “no” to more than two (2) of any of the above questions, the interview was not scheduled by the researcher.

Table 2: Mapping of the research questions with interview questions

No.	Research question	Interview guide questions
1	How do MNOs use its big data analytics competence to enhance customer value management?	<p>1.1 Can you describe your organisation’s big data analytics competence?</p> <p>1.2 How does your organisation enhance customer value management using big data analytics competence?</p>
2	How do MNOs turn big data analytics competence into a dynamic capability?	<p>2.1 How is your organisation using big data analytics competence to realise opportunities faster for customer value management?</p> <p>2.2 How does your organisation go about making sure that big data analytics competence remains a long-term competitive advantage for customer value management?</p> <p>2.3 How is your organisation’s big data analytics competence addressing the rapidly changing environment?</p>

No.	Research question	Interview guide questions
3	How do MNOs embed big data analytics competence to lead a sustainable competitive?	<p>3.1 What value does your organisation deliver to the customer using big data analytics competence, please describe how?</p> <p>3.2 How is the use of big data analytics competence embedded in your organisation?</p> <p>3.3 How does your organisation's big data analytics competence set you apart from your competitors?</p> <p>3.4 How easy do you think it will be for your competitors to replicate your organisation's big data analytics competence, and can you describe why you say so?</p>

4.7 Data collection and analysis

Given the seniority of some of the participants, the researcher initially provided context and explained the purpose of the study, followed by email communication with the official invitation for participation in the study, and an informed consent form. The potential participants could review the aim of the study and had to sign a consent form before the actual interview. The consent form aimed to ensure that the participants understood the nature of the research and that they were aware that participation is voluntary and could withdraw from the interview, at any point in time, without penalty. Participants were also asked to confirm their agreement to have the interviews recorded and were made aware that all data will be anonymised, with confidentiality ensured by the researcher (Saunders & Lewis, 2018). Data was gathered utilising a list of open-ended questions presented with the use of the semi-structured interview guide.

A total of 15 interviews with 15 participants (executives, senior managers, and industry experts with the knowledge of CVM and big data analytics) was conducted over seven weeks. Each interview lasted for about 45 to 60 minutes. All Interviews were conducted via online Zoom platform due to the current social distancing imposed Covid19 pandemic restrictions. Aligned to the nature of qualitative studies, the sampling process was to be terminated once a point of theoretical saturation is reached. In this study, a point of theoretical saturation was reached by the eighth interview since it appeared that no new insights or themes were uncovered. The remaining interviews were conducted nonetheless to confirm that saturation was in fact reached.

The researcher also cross-questioned the participants to clarify uncertainty and probed for clarity (Shenton, 2014). The interviews were also recorded, after having received the written consent from the participants, to ensure vital information is not missed. The researcher transcribed the recordings upon completion of the interview and conducted a pre-coding analysis in parallel to ensure the interview data is not compromised. This also ensured transcription accuracy (Braun & Clarke, 2006) and allowed efficient use of any notes captured during the interview as a base for the data to be analysed (Saunders & Lewis, 2018). The transcribed data was then coded and analysed to uncover recurring themes and to once again verify that data saturation had been achieved (Saunders & Lewis, 2018). Since the researcher aimed to identify common themes emerging from the data, thematic content analysis was utilised. This type of analysis makes use of a coding process (Shenton, 2014) which allows emerging patterns to be recognised and indicates when no new themes evolve (Braun & Clarke, 2006).

In keeping with the interpretive nature of the study, the researcher made use of an implicit approach to tease out the data for meaning, while performing thematic analysis of the data gathered. Atlas.ti is the tool of choice for data analysis. The software was utilised in coding, highlighting, and categorising data into specific themes based on emerging patterns. Using the software and its functions appropriately ensured that the results of the analysis process were valid and reliable. The following steps were adhered to during data analysis: transcription cleaning, manual creation of codes and categories, transferring transcription to Atlas.ti, data

coding, creation of code families through Atlas.ti, thematic analysis, data validity, and a reliability check.

4.8 Data storage

In line with the requirements to store MBA research data for a minimum of 10 years, the researcher has stored the data on Microsoft One Drive and Google drive cloud service platforms which enables the researcher to be in the position of the data at all times. Further to this personal access, the researcher has stored the data on the University of Pretoria Portal as per GIBS MBA policy.

4.9 Quality controls

Morgan and Govender (2017) indicate that exploratory studies investigate current literature, allowing the researcher to find emerging themes. Hence, qualitative studies provide rich data and strength of data, however, do not seek to prove the reliability of the data collected. Hence, the study observed quality controls to ensure the integrity and reliability of the data collection and analysis thereof.

To eliminate errors, it is suggested that qualitative studies are generally prone to subject bias; hence the reliability of the measurement instrument should not be compromised in any manner (Shenton, 2014). Quinlan (2015) suggests that reliability refers to the “dependability of the study, it also refers to the degree to which the research can be repeated while obtaining consistent values” (p. 24). Validity in research refers to “the accuracy of a measure or the extent to which a source truthfully represents a concept” (p. 24).

Reliability and validity are defined as trustworthiness, rigour, and quality in a qualitative paradigm (Golafshani, 2003). Saunders and Lewis (2018) refer to reliability as the extent to which there is consistency in the findings and data collection methods from which insights and conclusions are drawn. Babbie and Mouton (2001) argued that information regarding the validity and reliability of data should be readily available. Hence, the reliability of the findings was upheld by making use of the zoom platform recording feature, and pre-testing interview sample questions in a pilot interview to ensure that the questions have been well-formulated and can be articulated accurately during the interviews. These quality controls and

rigorous quality checks minimised the possibility of misinterpretation which may have influenced the participants' answers, analysis of the data or the translation of the findings.

Validity looks at the credibility of methods utilised, and questions whether the anticipated objectives of the study have been accurately measured, and if findings based on these methods are valid (Saunders & Lewis, 2018). To ascertain the validity of the findings, the researcher was guided by an exploratory set of interview questions utilised to facilitate discussions with the selected interviewees. Furthermore, all interviews were recorded with the consent of participants. Subsequently, the researcher was able to listen to and analyse the responses to the in-depth questions and discussions, ensuring that data validity and reliability are maintained. The recordings and transcripts were reviewed to confirm the authenticity and reliability of the results. Potential bias from the side of the interviewer and interpreter bias could also compromise the trust in the findings and conclusions drawn (Saunders & Lewis, 2018). To uphold the integrity of the results, the researcher made use of a "credibility, authenticity, transferability, dependability, and confirmability" assessment (Shenton, 2014, p.64). This also guaranteed the dependability of the data. In this study, the integrity of the findings were also assured by taking note of any form of subject bias, subject error, observer error, or observer bias (Saunders & Lewis, 2018).

The researcher received ethical clearance from the MBA Ethics Research Committee at the GIBS before commencing the research, and before data collection, that is, interviews with selected participants.

- a) A recording tool was utilised with the consent of the participant allowing the researcher to fully engage in the discussion while limiting the need to focus on taking manual notes.
- b) Recording, transcribing, analysis, and coding of the data of the interviews were performed by the researcher.
- c) Transcriptions were thoroughly read meticulously, analysed, and checked to ensure that the responses and data collected have been accurately captured.
- d) Quality control provisions such as relistening to the zoom recording, re-reading the transcriptions before loading the transcripts on Atlas.ti which included a check

of the credibility, authenticity, transferability, dependability, and confirmability of the data (Shenton, 2004).

The quality controls mentioned in this section are aligned to Guba's criteria for trustworthiness (Shenton, 2004) and is in line with the qualitative nature of this research. The quality controls were utilised as per the need and relevance to the study.

4.10 Research limitations

The researcher has identified the following limitations of the study:

- a) The study was subjected to potential researcher bias due to its qualitative nature (Saunders, Lewis, & Thornhill, 2009). This is attributable to the fact that objectivity by the researcher was at times challenging to maintain.
- b) The results will not be quantifiable or easy to replicate, as participants will not necessarily provide all their decision-making reasons and circumstances.
- c) As a result of time and cost limitations, the researcher will be forced to limit the selected target sample, hence future research may need to focus on other industries, to determine the fit of the findings of this study.
- d) Access to all selected executives may be limited within the set time frame, and the researcher was not able to interview all the identified participants.
- e) The researcher had challenges accessing any kind of secondary data that would make the findings of the study richer.
- f) Lastly, because of the time constraints for conducting the proposed research, the chosen cross-sectional study method only allows for a snapshot of the data at one point in time as opposed to a longitudinal study, which can observe behaviour over an extended study period.

4.11 Conclusion

This chapter detailed the justification behind the choice of the research methodology used in this study. It proceeded by defining the population, the unit of analysis, method of sampling, sample size, and instrument of measurement. This chapter concludes by stating the quality controls, data storage requirements and the identified limitations of the study.

Chapter 5: Presentation of Results

5.1 Introduction

This chapter presents the results of the interviews conducted in this research. A total of 15 interviews were conducted with industry professionals in the MNOs space. The chapter provides a brief description of the interviewees, the data collection and measurement processes used, and presents the findings on the role of big data analytics as a dynamic capability in enhancing customer value management. The results presented within this chapter are further analysed and discussed in relation to relevant literature in Chapter 6.

5.2 Description of the sample

This study made use of non-probability sampling as the researcher did not have access to the whole population group. This study was employed using purposive sampling techniques, given the qualitative nature of the research. This type of sampling is a category of non-probability sampling and is generally used when the researcher intends to use his/her clear judgement and rationale to select an adequate number of participants to contribute to the topic (Saunders & Lewis, 2018). This chosen sampling method allowed the researcher to identify and select senior participants within the four main MNOs to contribute to this study, in relation to customer value management and big data analytics.

Aligned to the nature of qualitative studies, the sampling process stopped once a point of theoretical saturation was reached; this implied that no further insights or contributions emerged from participants during the interviews and the analysis of data collected reveals no new emerging themes (Côte-Real et al., 2019). The sample comprised of 15 participants; whose descriptions are provided in Table 3. All participants, except one hailed from Gauteng. The researcher gained access from the participants through various channels such as LinkedIn and networks gained from the researcher's professional network within the major mobile network operators. A number of screening questions were also utilised by the researcher to determine the relevance of the potential interview as noted in chapter 4 of this research project.

Table 3: Participant information and context

Participant	Function of the participant	Description of the Role
1	Customer value management architect and subject matter expert	CVM subject matter expert, responsible for CVM architecture, capability, and delivery of the customer value management strategies
2	Senior Manager Customer Value Management	Manages Big Data Analytics strategies and implementation CVM and big data analytics models
3	Executive: Customer Value Management	Responsible for CVM and big data strategies
4	General Manager: Consumer and Information Technology Delivery	Responsible for IT delivery which includes but not limited to Big Data Analytics strategies and CVM
5	Senior Manager Customer Value Manager	Responsible for customer value management capability development and delivery in alignment with the delivery of big data analytics strategies and models
6	Executive Head: Customer Value Management Delivery	Responsible for customer value management delivery and big data analytics delivery
7	Senior Customer Value Manage Capability Analyst	Responsible for customer value management capability
8	General Manager: Customer Value Management	Responsible for customer value management strategy
9	Senior Data Scientist	Responsible for data modelling, machine learning in big data analytics platforms

Participant	Function of the participant	Description of the Role
10	Telecommunications Customer Value Management Strategist	Responsible for customer value management strategies
11	Manager Customer Value Management	Responsible for delivery of customer value management and big data analytics business strategy
12	General Management: Business Intelligence Competence Centre (Big Data Analytics)	Responsible for Big Data Analytics Strategy, governance, and operationalisation
13	Senior CVM and big data executive strategies	Responsible for MNO strategies across South Africa, Dubai and Pakistan
14	Executive Consumer Business Unit	Responsible for consumer strategy which includes but not limited to CVM
15	Executive: Strategy Transformation	Responsible for MNO transformation strategy

5.3 Description of the interviews

All the interviews were analysed concurrently, and shared themes were identified, coded, and grouped. Common, recurring themes were derived bearing in mind the existing literature, but in some cases straight from the data itself, as no direct relation to specific literature could be identified (at the time) for some newly observed 'emerging' themes and insights. Absolute frequency counts (across all interviews) of the occurrences were used to determine the key themes and role the data played. The frequency value presented in the rank-ordered tables (in tables further in the chapter) is the absolute frequency count and is ranked from highest to lowest in each table. This somewhat offered the researcher an idea of the perceived importance participants attributed to a specific theme. However, it is important to note that some

of the frequency counts do not necessarily add up to 15 because some of the participants may not have commented or responded to all the interview questions.

A total of 15 virtual interviews were conducted with subject matter experts within the four major MNOs. All audio transcripts were mostly audible with only a few sections that were inaudible, though not affecting the materiality of the transcribed notes. The researcher tried to conduct the interviews in silent areas to ensure the quality of the recordings. On average, most interview duration lasted for 45 to 60 minutes. The researcher provided the interviewees with the set of questions beforehand, to ensure that they were well prepared and acquainted with the subject of conversation. The formal interviews were conducted and recorded, after which the audios were transcribed by the researcher for analysis purposes.

5.4 Data collection and measurement

The researcher transcribed all 15 interviews and verified the accuracy of the transcriptions by going through the audio recordings during the pre-analysis phase of the thematic analysis. The researcher used a bold font for the interviewer and normal font for the interviewee when transcribing the interviews in MS Word. Furthermore, where key themes and insights were identified, the researcher also used bold font to highlight these findings during the pre-analysis phase. The interview questions were qualitative in nature and the results collected were analysed and coded using qualitative analysis computer software, Atlas.ti, version 8.4.19.0, which uses content and frequency analysis technique. This technique identifies common themes in the data and allows for these themes to be grouped through coding. The codes were then exported to an Excel Spreadsheet where the further content analysis was performed.

Themes identified were assigned numbers in line with the research question numbers. For example, questions pertaining to interview question 1.1, that is, "*Can you describe your organisation's big data analytics competence?*", were assigned the code number '1.1'. Any themes that came under each interview question had the prefix of that research question, for example, the code indicated by '1.1.14 Real-Time Analysis', implied that the theme, 'real-time analysis' was the fourteenth unique theme mentioned by the participants under interview question 1.1.

In terms of saturation, the frequency counts assigned to each theme dictated to the researcher the point where theoretical saturation was reached for a particular question, that is, when no new themes were evident from the interviews, or in the coding. This falls in line with Dworkin (2012) who suggested that saturation is achieved when gathering new data does not introduce new theoretical insights nor reveals new properties of your core theoretical categories.

A total of 15 interviews were conducted over seven weeks, more than the number of interviews required to achieve data saturation as asserted by Christensen, Johnson, and Rigby (2002b). According to Christensen, Johnson and Rigby (2002), 12 interviews will prove adequate to achieve data saturation when conducting in-depth interviews. Saturation was reached by the eight interviews, since it appeared no new insights were gained. The remaining interviews were conducted nonetheless to confirm that saturation was in-fact reached.

5.5 Findings for research question 1

Research question 1: How do MNOs use its big data analytics competence to enhance customer value management?

Research question 1 attempted to understand how big data analytics competence is used within MNOs to enhance their CVM. Research question 1 was subdivided into two interview questions which both fed back to into research question 1. The first interview question probed participants to describe their organisation's big data analytics competence to give a general background, insights and set the tone for discussion with the researcher. The second interview question, which is also directly linked to Research question 1, probed participants on how their various organisations enhanced CVM using big data analytics competence. The latter question being the basis of Research question 1.

Key insights from the first interview question revealed that most responses were classified into two broad categories based on the maturity levels of the big data analytics, that is, low maturity/not yet mature and high maturity level. The reason for this is that most participants approached this question from an understanding of the maturity of the big data analytics environment. The concept of maturity is key because depending on where most organisations are on their maturity scale, it

informs how well MNOs are unlocking big data analytics competencies as a capability to enhance CVM.

5.5.1 Organisation's big data analytics competence

Big data analytics competence was described by participants in terms of the level of big data analytics maturity within the organisation. If big data analytics capabilities were seen to be mature within the firm, then big data analytics competence to enhance CVM was deemed to be high. The main feedback from the participants was that their big data analytics competency was *"not yet mature"* and that their organisation still needs *"several more years to go before the advanced levels of maturity use cases start coming through"*. That is, big data analytics competency was still lacking. This shows that participants acknowledged the role of the maturity of the big data analytics plays in their organisations concerning the competency of big data analytics within their organisations. A key insight shared by the other participants shows that big data analytics maturity *"starts with the people that you have"* highlighting that people skills are linked to the maturity of the big data analytics. Hence, it can be concluded that there is a link between competency and the maturity of the big data analytics capabilities within organisations as seen in Figure 2.

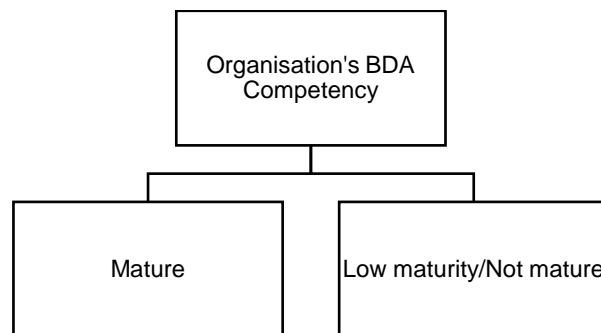


Figure 2: Big data analytics competency in enhancing customer value management

Table 4 presents an overview of the themes the recurred.

Table 4: Overview of big data analytics maturity levels

Rank	Key themes	Frequency
1	Low maturity/ not yet mature	7
2	High/full maturity	0

5.5.2 How big data analytics competence enhances customer value management

The second interview question probed participants on how big data analytics capabilities, if mature and present, would enhance CVM. Three main themes were identified by the participants, namely targeted propositions, personalisation and understanding customer behaviour. These themes highlight how big data analytics are used to enhance CVM by MNOs in South Africa. From the responses, it is evident that big data analytics enables firms to offer targeted propositions to its customers, and in doing so enhance customer value. Furthermore, big data analytics could be used as a tool to understand customer behaviour as mentioned by four of the 15 participants interviewed. Figure 3 depicts the main ways in which big data analytics capabilities enhance CVM, while Table 5 presents an overview of the participants that mentioned these themes.

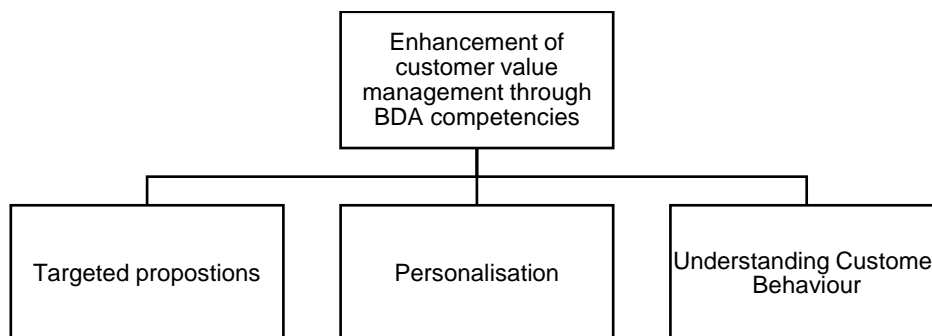


Figure 3: How big data analytics competencies enhance customer value management

Table 5 presents an overview of the key themes identified on how big data analytics capabilities enhance CVM.

Table 5: Overview of how big data analytics capabilities enhance customer value management

Rank	Key themes	Frequency
1	Targeted propositions	6
2	Personalisation	5
3	Understanding customer behaviour	4

5.5.1.1 Targeted propositions

Participants highlighted that targeted propositions are used to enhance customer value using big data analytics competence. Participants 5 and 7 alluded to methods such *“targeted communication”* with their customers to drive value, that is, organisations continuously analyse the data to identify opportunities in the customer databases to be able to inform the rest of the organisation in terms of what can be done in terms of targeted communication. This then ensures that the communication sent out to customers is relevant. Participant 3 and 4 also highlighted that targeted propositions were a migration from the generally used approach of *“spray and pray”* where organisations sent campaign messages, but those campaign messages were based on very large segments without first narrowing it down to much smaller relevant segments. The targeted propositions now allow for organisations to be able to *“curate an individual customer”* and *“give them context”*. According to Participant 11, if the organisation does not have the appropriate data, the interventions they make are meaningless as they end up giving value to customers who do not need to be given value, for example, sending Christian Bible verses to a Muslim on Ramadan. This results in a huge disconnect between the MNO and the customer service.

5.5.1.2 Personalisation

A key theme highlighted by five of the participants is that big data analytics competencies allow for personalisation, enabling better CVM. Participants alluded that access to customer data has enabled MNOs to be able to create personalized profiles, avoiding generic propositions that might not be relevant to the customers or customer specific. Participant 14 opined that access large amounts of customer data and big data have helped MNOs improve customer experience because they are

now able to be a bit more precise and “*personalised and contextual*” in terms of how they address customers specific issues. Participants 2,4 and 15 opined that the value that MNOs can give a customer, is “*greater personalisation and relevance*”.

5.5.1.3 Understanding customer behaviour

This theme was interlinked with a myriad of other themes that were highlighted by other participants. For example, participants opined that access to big data analytics enables MNOs to better understand customer behaviour, which in turn enables MNOs to cross-sell and upsell, predict the customer next best offer and next best action. Participant 9 best encapsulated this view when he opined that their organisation was “*getting a better understanding of customers in terms of building a profile against them and understanding what their preferences are and treatments*”. In simple terms, participants alluded that big data analytics enables their MNOs to understand the customer behaviour which then informs the MNOs product offerings, helping firms sell the appropriate and relevant products to customers. Participant 10 opined that “*It's about understanding who your customer is.*”

Participant 10: “You are able to understand their social behaviour, whatever behaviour sets that you have access to, and it's said to a consultant that this would be the best offer for this type of person”.

Participant 13 provided an in-depth view of the breadth and depth of the quality of the behavioural data they harvest and the extent to which customer behavioural data is incorporated in enhancing CVM, “*they will have the behavioural data not only from a telecom or service checkpoint but what kind of person you are*”.

5.5.2 Summary of findings for research question 1

This research question intended to uncover the common subthemes amongst the participants regarding how their organisations, that is, MNOs, use their big data analytics competence to enhance CVM. Most participants agreed that their big data analytics maturity levels were still not fully developed, and this affected and how well their MNOs are unlocking the big data analytics capabilities. Participants highlighted that enhancers of CVM through big data analytics capabilities included targeted

propositions, personalisation and understanding customer behaviour. Figure 4 presents a summary of the key themes identified in research question 1.

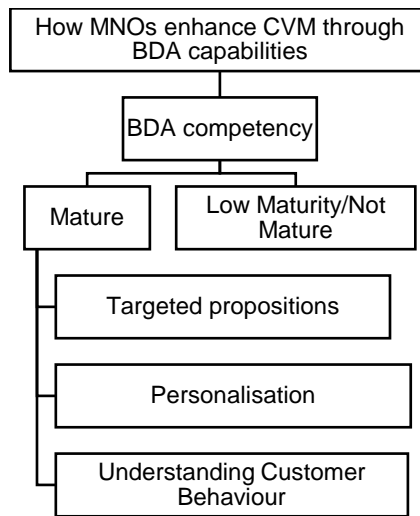


Figure 4: Graphical summary of the findings of research question 1

Other themes were also mentioned by participants including contextual marketing, customer convenience, relevance, understanding customer behaviour, cross-selling and upselling as ways organisations could enhance CVM using big data analytics competence. However, these themes did not receive common consensus among participants, hence are not considered the major themes to this research question.

5.6 Findings for research question 2

Research question 2: How do MNOs turn big data analytics competence into a dynamic capability?

The aim of research question 2 was to identify how MNOs turn their competencies in big data analytics into a dynamic capability. Three interview questions were formulated to answer research question 2. The first interview question tried to understand how the organisations use capabilities of big data analytics to realise opportunities for CVM. The second interview question sought to unravel how MNOs ensure that the capability of big data analytics remains a long-term competitive advantage for the management of customer value; and finally, the third interview question aimed at understanding how these organisations approached the rapidly evolving market through their big data analytics competencies.

Key insights from the findings showed that speed to market, maturity levels of big data analytics, human capital and conversion rate for customers were the key manners in which MNOs turn their big data analytics competencies into dynamic capabilities. Most participants answered research question 2 from an awareness of how a customer-centric organisation can solve the VUCA phenomena through big data analytics. The idea of speed is founded on big data analytics, but the context of maturity levels indicated to which levels these organisations integrated big data analytics and how they find a balance between automation and the use of human capital.

5.6.1 Big data analytics competencies for opportunity realisation in customer value management

The first interview question under research question 2 prompted responses on how big data analytics is used by organisations to realise opportunities within CVM. Four main themes were evident from the findings. Participants indicated that the big data analytics competencies enabled speed-to-market, effective use of human capital and higher conversion rates. Figure 5 illustrates the ways wherein big data analytics are being used by organisations to realise opportunities.

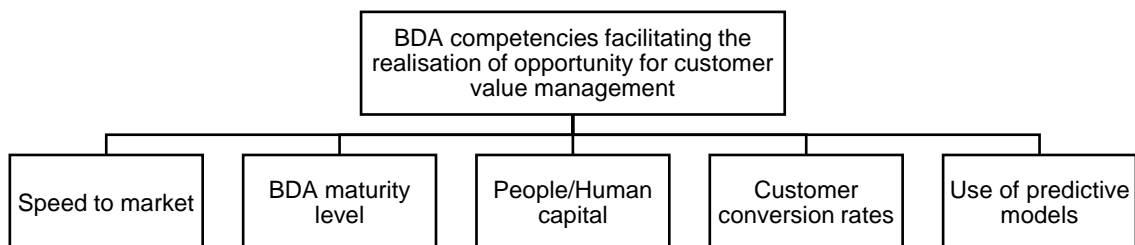


Figure 5: Big data analytics competencies enabling opportunity realisation for customer value management

Table 6 also provides a summary of these concepts in relation to the frequency of occurrences.

Table 6: Overview of themes of how big data analytics enables opportunity realisation for customer value management

Rank	Key themes	Frequency
1	Use of predictive models	5
2	Speed to market	4
2	Big data analytics maturity level	4
3	People/ human capital	2
23	Customer conversion rates	2

5.6.1.1 Use of predictive models

The findings indicated that big data analytics and the use of predictive models enhanced opportunity realisation through customer segmentation. According to participant 2, using data provides the *“power to build predictive model...and segment our base on behaviour”*. Furthermore, it was identified by participant 3 that using predictive models allows MNOs to *“leverage the opportunities...in real-time as the customer interacts”* with them. Two of the participants demonstrated how predictive models are being designed and used to predict and foresee consumer conduct, next best action, and next best offer. According to participant 4 the use of predictive analytics helps in *“processing the unstructured data”* about a customer, and in doing so, predict that customer’s *“behaviour”*, allowing for opportunity creation, or as put by participant 7, predictive modelling and analytics are used to *“catch you in the moment”*. Participant 10 also shared similar sentiments by stating that through big data analytics and predictive modelling, data can be used to *“tell a story”*. However, it was indicated that the use of big data analytics for predictive analysis and predictive modelling is still quite difficult for most MNOs due to technical skills.

5.6.1.2 Speed to market

There was a clear consensus that the speed to market, enabled through big data analytics competencies allowed MNOs to realise opportunities for CVM. As indicated by Participant 15, opportunity windows are *“very limited”*, hence organisations, by exploiting big data analytics, can realise opportunities *“in a very timely manner”*. Participant 6 expressed a similar perspective and indicated that there is a need to *“productionalise”* models of big data analytics so that opportunities can be realised

faster, and services and products deployed to the market over a shorter period otherwise the “*time to market*” will be compromised. Participant 14 shared a fascinating and distinct viewpoint, demonstrating that business speed has helped organisations to be more proactive and boost the precision of targeting consumers for the better. From the findings it is evident that big data analytics competencies allow organisations to enhance their speed to market, allowing them to realise opportunities for CVM.

5.6.1.3 Big data analytics maturity level

An interesting theme that arose was the fact that how fast opportunities were realised was also dependent on the degree of maturity of big data analytics within the organisation. According to Participants 5 and 9, to overcome the rapidly evolving world, big data analytics competence must be “*at a certain level of maturity*”. It was further noted that “*when you achieve a certain level of maturity*” it would support the business with “*being able to adapt, being able to absorb, be able to cut and move.*” Furthermore, in terms of business operations, “*it will be much easier to flow with the business*”. This was a clear indication that the level of big data analytics maturity within the organisation indicated how fast opportunities were realised for CVM. Participant 9 indicate that their organisation was only able to use the competence of big data analytics to realise opportunities faster only to a “*certain extent but not to the full extent they could*”, due to a lack of maturity. Participant 11 reflected that an organisation’s big data analytics maturity level is a key factor in how the organisation understands opportunities for CVM. The participant compared a rival competitor with the maturity level of their big data analytics competence and emphasised that their competitor was “*a step ahead in terms of the maturity of their ecosystem and their big data*” and that their company was constantly trying to “*build up all these capabilities*” as they go, hence opportunities for better CVM are more easily realised.

5.6.1.4 Human capital

Another recurring theme that was brought up is that opportunities being realised faster are a function of the MNO leadership and the role of human resources in using big data analytics competencies to enhance CVM. Participants 2 and 12 indicated that opportunities being realised faster are a “*function of the people using the data*”

and seeing the opportunities.” Depending on the people on the ground and the people on the teams and the people who lead those teams, “the value-add and the quickness of that value-add is dependent on those people”. Participant 12 alluded to the people aspect, in terms of human capital and skillsets, highlighting the “need” for a “skill set”, and “identifying capable human capital as individuals who need to support the transformation”.

Participant 12: “You need the skill sets. So, we might have team structures and all of this. And our skill set is on the scarce side We need to, through having a culture that adopts this, we need to also provide a budget to train people”.

These results indicate that in addition to big data analytics competencies, the people within these organisations need to be upskilled and trained to recognise opportunities for CVM. One of the participants highlighted the need to leverage data scientists/engineers' expertise and resources as a skill in big data analytics to rapidly realise opportunities for CVM.

5.6.1.5 Customer conversion rates

Customer conversion rates were used as a primary metric to assess the degree of value management of consumers, according to Participant 3. This metric helps organisations to evaluate whether they are making inroads for CVM in terms of their data analytics competence in realising opportunities faster. The participant claimed that *“improving conversion rates”* forced CVM professionals to begin to be *“open to trying out other things”* resulting in *“continuously doing something”* by organisations. Participant 8's view on conversion-focused on the product conversion rates, which ultimately affects the customer conversion rates – showing the link between the two. This then forces organisations to revisit their original hypotheses based on the product conversion rates and change them if need be, ultimately helping organisations improve their decision-making processes, and enabling faster recognition of opportunities.

5.6.2 Using big data analytics for long-term competitive advantage

Findings indicated that the competitive advantage of using big data capabilities include the fact that data can be more effectively analysed which helps in better understanding of customer needs, thereby improving customer experience. Also, the use of big data analytics sees improvement in human resource skillsets as people now must be trained and skilled up to use these technologies. Both these factors contribute to the long-term competitive advantage of the organisation. The main themes from this question are indicated in Figure 6.

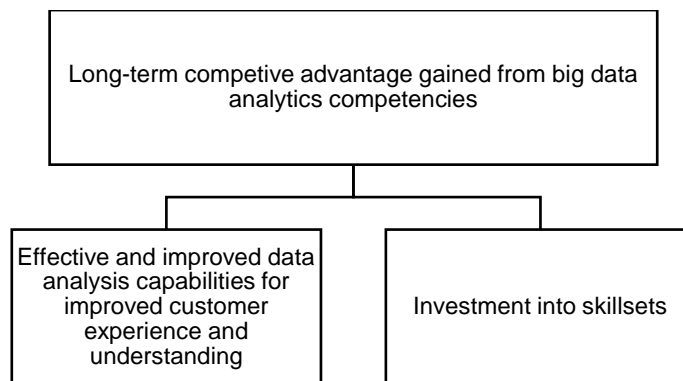


Figure 6: Long-term competitive advantage brought about by big data analytics competencies

Table 7 summarises the themes in line with the number of participants that spoke to that theme.

Table 7: Overview of themes identified for how big data analytics competencies bring about long-term competitive advantage

Rank	Key themes	Frequency
1	Effective data analysis capabilities for improved customer experience and understanding	11
2	Investment into skillsets	2

5.6.2.1 Customer experience and understanding

Almost all the participants, 11 out of the 15 participants interviewed indicated that customer experience and knowledge of customer ensures that big data analytics

expertise remains a long-term competitive advantage for CVM. Through the use of “*predictive analysis*”, “*segmentation*”, “*churn*”, it was noted that big data analytics could be used to understand customer behaviour and experience. Participant 11 commented that understanding customer behaviour is important as it allows the organisation to know “*where to reach them and what to offer when there*”. Similar sentiments were shared by participant 6 who connected customer experience to the whole customer journey offered by MNOs, “*customer experience is very important...customer experience talks about how efficient*” the end-to-end path should be.

Participant 6: “Customer experience, how efficient, that whole journey, the end-to-end journey is. So big data yes, big data is currently very critical but one thing that we must not forget is that the whole ecosystem is very important for big data to succeed because with big data we can build models until we become blue”

This indicated that by understanding customer experience it was possible to set goals on which path or offering to provide customers – one way to enhance competitive advantage in the long run. Big data analytics is thus crucial at large, but the whole environment is also important to achieve a competitive advantage in the long run.

Participant 14 spoke along a similar trajectory and proposed that long-term sustainable competitiveness for any operator in the future would come from the value proposition that focuses on customer experience - “*customer experience promise...that is where the sustainable difference is*”. The participant argued that pricing goods could be easily replicated, but it was not possible to reproduce customer experience and was, therefore, a critical component.

Participant 14: “We will not get a sustainable competitive advantage from just flashing prices. That is short term; we will not get it from just launching products. We are going to get it from like from what I'm going to call the fibre of the relationship that we build. It's like the layers”

This insight that sustainable competitive advantage will not be gained from just “*flashing prices*”, indicate that pricing might be a key differentiator and competitive

advantage in the short run, but not in the long-term among MNOs. Another perspective offered by participant 14 tied indicated that businesses that were successful in achieving *“longevity and competitive advantage”* ensured that they deliver on customer promise and solve customer problems. To further highlight these views on the role of customer experience in providing a competitive advantage, Participant 14 theorised that solving a problem a customer might face, even before they realise, they have a problem, sets one apart from rivals when it comes to competitive advantage through big data analytics competencies. Overall, it is evident that big data competence improves competitive advantage by shifting the focus to the customer experience through improved and effective data analysis accomplished through big data analytics.

5.6.2.2 Investment in skillsets

The role of investing in skillsets came up as an important factor driving long-term competitive advantage. Participants were of the perspective that training, education and upskilling people are a key differentiator in ensuring long-term competitiveness. This was about advancing the skillsets of those dealing with big data analytics to ensure that these competencies can be used and advanced with time. That is, as the world becomes more data-driven it is vital for organisations which want to retain their competitive advantage to ensure that their people have been *“trained up”* because eventually *“those are the types of skills that we will need to move ahead in what we call the fourth industrial revolution”*. It was also evident from the findings that the role digital skills and empowering people with such skills will play in ensuring big data analytics’ long term competitiveness, *“A competitor has invested heavily in terms of digital capabilities across the staff”*. Participant 13 highlighted the need to *“keep on upgrading their skills, and that needs to happen again for the three to six months’ timeframe”*.

Upskilling and training staff to utilise big data analytics effectively eventually determines the competitive advantage one organisation has over another, especially when MNOs are moving into more digital means of operating.

5.6.3 How big data analytics competence tackles the rapidly evolving environment

The final interview question under Research Question 2 aimed to provide insight into how big data analytics competence assists in addressing a volatile and rapidly changing industry. The data indicated three key recurring themes, in that big data analytics competence allowed (1) the organisation to understand the best offering to place to customers, (2) better understanding and efficiency of current operating models, and (3) agility. Figure 7 provides a summary of the key themes identified.

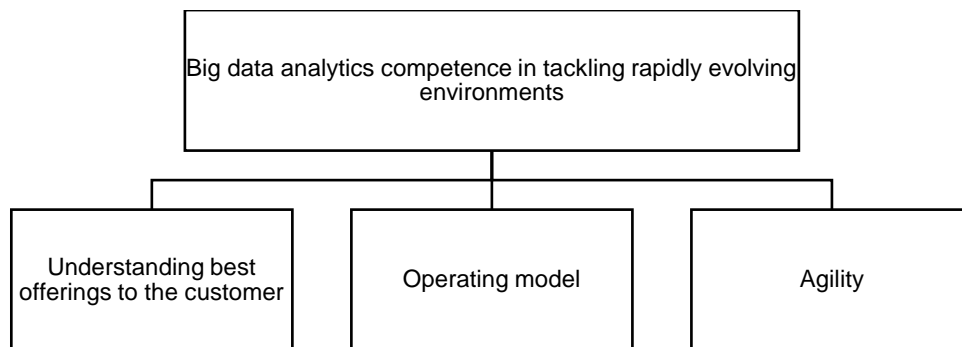


Figure 7: How big data analytics competence tackles the rapidly changing environment

Table 8 provides the frequency counts associated with each theme.

Table 8: Overview of how big data analytics competence tackles the rapidly changing environment

Rank	Key themes	Frequency
1	Understanding the best offerings to customer	7
2	Operating model	2
2	Agility	2

5.6.3.1 Understanding the next best offer to customers

Participants highlighted that understanding what could be offered to the customer next was one way in which big data analytics competencies were being utilised to address the rapidly changing environment. Participant 3 acknowledged that *“technology is changing at a very rapid pace”* and that *“the technology that we are*

using today, may not be the technology that we are using tomorrow". This premise, therefore, led to the suggestion that one way to address the rapidly changing environment is to use big data analytics competencies for *"trigger-based marketing, whereby customer needs are informed by some analytics in the background, to say that as customer engage with any of our channels, what is the next best offer that we can pass on to that customer?"* An interesting insight highlighted by the participant is that the era we are living in now requires that *"the traditional communication to customers... based on campaign flow charts"* be done away with in favour of trigger-based marketing backed by analytics.

Participant 7's view of this theme was based on the example of buying airtime, particularly how MNOs did not wait for the customer's airtime or data to run out before notifying them. This ties to the theme of understanding what best to offer the customer next. According to Participant 7, *"the moment you run out (of airtime or data), they catch you in the moment."* Whilst this theme was not well articulated by the participant, he did however infer key insights, particularly how their view links this ability to notify the customer as soon as their airtime runs out with predictive analytics and the ability to offer customers propositions at the right time. Participant 9 noted that it was possible to understand what a customer's preferences and likes are, and this created an avenue to keep up with the rapidly changing environment.

Participant 9: "We're getting a better understanding of customers in terms of building a profile against them and understanding what their preferences are and treatments. So maybe it would make a lot more sense to create a new kind of package towards them where they can buy a dedicated content type for a reduced price. We are able to almost anticipate what the customer needs are".

Overall, it is evident that by using analytical competencies, MNOs can recognise customer needs, which are constantly changing, and offer them the best propositions, at the right time.

5.6.3.2 Operating model

Participants indicated that another key contributor in how MNOs used big data analytics competencies to address the rapidly changing environment was also

dependent on the operating model or strategy employed by the organisation. An interesting view offered by Participant 9 highlighted key deficiencies that can be attributed to the operating model of the MNOs; *“because everything's been run in very much an enterprise type fashion where you build the capability of the pipeline going through, but the ability to shift it quickly is not there...”* This implies that there need to be improvements to the internal processes which suggests that there need to be changed to the operating model to fully utilise big data analytics competencies to address the rapidly changing environment. According to Participant 15, MNOs are not able to use the competencies that they must leverage off these dynamic changes because it is *“a structural weakness within the company”* and that it had *“nothing to do with data, absence of data or the absence of analytics”*. This supports the notion that the operating model plays a key role in the big data analytics competency in addressing dynamic changes.

5.6.3.3 Agility

From the findings it was also evident that use of big data analytics capabilities allows for agility, that is MNOs *“can respond with an agile way, so your agility is again driven by the maturity of your enablers”*. A key insight to note from the participant 13's view is that agility goes hand and glove with the maturity of the enablers, and *“the better and the more mature you get in driving all of the enablers across this value chain, the faster you can respond to changes.”* This implies that agility and maturity are very much interdependent, and one cannot have agility without maturity. Furthermore, participant 8 noted that agility has been embedded through the offerings the MNO offers.

Participant 8: “We then gave them the ability to connect to the Internet and connect differently and gave them, let's say, more information at their fingertips. We give them agility”.

5.6.4 Summary of findings for research question 2

The objective of this research question was to uncover how their organisations transform the competence of big data analytics into a dynamic capability. Most participants agreed that speed to market, the degree of maturity, individual abilities and the use of consumer conversion rates all help organisations understand

opportunities for CVM faster. Furthermore, it was identified that big data analytics competencies allow long-term competitive advantage by allowing organisations to manage customer experience and invest in human skillsets. Ultimately, participants described the awareness of the next best customer proposition, operating model and agility through big data analytics-enabled organisations to address the rapidly evolving environment. What should be noted is that there is a link between the maturity of big data analytics and how fast they respond to a changing environment. provides a summary of the key themes identified in research question 2.

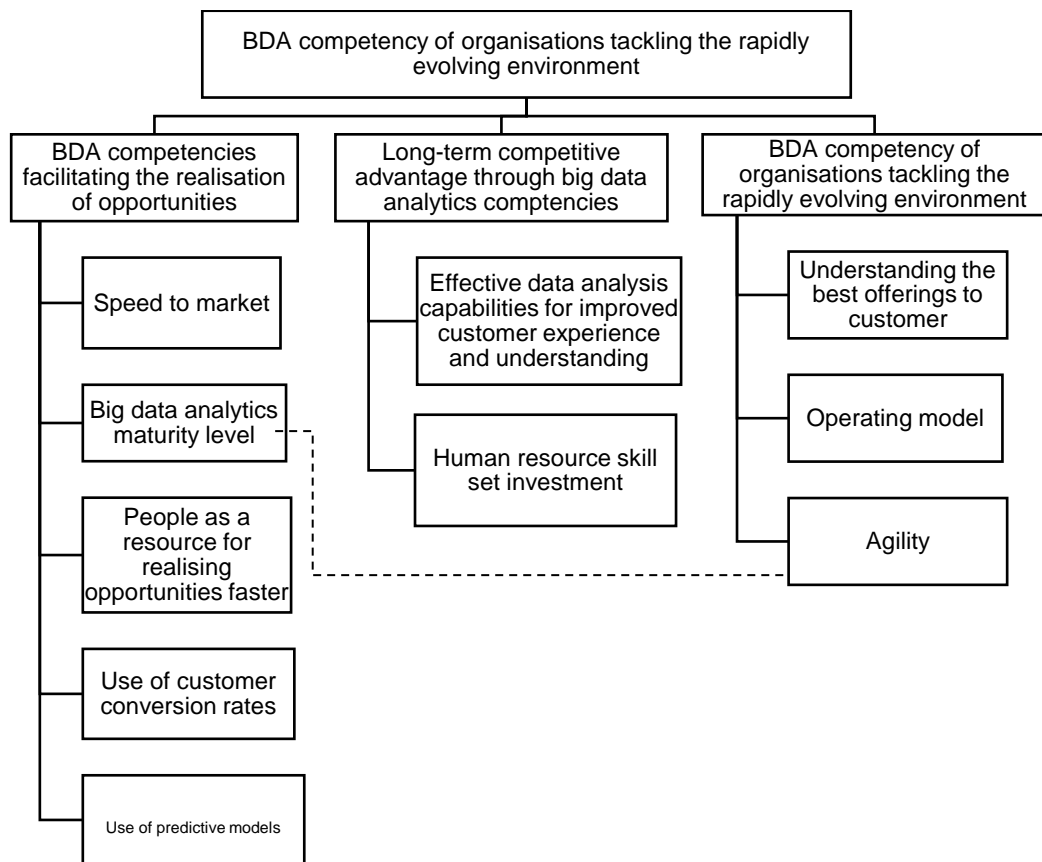


Figure 8: Graphical summary of the findings of research question 2

5.7 Findings for research question 3

Research question 3: How do MNOs embed big data analytics competence to lead a sustainable competitive?

This research question intended to uncover how big data analytics competencies were embedded into MNOs allow for sustainable competitive advantage. Four interview questions were formulated to answer research question 3.

5.7.1 Value delivered to the customer through big data analytics competency

Participants noted that through their organisations’ big data analytics competencies they were able to add value to customers because they could (1) deliver targeted and personalised services, (2) they were able to develop a customer-centric strategy, (3) enhance customer affordability, (4) enable cross-selling and up-selling, (5) drive customer experience, and (6) allow a frictionless customer journey. Participants identified these six themes to be key in delivering value to customers, all enhanced through their organisations’ big data analytics competencies. These drivers of customer value are depicted in

Figure 9.

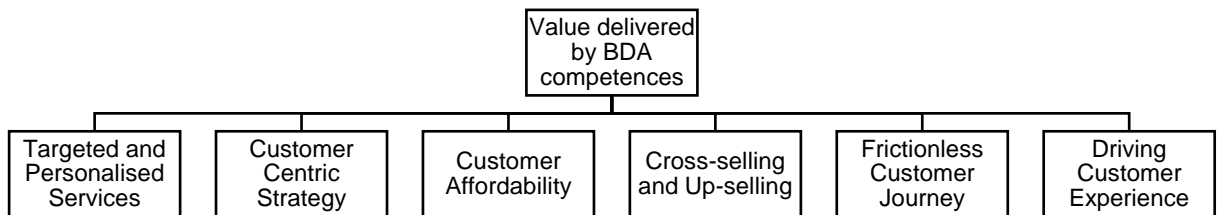


Figure 9: Value delivered to customers by big data analytics competencies

Table 9 indicates the frequency of mentions of the particular theme.

Table 9: Overview of how big data analytics competencies drive value

Rank	Key themes	Frequency
1	Targeted and personalised services	8
2	Customer-centric strategy	5
2	Customer affordability	5
3	Cross-selling and up-selling	3
3	Frictionless customer journey	3
3	Driving customer experience	3

5.7.1.1 Targeted and personalised services

Most participants identified that big data analytics competencies allow MNOs to provide targeted and personalised services to customers, which enhances value to their customers. According to participant 3, the use of targeted communication is possible through big data analytics.

Participant 3: "They use the wealth of the information that they have created to start targeting customers and to start doing a lot more targeted communication with their customers to drive value".

Participant 6 explained the idea of personalisation using an example of buying airtime, saying *"if you have got the unlimited voice, we will not sell you voice"*. This indicates that through these big data analytics competencies, organisations can identify what customers already have, and consequently can look to providing complimenting offers or the next best deal targeted specifically towards them. Participant 8 indicated that through big data analytics and the insights provided, they can communicate to their customers in a personalised manner.

Participant 8: "Big data and understanding and insight to make recommendations to the customer to be able to build that relationship. And we sort of calling it now hyper-personalisation...it speaks directly to that customer alone...all of these decisions, all of these recommendations that we make to customers is based on data".

Participant 12 noted that by *"understanding the customer intimately"* and *"exploring all the big data around this customer and his behaviour so that you when you do interact with them, that you are interacting with them in a personalised way"*. Similar responses were offered by Participant 13 who indicated that customers have a *"different persona"* hence through their big data competencies organisations can offer services that cater to these different customer personas which require different considerations and care.

Participant 13: "Serve every customer based on their persona...have a professional segment, the qualifications segment...have a package specifically designed for customers and to fulfil their needs".

5.7.1.2 Customer-centric strategy

Participants noted that through big data analytics competencies, it was possible to redefine and improve current customer strategies to these strategies more customer focused. Participant 10 indicated that value is created because there is concern about *"solving the customer's needs"*. The above corresponds to the theme of customer-centricity, where solving the needs of the customer generates value, and illustrates that the customer is king. However, with satisfying corporate expectations, there must be a win-win. Participant 10 emphasised that in solving the needs of the customer by the needs of the company should also be addressed suggesting that there must be a win-win situation or a place of balance where both consumer and organisational interests are satisfied.

5.7.1.3 Affordability

A third of the participants emphasised that affordability is a crucial attribute that can be monitored and improved through the competence of big data analytics. Participant 6 emphasised that their organisations' big data analytics competency allows them to *"look at affordability"* suggesting that what they sell to their customer is *"price-sensitive"*. It interlinks affordability and price sensitivity. Participant 8 indicated that *"affordability is a big issue in Africa"*, implying data in Africa is pricey. Participant 11 pointed to the functions of affordability in providing value to customers: *"There's convenience, there's affordability, and you're making it cheaper for people to connect because the reality is we cannot sell an expensive data bundle"*. From this, it is evident that big data competencies allow MNOs to understand the affordability of consumers, hence can cater to this.

5.7.1.4 Cross-selling and upselling

Three participants noted that value to the customer is created through the application of cross-selling and up-selling, and this occurs through customers *"recommending"* their services to other customers. An interesting point shared by Participant 9 is that

there is a link between anticipating what the customer needs and whether they will be able to purchase more, cross-sell or upsell services to them in future. Therefore, if MNOs *“almost anticipate what the customer needs are, they are much more likely to purchase more items from you or up-sell or cross-sell.”*

Participant 11 noted that big data analytics allows their organisation to cross-sell and up-sell.

Participant 11: “Our efforts are focused on either selling you more stuff and that is in upselling or cross-sells. If we want to keep you for longer we should be able to understand if you want to leave...this is how we use data”.

A similar view was shared by Participant 13 who highlighted the use of models to *“predict for every single customer, what kind of a package it needs to be.”* This level of predictability specification implies that once an MNO can predict for each customer what package they require, it is easier to upsell and cross-sell.

5.7.1.5 Customer journey

Several participants indicated that providing customers with a frictionless journey adds value to them, and this could be achieved through the big data analytics capabilities the organisation has achieved. Processes or activities such as buying airtime, performing a sim swap, activating a post-paid contract, without any hassles added to customer value as indicated by Participant 4. Participants alluded that using big data analytics competencies, it was possible to understand where there are breaks or challenges within the customer journey and address these. The seamless the customer journey is, the better the value created; *“what are customers happy with, what are they unhappy with... working hard on high-value customer journeys and in making sure that each customer journey is seamless”*. An insight was proffered by Participant 12, who opined that the data analytics capabilities enable an analysis of customer data that will in turn help to *“create more efficient efficiencies around journeys and processes”*. According to Participant 5 *“customer journey”* informs problems in the procedures. This is in alignment with the other participants' views on the need to understand the customer journey to create efficient processes and near-seamless customer journeys.

5.7.1.6 Driving customer experience

Participants also pointed to customer experience as a way in which value is added to customers. According to Participant 5, there is a link between personalisation and driving customer experience, *“look at driving customer experience and giving customers the best value, they can get for their money... which is a function of personalisation”*. A key insight to note is how driving customer experience is a personalisation feature as well as how it applies to giving customers value for their money. Similar sentiments were shared by participant 6 who indicated that *“customer experience is very important...customer experience, talks about how efficient”* the end-to-end path should be.

5.7.1.7 Other themes

Participants highlighted a myriad of other themes that they believed to be values that their organisations deliver to customers using big data analytics. Participants identified several customer-related themes such as providing affordable customer propositions, contextual marketing for customers, retaining customers, educating the customer, customer behaviour leaning, customer segmentation, providing customer convenience, customer convenience, real-time contextual prediction of customer needs, providing customer value by choice, establishing estimated value points for customers and understanding customer preferences. Other values identified to focus on real-time monitoring and intervention, delivering the right products & leveraging the big data analytics insights, offering location-based products, accelerated digital transformation, the ability to predict the likelihood to churn, and the ability to monetise services.

5.7.2 How big data analytics competence is embedded within the organisation

In asking this question, the aim was to understand how organisations went about incorporating big data analytics competencies. Four key themes were highlighted by the participants. It was clear that embedding of big data analytics competencies was achieved through data governance, skills and training and the culture of the organisation. Figure 10 indicates the main themes uncovered through this question.

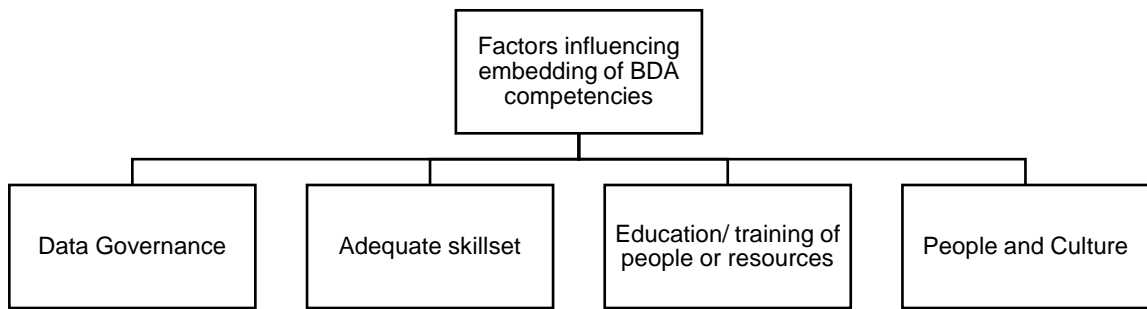


Figure 10: Themes of big data analytics uses and how they are embedded in the organisation

Table 10 provides an overview of the frequency counts for each identified theme.

Table 10: Overview of factors influencing embedding of big data analytics competencies

Rank	Key themes	Frequency
1	Data governance	2
1	Adequate skillsets	2
1	Education/ training of people or resources	2
1	People & culture	2
1	Data governance	2
1	Adequate skillsets	2

5.7.2.1 Data governance

There was a clear indication from participants that the level to which big data analytics competencies are embedded within their organisation was attributed to data governance, and particularly data governance forums. The data governance forums provide a platform where the quality of the data is determined and “*a much more prescribed kind of semantic analysis*” to see what people think and where the focus needs to be improved on. According to Participant 14, big data analytics competencies are embedded in their organisation by data governance measures that “*make everyone realise the importance of data, at every department within the organisation.*” The participant further indicated that it was essential to “*make policies about data, how to maintain the data, how to report the data. This needs to be a*

single definition of data cutting across the organisation". This makes sense as data governance informs the policy strategies about data quality and how to harness the data, subsequently leading to better ways of sustaining and managing the data and incorporating big data analytics competencies.

5.7.2.2 Adequate skillsets

There was a clear consensus that adequate embedding of big data analytics competencies will only occur if there is a skill set within the organisation that allows it. These could be the skills required to handle and process the data for effective analysis. Participant 12 opined that big data analytics competencies are embedded through the appropriate skills. It was noted that for big data analytics competencies to be embedded *"you need the skill sets"*, implying that specialised skills sets are a requirement for big data analytics competencies to be embedded in organisations. Participant 15 postulated that a lack of *"people skills and technical maturity"* was one of the reasons why their organisation was falling behind with respect to big data analytics competencies being embedded in the organisation. This view further supports the view that big data analytics competencies are embedded through skill sets.

5.7.2.3 Education and training of staff

In line with the notion that there need to be adequate skillsets for effective embedding, participants highlighted that the incorporation of big data analytics competencies is also impacted by the level of education or training provided to staff within the organisation. According to Participant 12, there is a need to train people and invest in their upskilling. The participant noted that there should be sufficient budget to train staff, and also to hire skilled staff.

Participant 12: "We need to, through having a culture that adopts this, we need to also provide a budget to train people. And when we do go to the market to find a contract, we have a dispensation to spend a little bit more money because data scientists are expensive".

Participant 15 shared similar views on the need to train people, through their organisation's learning and development program.

Participant 15: “You also need to bring in training and so on. And this is what the CVM operations team have to do together with the different businesses units”.

5.7.2.4 People and culture

Participants also noted that organisational culture and their human capital also influence how embedded big data analytics competencies are within their organisations. According to Participant 12, the view is that big data analytics competencies are embedded *“through having a culture that adopts this,”* which speaks to the culture of the organisation.

5.7.2.5 Other themes

Once again, a few interesting insights were shared by participants in relation to the factors that influence the embedding of big data analytics competencies, however, these themes did not recur from participant to participant. One insight offered is that big data analytics competencies are embedded through people and skills. Also, the integration of a business intelligence competency centre aids in the embedding of big data analytics competencies; *“a function called BICC or Business Intelligence Competency Centre... to talk to all aspects of data. So, where the data is stored, for how long, the regulatory aspect of it”.* One of the participants also indicated that big data analytics competence is embedded by using models built from a big data environment and incorporating them into the customer journeys such that whenever there is an interaction with customers it then allows MNOs to then take the corrective measure or the right action for their customers.

5.7.3 Differentiation through big data analytics competence

In line with adding value to research question 3, this question aimed to uncover how organisations are using their big data analytics competencies to differentiate themselves from others. All participants mentioned that big data analytics competencies were not the only factor allowing for differentiation, however, through big data analytics competencies, differentiation was possible because of human capital and clear strategic visions. Figure 11 and Table 11 summarise the findings of this interview question.

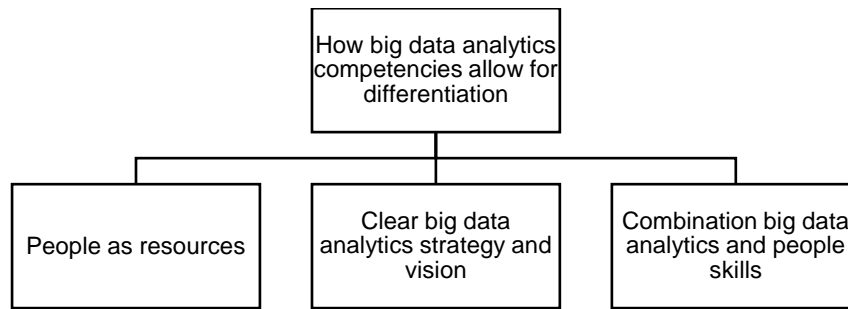


Figure 11: Themes influencing organisational differentiation

Table 11 below shows the key themes in relation to the frequency counts obtained.

Table 11: Overview of themes on how big data analytics competencies allow differentiation

Rank	Key themes	Frequency
1	People as resources	4
2	Clear big data analytics strategy and vision	2
2	Combination of big data analytics and people skills	2
1	People as resources	4
2	Clear big data analytics strategy and vision	2
2	Combination of big data analytics and people skills	2

5.7.3.1 People as resources

There was a clear notion among the participants that differentiation because of big data analytics competencies as a result of human capital (people as resources). Findings indicated that big data analytics alone is not the answer, but people skills are critical to the ecosystem. As indicated by Participant 1 the integration of big data analytics competencies has enabled the upskilling of people with skills *“in the right domain and right technologies”*. Participant 2 noted that for technology to add value, people need to be able to use it effectively, *“it is not good enough to have the technology, you still need that second layer of people to use it to bring value which is why probably the only competitive add you can get in the market when it comes to our competitors is to have the right people that are smarter than their people”*. Furthermore, participants highlighted from a technology and tools point of view, the

same vendors sell the same products to everyone, so this does not necessarily give an edge with the only difference arising in the quality of human capital and people skills available to use the technology. Like the other opinions shared, Participant 10 acknowledged that it is the right skills and the right technical capabilities obtained through the people in the organisation that gives the competitive edge. Participant 6 alluded to the people behind the technology because *“big data itself is just a capability... and unless if you have got the smart people behind it to make the platform to do what you want it to do, it won't do anything much”*.

5.7.3.2 Clear strategy and vision

An interesting theme highlighted showed that organisations with a clear big data analytics strategy and vision use that to their advantage to stand out from the rest of the competitors. Participant 12 opined that if an organisation understood its strategy and vision, it was already setting itself up for huge success. Participant 14 articulated the role of strategy and vision well and how it is a competitive advantage, *“I think that from a vision perspective, I believe in our vision and I think that vision has been developed at the right level and I think that if we can execute on that vision it can set us apart from our competitors.”* An important insight is the ability to execute the vision, which can potentially be a competitive advantage for organisations which successfully execute their visions.

5.7.3.3 Combination of big data analytics and people skills

This theme, though like people skills, emphasised the need for a combination of big data analytics and people skills as a factor giving a competitive edge over their competitors. Participant 6 highlighted that *“it is a combination of the platform itself being robust and making sure it is stable, it is scalable, it's the latest versions and then from there the people behind it make it a success”*.

5.7.4 Ease of replication of big data analytics competencies by competitors

This question sought to determine whether big data analytics capabilities could be replicated by competitors, and if so, how easily it could be done. The findings revealed mixed responses, with most participants indicating that replicating their competencies would not be easy for competitive organisations. This showed that the

participants recognised the sophistication and novelty of organisations using big data analytics capabilities to differentiate themselves. Sustainable competitive advantage was then related to the versatility of the big data analytics competencies used by an organisation. The main themes identified is presented in Figure 12, with Table 12 providing an overview of the frequency counts each theme achieved.

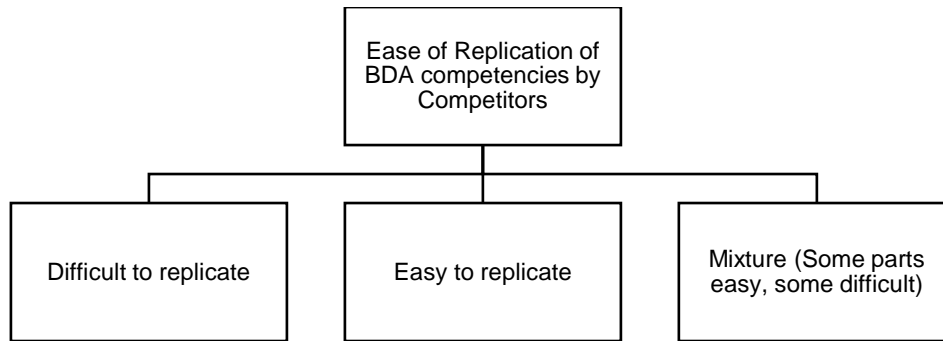


Figure 12: Key themes on how easily big data competencies can be replicated by competitors

Table 12: Overview of how easily big data competencies can be replicated by competitors

Rank	Key themes	Frequency
1	Difficult to replicate	6
2	Easy to replicate	5
3	Mixture (Some parts easy, some difficult)	3

5.7.4.1 Difficult to replicate

The main reason why it is difficult to replicate big data analytics competencies across competitor organisations is a result of the learning process of getting feedback and incorporating that feedback to do things better. Furthermore, there is a governing strategy when it comes to an organisation’s big data analytics competencies, and as postulated by Participant 4, it is not easy to replicate because even if the strategy is known by competitors, it is the execution of the strategy that makes it difficult to replicate. Participant 11 looked opined that it was not easy to replicate because *“it is a journey that takes years to build up”* and that level of competence even after a competitor has built up a comparable level of competency *“will always be of a different flavour”*.

Participant 11: "It is a journey that takes years to build up, that level of competence even after you have built up a comparable level of competency it will always be of a different flavour. No two organisations are going to be the same and will use it the same way, so you will always find differentiating factors within ultimately how you express this usage of big data".

Participants highlighted some of the factors which makes replication of the big data analytics competencies difficult. Particularly, the operating model, organisational culture, people skills/human resource skills, big data analytics maturity level and ability to fully exploit the big data analytics competence as key factors that make replication of big data analytics competencies difficult. These spoke to core themes such as the organisational culture of data analytics, underlying data quality as other factors that make replication difficult. Participant 12 commented that replication is difficult because each company has a different intellectual property and strategy that they follow.

Participant 12: "IP lies in how we are analysing and building our models about our customer, so difficult to replicate".

Strategy related themes that some of the participants highlighted as being difficult to replicate include change management, dynamism, the scale of investment (as it is informed at strategy level), transformation journey and strategy execution. One of the participants also identified customer understanding and connectedness as a factor which makes replication of big data analytics competencies difficult.

Participant 4: "It is not easy because I think, first of all, the strategy would be different. But even if it is known. Even if you know a company's strategy. The execution of that strategy is what wins. Rather than the strategy itself.

Interestingly, participant 8 identified CVM monetisation as a factor which makes replication of big data analytics competencies difficult.

5.7.4.2 Easy to replicate

Five out of the 15 participants interviewed, however, felt that big data analytics competencies are quite easy to replicate by competitors. There was a notion that

since all the organisations were competing for the same market share, strategies are easy to replicate.

Participant 3: "So I do not think we have an advantage. I think the suppliers that help us sort of define Our Data from a what is required as a foundation of basic. We have the same views".

Participant 14 suggested that *"it is replicable by competitors"* primarily because organisations use technology partners who offer a remarkably similar value as other operators.

This implied that similar offerings were provided across the MNO networks. However, it was also noted that it is not so much about the technical part, but the skills and people that are brought in that distinguishes organisations.

5.7.4.3 Mixed

Some participants indicated that certain aspects are easy to replicate, while others not. Participant 10 expressed this by noting that the technical aspects may be replicable by competitors, but the personal elements not as such.

Participant 10: "From a technical capability perspective it can be replicated. from a skillset and technology or a personal perspective it can't be replicated because you can hire in those people".

Participant 8 was of a similar opinion and suggested that information gathered could be replicable but the personal element was not, *"you can't look at this information in isolation. You can't make this decision on technology alone"*. This was also iterated by participant 6, who suggested that it is possible to replicate the *"big data environment but whatever capabilities that are on the channel for example on the app site, on USSD, on our charging platform on other channels that are going to be a differentiating factor"*.

5.7.5 Summary of the findings for research question 3

The objective of research question 3 was to uncover how organisations transform the competence of big data analytics into a sustainable competitive advantage. It

was clear that big data analytics competencies do add value to the customer as it allows organisations to offer targeted and personalised offerings, which improves customer retention. Also, to embed big data analytics competencies, there is a level of governance, training, and upskilling of staff, all which contribute to differentiation among competing organisations. It was noted that big data analytics competencies are not easy to replicate because there are underlying strategies, skills and resources used that make this replication hard. Interestingly, though, it was evident that it not merely the technology that provides differentiation but rather the skills, culture and people that allow for differentiation.

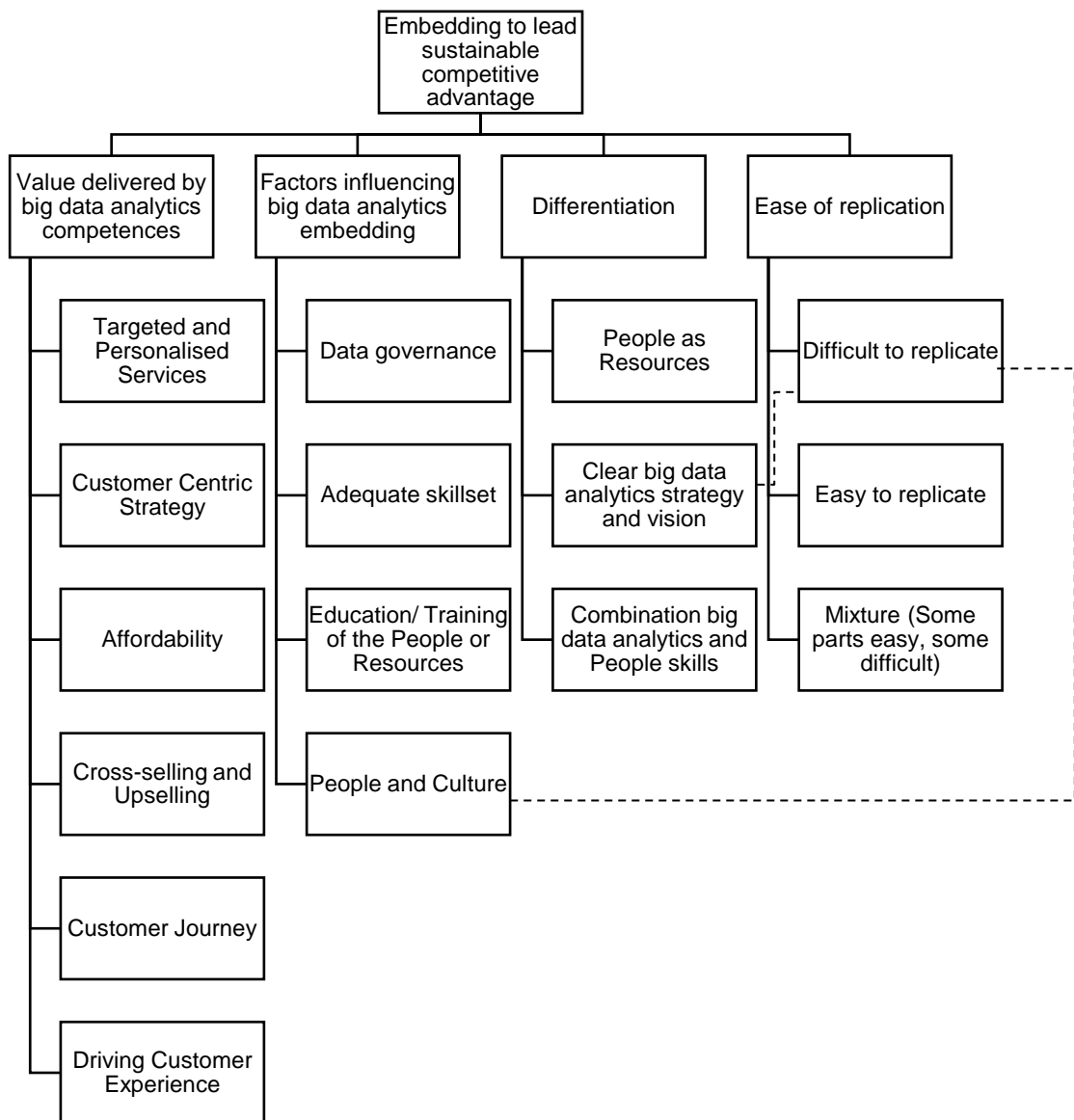


Figure 13: Graphical summary of the findings of research question 3

5.8 Conclusion

Most participants agreed that their big data analytics maturity levels were still not fully developed or matured, and this affected and how well their MNOs were unlocking big data analytics capabilities. Market, the big data analytics maturity level, people skills and the use of customer conversion rates were factors worth considering. Customer experience and human resource skillset investment were some of the ways identified by participants for ensuring that big data analytics competence remains a long-term competitive advantage for CVM. Participants identified themes such as understanding the next best offer to the customer, operating model, and agility as ways to enhance big data analytics competency in addressing the rapidly changing environment or dynamic changes. Most participants agreed that it was not the technology or the platform that gave the competitive advantage, but instead the people skills behind the technologies. Furthermore, whilst big data is currently critical, the whole ecosystem is especially important for big data to succeed. Most participants indicated that their big data analytics capabilities were difficult to replicate because of factors such as the difficulty in replicating the operating model, organisational culture, underlying data quality and the scale of investment the MNOs put into the big data analytics platforms. Lastly, participants further alluded that big data analytics competence was not yet fully embedded in their organisations and this was largely because of the maturity level of their big data analytics.

Chapter 6: Discussion of Results

6.1 Introduction

This chapter discusses in detail the results presented in Chapter 5 and relates these findings to the literature review presented in Chapter 2 to identify new insights that contribute to the concept of big data analytics as a dynamic capability to enhance customer value management. The findings address and proffer insights on the three key research questions: (1) How Mobile Network Operators (MNOs) use big data analytics competence to enhance customer value management; (2) ways in which MNOs turn big data analytics competence into a dynamic capability; and (3) whether and to what extent MNOs embed big data analytics competence to lead a sustainable competitive. The focus was to understand the role of big data analytics as a dynamic capability and how it could be utilised to enhance CVM for sustainable competitive advantage. The chapter is divided into three sub-sections, wherein the findings of each research question are corroborated with literature, this to assess whether there is alignment or contradictions with the literature and if there are any new insights that can build on the current body of literature on big data analytics, dynamic capabilities and CVM.

6.2 Discussion of results for research question 1

Research question 1: How do Mobile Network Operators (MNOs) use its big data analytics competence to enhance customer value management?

Research question 1 aimed to determine how the Participants' respective organisations use its big data analytics competence in enhancing CVM. The findings were very much in line with what has been established in existent literature. The research questions are discussed in line with the key themes established in chapter 5.

6.2.1 Organisation's big data analytics competence

Participants inferred that the level of maturity when it comes to big data is a key determinant in any organisation's big data analytical competencies. According to Halper and Krishnan (2013), maturity can be defined as the evolution of an organisation to integrate, manage, and leverage all relevant internal and external

data sources. This is tantamount to creating an innovative ecosystem, delivering insightful business value, and enabling impactful transformations.

Most participants indicated that in terms of big data maturity, they were still at a level of low maturity. This also falls in line with the study by (El Houari et al., 2015) which indicates that many organisations are still in the early stages of reaping the benefits of big data and analytics. Also, as opined by most participants, and in line with (Nda & Hamid, 2020) to appreciate the benefit big data analytics competencies might offer organisations it is worth examining the maturity level(s) of that organisation. Although data did not evidence at what specific stages of maturity their big data analytics competencies were, it is noted that there is a direct correlation between the level of maturity and the level of big data analytics competencies the organisation has. The reasoning being the more mature the organisation in terms of big data analytics capabilities, the more significant the big data analytic competencies within the organisation. This is consistent with findings by El-Darwiche et al. (2014) who highlighted that a high maturity level correlates to the increase of top-line revenues and reduction of operational expenses and better customer experience.

Also, it was evident from the findings in Chapter 5 that organisations enhanced CVM using big data analytics using (1) targeted propositions, (2) personalisation and (3) understanding customer behaviour.

6.2.2 Targeted propositions

In line with findings from (Kotler, 2017; Payne et al., 2017), which states that factors that drive CVM include those that can accurately pinpoint the needs of the target market and those which optimise the customer-base value (Verhoef & Lemon, 2013), participants talked to the use of targeted propositions as a way to enhance CVM. This entails providing customers with the most relevant content and products, 'targeted' at them. These findings identify with existent literature such as Erevelles et al. (2016) that opined that organisations that leverage customer insights, utilising big data to understand and respond to changing consumer needs through their dynamic capabilities enhance CVM.

6.2.3 Personalisation and understanding customer behaviour

Participants highlighted the use of personalisation and understanding customer behaviour techniques, as ways of enhancing customer value, alluding to the findings that big data analytics provides extraction of valuable insights from data via creation and distribution of reports, building and deploying statistical and data-mining models, exploration and visualisation data, sense-making and other related techniques (Grossman & Siegel, 2014). The themes highlighted by participants that fit the 'extraction of valuable insights from data' profile include cross-selling and upselling, contextual marketing, real-time analysis, and real-time predictions for the customer's next best action and next best offer, location-based propositions. These key themes are well aligned with the underlying literature that agrees that big data analytics is a powerful tool that offers data extraction and data-driven decision making (Srinivasan & Swink, 2018).

6.2.4 Summary of discussion for research question 1

The aim of research question 1 was to determine how MNOs use their big data analytics competence to enhance customer value. Overall, there was consensus from the participants that organisations need a level of maturity in terms of big data analytics to effectively enhance CVM. Aligned to El-Darwiche et al. (2014), MNOs in South Africa are still in the early stages of reaping the benefits of big data analytics and this is because of the big data analytics maturity level of these organisations. Furthermore, in achieving a good level of big data analytics maturity, it was evident that the main drivers enhancing CVM was possible because big data analytics competencies allowed MNOs to offer targeted and personalised services to their customers, and they were able to understand their customers better. Interestingly, literature Srinivasan and Swink (2018), Erevelles et al. (2016) and Grossman and Siegel (2014) only provided general views, highlighting how big data analytics provides extraction of valuable insights from data and how this helps in making data-driven decision making. The findings, however, clearly indicated how big data analytics competencies enhance CVM.

Overall, it is evident that targeted propositions, personalised services and understanding customer behaviour identified through big data analytics enhance

CVM, and how effective the organisation's big data analytics competency depends on the level of maturity of the organisation.

6.3 Discussion of results for research question 2

Research question 2: How do MNOs turn big data analytics competence into a dynamic capability?

The objective of research question 2 was to uncover how MNOs use big data analytics competence into a dynamic capability. This research question sought to find any similarities and or differences with the literature on how firms turn big data analytics competence into a dynamic capability. Teece et al. (1993) defined dynamic capability as the ability of a firm or organisation to use and integrate internal and external skills in rapidly changing environments. Key to note from this definition is the association of dynamic capability with volatile environments. Furthermore, this definition is consistent with the views in various literature studies that allude that dynamic capabilities contribute to organisational performance and sustainable competitive advantage in a VUCA environment (Li & Liu, 2014; Lin & Wu, 2014; Osisioma et al., 2016; Wu, 2010).

6.3.1 Big data analytics competencies in realising opportunities for customer value management

In trying to understand how big data analytic competencies can be used as a dynamic capability in ever-changing environments, the researcher sought to understand how these competencies helped in realising the opportunity for CVM. The findings in Chapter 5 indicated that CVM is enhanced because big data analytics competencies improve speed-to-market and investment into human capital and enable customer conversion rates and the use of predictive modelling. An underlying factor that was outlined was that the effectiveness of these competencies depended on the level of big data analytics maturity as well.

6.3.1.1 Use of predictive analytics

A key finding from the study is the use of predictive analytics or predictive models in realising opportunities for CVM. Most respondents alluded that predictive analytics

is an important big data analytics competency that helps in realising opportunities for CVM, particularly how within their MNOs they used processes to discover meaningful insights and patterns from data. According to Kumari et al. (2016) predictive analytics is defined as the process of discovering meaningful patterns of data using pattern recognition techniques, statistics, machine learning, artificial intelligence, and data mining. This definition solidifies the alignment between the study findings and the literature as techniques highlighted by respondents are well aligned with the definition of predictive analytics in the existing literature.

6.3.1.2 Speed to market

Through big data analytics capabilities, it was evident that MNOs were able to process information and data received at much faster rates, enabling them to offer customers more in less time. These findings align to those by Hung et al. (2006); Tsai et al. (2015) and Wamba et al. (2017), which show that big data analytics competencies enable managers, statisticians, trend analysts, among other professionals, to systematically analyse rapidly incoming data. This ability to analyse rapidly incoming data through techniques such as real-time decision making, data exploitation in real-time as well as readjusting propositions in real-time were highlighted in the findings and speaks to the overarching theme of speed to market. Thus, the use of big data analytics to make sense of such vast amounts of data can help organisations 'reconfigure' their strategies based on observed trends, within their competitive environment, and thereby improve opportunity realisation for CVM (Mikalef et al., 2020). Interestingly though, Chen, Reilly and Lynn (2005) postulated that speed of the market is less important when market uncertainty is low, that is, market uncertainty results from not knowing what the customers desire from the new technology. While findings indicated that big data analytics competencies assist with speed to market, (Chen et al., 2005) suggest that the degree of technological advancement might not have the perceived impact. Overall, there is an alignment that big data competencies improve speed to market, which in turn allows faster opportunity realisation for customer value management.

6.3.1.3 Maturity levels

One key overarching theme that was mentioned time and time again was the role of big data analytics maturity of the organisation. According to Nda and Hamid (2020) in the context of big data analytics capabilities, maturity can be described as a condition of being ready and flexible. Also, El-Darwiche, Koch, Meer, Shehadi and Tohme (2014) showed that there is a correlation between big data analytics competencies and organisational performance. Overall, there is an alignment between the findings and extant literature. There is clear evidence that the more the mature big data analytics is within the organisation, the more capabilities the MNO can achieve, and the more the opportunities that can be realised.

6.3.1.4 Human capital

A key finding of the study is the big data analytics competencies alone is not sufficient to ensure the long-term competitive advantage of MNOs. Rather, these competencies need to be complemented with human capital and skills. Bitencourt et al. (2020) classified human capital under the resource's antecedents for dynamic capabilities. This implies that human capital that deals with big data analytics need to be competent in handling data and information, and through this only are opportunities going to be realised. Big data analytics is the tool; however, people are needed to interpret and decipher whether there is opportunity present.

6.3.1.5 Conversion Rates

An important finding from the study is the use of conversion rates as a key metric to assess whether MNOs are making inroads for CVM in terms of their data analytics competence in realising opportunities faster. The literature classifies improving conversion rates for any metric in general as Conversion Rate Optimisation (CRO) (Saleem et al., 2019)). Conversion Rate Optimisation is defined as a series of different procedures and data-driven techniques through which any website, application or even an advert could be improved in order to achieve increased sales and revenue, better usability, or higher engagement (Saleem et al., 2019). There is therefore aligned with the study as respondents articulated how conversion rates, for example, product and customer conversion rates were used in improving their organisations' decision-making processes.

Furthermore, posit that platforms that enhance CRO usually gather users' data for their utilisation to increase sales, as well as to upsell or cross-sell their user's behavioural data. This links to the up-selling and cross-selling theme respondents highlighted as a way of realising opportunities faster. This further buttresses the notion that there is alignment between study findings and the literature. In the study conducted by Saleem et al. (2019) where they showed how big data can be experimentally used at a large scale for marketing purposes at a mobile network operator, results showed that using behavioural patterns increased the conversion rate of an internet data campaign by 13 times compared to current best practice in MNOs, proving beyond doubt that data-driven marketing can significantly improve conversion rates over current best-practice marketing strategies. This further supports the view that better conversion rates lead to big data analytics competencies that help realise opportunities for CVM.

6.3.2 The long-term competitive advantage using big data analytics capabilities

According to Barney (1991), a firm is said to have a sustainable competitive advantage when it is implementing value-creating strategies that are not simultaneously being implemented by any current or potential competitors. Findings from this study, however, revealed that the various MNOs were implementing "*similar*" strategies to ensure big data analytics competence remains a long-term competitive advantage. Two key themes were identified (1) effective data analysis capabilities for improved customer experience and understanding, and (2) human resource skillset investment. This contradicts the above definition as indeed the identified MNOs were "simultaneously" implementing similar value-creating strategies.

6.3.2.1 Effective data analysis for improved customer experience and understanding

In alignment with the focus of the study, big data analytics is a source of a sustainable competitive advantage (Kitchens et al., 2018; Mikalef et al., 2020; Opresnik & Taisch, 2015). It was established that the use of big data analytics competencies allows for effective data analysis includes activities such as predicting the likelihood to churn,

targeted and contextualised approaches, upselling and cross-selling and the ability to create relevant propositions to targeted markets. This provides MNOs with a competitive edge because as suggested by Li and Liu (2014), the role of sense-making, real-time decision-making and management of change as capabilities that are essential for competitive advantage and improvement of performance. Furthermore, this effective data analysis capability aligns with the resource-based view theory which identifies resources of the organisations and emphasises resources and capabilities as contributors in formulating a strategy to achieve sustainable competitive advantages (Wang, 2014).

6.3.2.2 Investment into skillsets

Chen et al. (2015), Mikalef et al. (2020); Verhoef and Lemon (2013) and Wamba et al. (2017) all indicated that even though there is sufficient potential for big data analytics as a source of sustainable competitive advantage, there are indications that this could prove futile without the needed organisational capabilities. These organisational capabilities include investment in human capital, that is, training and developing people's big data analytics skills. These sentiments aligned well to what was mentioned by the participants. It was established that to ensure long term competitive advantage, big data analytics capabilities should be at the core, but these must be supported by the relevant people skills and HR resources – both at a technical and strategic level. Hence, there is value in ensuring that people within MNOs are trained to deal with and handle big data analytics.

6.3.3 Big data analytics competencies tackling the rapidly evolving environment

Organisations respond to changing environments by allowing innovation and adaptation of new ideas across the company while combining data sensing, product development, and innovation processes (Chesbrough et al., 2007; Foss et al., 2011; Helfat & Peteraf, 2015). The findings established in this study agreed with this notion by elaborating on how big data competencies were assisting with a rapidly changing environment. Three main themes were established in Chapter 5 as to how big data analytics competence assists in addressing a volatile and rapidly changing industry. These are discussed in relation to the relevant literature.

6.3.3.1 Understanding the best offering to customers

Mdluli and Makhupe (2017), Millar et al. (2018) and Schoemaker et al. (2018) are of the view MNOs have expanded beyond the original face-to-face marketing of products, and now encompass additional customer-driven incentives, from the creation of customer-driven services to product proliferation. Similarly, participants highlighted customer-driven incentives such as customer engagement, the use of real-time predictive analytics to determine customer behaviour, customer best action to inform and understand the best offering to place to customers. This was a way in which the rapidly changing environment could be addressed. Furthermore, Verhoef et al. (2007), suggested that customers should be considered as assets of an organisation that can be cultivated and activated. This emphasised the role of customers and processes in organisational success, which also contributes to responding to a volatile market effectively.

6.3.3.2 Operating models

Findings indicated that an MNO's operating model plays an integral role in whether the organisation can handle a rapidly changing environment. Particularly, there was an emphasis that there need to be improvements in the internal processes and subsequently the operating model. This makes sense, because as suggested by Asghari et al. (2017); Baroudy et al. (2018), Ghezzi et al. (2015), MNOs that evolve their business models enhance their ability to utilise data as well as enhance customer experience and value.

6.3.3.3 Agility

Lee (2004) indicated that organisations are building into agility to respond to sudden and unexpected changes in the market. This sentiment was concurrent with the findings of this study. Participants highlighted organisational agility as a means of responding to changes quickly. This makes sense because as postulated by Wamba et al. (2017) big data analytics provides a dynamic capability function which provides organisational agility, effectiveness, efficiency, and timeliness; that is, through big data analytics competencies agility can be achieved.

6.3.4 Summary of discussion for research question 2

This research question aimed to uncover how MNOs use big data analytics competencies as a dynamic capability. Dynamic capabilities contribute to rapidly changing environments, organisational performance, and sustainable competitive advantage (Li & Liu, 2014; Lin & Wu, 2014; Osisioma et al., 2016; Wu, 2010). Through this research question, it was established that big data analytics competencies can be used as a dynamic capability because it enables contribution to rapidly changing environments by understanding the next best offering to customers and agility. Furthermore, big data analytics competencies improve contribution to competitive advantage because organisations now have a means for effective data analysis, which further enhances CVM and competitive advantage. Also, Wamba et al. (2017) posited that while there is sufficient potential for big data analytics as a source of sustainable competitive advantage, there are indications that this could prove futile without the needed organisational and people skills. The findings of this study established that a key driver of competitive advantage is investing in human capital skillsets, this finding explicitly reinforces what has been found in the existing body of knowledge. Overall, the overarching question on how MNOs turn big data analytics competence into a dynamic capability revealed that customer-driven incentives such as customer engagement, understanding the customer best offer, and customer best action was key in turning big data analytics competencies into a dynamic capability. Furthermore, organisation agility and organisational operating models play a key role in ensuring big data analytics used as a dynamic capability.

6.4 Discussion of results for research question 3

Research question 3: How do MNOs embed big data analytics competence to lead a sustainable competitive?

Research question 3 aimed to determine how big data analytics competencies are embedded to lead to a sustainable competitive. Through this, the focus was on understanding the value that MNOs deliver to the customers using big data analytics competence; how the use of big data analytics competence is embedded in the

MNO; how the organisation's big data analytics competence sets it apart from its competitors and the ease of replicability of the big data analytics competence.

6.4.1 Customer value proposition

In trying to understand the value that MNOs deliver to customers using big data competencies, respondents emphasised the overarching theme centred on improving the customer value proposition as a way in which MNOs embedded big data analytics competencies. Improving the customer value proposition includes the use of targeted and personalised services, addressing customer needs by offering affordable, convenient, relevant products and services, cross-selling and upselling products thus improving customer convenience, having an integrated customer journey, as well as improving the overall customer services giving customers value for money. With this well established by the participants, the researcher sought to find from the literature the value MNOs deliver to customers using big data analytics competencies.

According to Teece and Leih (2016), addressing customer needs helps reduce uncertainty in the market as products and services that are on-demand are the ones produced. This aligns with the view that offering customers what they require helps MNOs provide relevant products and services, resulting in organisational efficiencies. Chen and Popovich (2003) opined that as customers are becoming more knowledgeable, they seek a more personalized customer experience which is challenging to achieve for MNOs that have a lot of customers. This buttresses the view that the value big data analytics competencies provide is that of personalised and targeted services, overall improving the customer value proposition by MNOs. Furthermore, findings from the study show that the majority of the MNOs have made strides in giving customers personalised or hyper-personalised services, relevant and convenient products through contextual marketing techniques, predictive analytics that determine the customer's best action and offer. This establishes the view that the value that big data analytics competencies deliver to customers is that of a unique, improved customer value proposition.

6.4.2 Organisational resources and capabilities

As the researcher sought to understand how the use of big data analytics competence is embedded in the MNOs, respondents highlighted themes such as data governance, skills, education/ training of the people or resources, and people and culture as ways in which big data analytics competencies are embedded in their organisations. The overarching theme speaking to the organisation's resources and capabilities is key in how big data competence is embedded in MNOs.

6.4.2.1 Data governance

According to several studies, many MNOs are evolving their business models to enable them to utilise data and enhance the customer experience and value (Asghari et al., 2017; Baroudy et al., 2018; Ghezzi et al., 2015). An insight implied by the authors' views is that in 'evolving business models to utilise data' there is an investment in proper data systems and establishing data systems and data governance processes that ensure data integrity and quality, which to some extent aligns with the findings in the study. Research conducted by Fiedler et al. (2016) indicates that investments into customer analytics infrastructure introduce promising insights into a critical decision-making tool. This further implies the need for having key data governance processes in place as data quality and integrity are crucial in the customer analytics infrastructure.

6.4.2.2 Skills, education, training of people

It was well established by the respondents that big data capabilities were embedded through upskilling and training people with the relevant data analysis skills, and in some instances, hiring people with the appropriate skill sets. While authors such as Manyika et al. (2011) allude that big data analytics could potentially help generate insights that can lead to innovation and vital shifts in performance, decision-making, efficiency, growth, competitiveness, performance, and customer value, many organisations face challenges in harnessing the value from big data analytics due to a lack of skills and uncertainties around how best to deploy big data analytics and transform insights into value (Mazzei and Noble, 2017).

These challenges pose a challenge as to how big data competencies are embedded in MNOs, which supports the idea highlighted in Chapter 5 that, the more data, and superior analytical methods an organisation has, this does not necessarily equate to better insights or greater value, Boyd and Crawford (2012) unless the key essential people with relevant skills are available. This shows an alignment between the study and the literature asserting the role of the right people skills, training, and education in embedding big data analytics competencies. Furthermore, the multidisciplinary nature of big data analytics has led many authors to argue that data analysis and deriving insights from voluminous and complex data requires not only upgrading of software and hardware platforms but also configurations of people with new skills (Mikalef, Giannakos, et al., 2018). This firmly asserts that to fully embed big data analytics competencies, it is necessary to upskill, train, and educate people with the appropriate skills.

6.4.3 Unique big data competencies

In assessing how MNOs' big data analytics competence sets it apart from its competitors, the study revealed that respondents reaffirmed unique big data competencies such as people as resources, clear MNO big data analytics strategy and vision, and the importance of a combination big data analytics and people skills. Literature studies by Boyd and Crawford (2012) and Mikalef, Giannakos, et al. (2018) all emphasise the role of people skills in ensuring the full utilisation of big data analytics competencies.

Study findings showed that the organisational strategy sets MNOs apart as some participants alluded to the role of having a clear big data strategy and vision played. Despite considerable recent advances in big data analytics, there is substantial evidence that many organisations have failed to effectively incorporate them in their decision-making processes. Mazzei and Noble (2017) revealed that most businesses have failed to successfully implement their big data strategies, despite the popularity of big data analytics as a game-changer in revolutionising the way organisations make decisions and operate. This only establishes the study findings that indeed having a clear big data strategy is a differentiator amongst MNOs.

6.4.4 Replicability of big data competencies

It was well established by most respondents that replicating big data analytics competencies was generally difficult. Respondents alluded to the fact that the nature of the MNO market in South Africa is oligopolistic, which makes it challenging to outdo competitors. Further findings from the research showed that MNOs have similar vendors that provide similar products to various organisations. This makes replication in a few instances easy particularly at the strategy level, however, it is skills and people that distinguish organisations and makes it difficult to replicate.

According to Kitchens et al. (2018) and Ostrander (2018) differentiation among organisations is created by designing sustainable competitive advantages strategies that are unique to the organisation and which cannot be duplicated. Nevertheless, within the South African MNOs market, duplication or replication cannot be done as opined by respondents. This posits a deviation or contrast from the literature, primarily because of the oligopolistic nature of the MNO industry, thus the onus is on the respective MNOs to complement their big data analytics competencies with the relevant people and organisational skills to create some sort of key differentiator.

6.4.5 Summary of discussions for research question 3

Whilst there is an increase in the confluence of data proliferation, algorithmic progression, and the availability of more powerful computing abilities that have opened new doors for data analysis to obtain and uncover new business insights, decisions, and actions, organisations have failed to successfully implement their big data strategies (Erevelles et al., 2016; Fiedler et al., 2016). This emphasises the role of having a clear big data analytics vision and strategy has in setting an MNO apart.

There is misalignment and contrast between the findings of this study and that in the existing literature on the replicability of the big data competencies. The nature of the market in South Africa does not allow with ease for undertakings to surpass the competitor's ability to replicate its big data analytics competencies. There is alignment between the study findings and the literature by Boyd and Crawford (2012) who opined that the more data and superior analytical methods an organisation has does not necessarily equate to better insights or greater value. Big data analytics capabilities alone do not suffice to set apart an organisation from its competitors.

6.5 Conclusion

This chapter aimed to relate the findings of this study to existing literature, with the overall aim to understand how big data analytics competencies can be used as a dynamic capability to enhance CVM and sustainable competitive advantage. It was evident that existent literature only provided a general view, indicating how big data analytics provides the extraction of valuable insights from data, and how this could then be used for data-driven decision making. Furthermore, organisational agility, organisational strategy/operating model play a key role in ensuring big data analytics as a dynamic capability. It was also noted that predictive analytics was most important in realising opportunities for CVM, however, South African MNOs are still struggling to effectively utilise this ability due to the lack of sufficient technical skills. In line with extant studies, organisational resources such as skilled staff were seen to be central to fully utilise big data analytics for enhancing CVM. Of significance is that people or human capital skillsets lead to gradual efficiency gains and competitive advantages enabled by big data analytics, that is, big data analytics competency alone does not suffice to set an organisation apart from its competitors. While the nature of the market in South Africa does not allow with ease for undertakings to surpass competitor's ability to replicate their big data analytics competencies, it was noted that competitive advantage and differentiation have nothing to do with the technology itself, rather it depends on the personal element and effective use of human capital. The following chapter proceeds with a discussion of these findings and proposes a framework that links big data analytics as a dynamic capability to CVM and sustainable competitive advantage.

Chapter 7: Conclusion and Recommendations

7.1 Introduction

This research was founded on dynamic capabilities theory (Bitencourt et al., 2020). Currently, MNOs operate in business environments that volatile and unpredictable, requiring organisations to have dynamic capabilities (Mdluli & Makhube, 2017; Beer, Voelpel, Leibold, & Tekie, 2005). Also, from extant literature, it is evident that organisations, which use big data analytics competencies as a dynamic capability to understand and respond to changing consumer needs, could be at a competitive advantage to those that do not use these capabilities (Erevelles et al., 2016).

Although organisations are capitalising on big data analytics investments, there are still few studies conducted on the potential big data analytics could offer (Mikalef et al., 2020), especially from the perspective of enhancing CVM for sustainable competitive advantage. Hence, the need arose to explore how big data analytics could be used as a dynamic capability to enhance CVM for competitive advantage in MNOs. This chapter presents the principal findings of this study and the implications for academics and business. The chapter concludes by detailing the research limitations and suggesting areas for future research.

7.2 Principal findings

The principal findings relate to the use of big data analytics competencies for CVM and illustrate how big data analytics is being embedded and used by MNOs to create sustainable competitive advantage. This research confirmed that there is a deep understanding of the value big data analytics competencies holds for MNOs, however, human capital assets are also key to harnessing these competencies for competitive advantage. The main findings of this research are displayed in Figure 14 in the form of a framework that depicts the context of big data analytics competencies in relation to the other key themes.

7.2.1 Big data analytics competencies for customer value management

This research confirmed that big data analytics enhances CVM in MNOs since MNOs now have access to customer insights and decision-making capabilities founded by data analytics. Premised on big data analytics still being relatively 'immature' within

South African MNOs it is still seen as a source of value for understanding customer behaviour and improving customer experience. CVM was perceived to be enhanced by utilising the wealth of data to understand customer behaviour allowing the offerings of targeted propositions and personalisation.

7.2.2 Harnessing big data analytics competencies as a dynamic capability

For MNOs to keep up with the ever-changing environments, they need to possess dynamic capabilities (Mdluli & Makhupe, 2017). It was established by the participants that big data analytics competencies provide MNOs with the ability to act and respond quickly to changing customer expectations and environments as a result of the insights provided by data analytics. This was closely aligned to literature. For MNOs to keep up with the ever-changing environments, they need to possess dynamic capabilities (Mdluli & Makhupe, 2017). Findings indicated that big data analytics competencies can be leveraged as a dynamic capability since big data analytics competencies could be used to address rapidly changing environments by understanding the next best offering to customers and speed-to-market by using predictive analysis and modelling.

The key role of investment into human capital skillset was identified. Within the big data analytics context, it seems that the role played by those that handle the data is as important as the technology itself, if not more important. This importance is accentuated by literature postulating that big data analytics are ineffectively leveraged due to the lack of skilled human capital rather than the technology or data-related issues itself (Mikalef, Giannakos, et al., 2018).

The findings indicated that big data analytics competencies are antecedents to developing dynamic capabilities as it provides a means for acting and responding quickly to ever-changing markets. Big data analytics can be used as a dynamic capability through predictive modelling and by investing in human capital skillsets.

7.2.3 Embedding big data analytics for sustainable competitive advantage

MNOs are in the race to remain competitive hence it is important to extract profound knowledge from data analysis to render reliable predictions of the future This

research confirmed that big data analytics is a source of potential competitive advantage as MNOs sit on vast amounts of subscriber data and information.

The key findings indicate that for competitive advantage to be attained, big data analytics should be effectively embedded into the organisation. To embed big data analytics competencies, it is required that the current operating models and strategies employed by the MNOs evolve and that there is sufficient investment into training, skills development and education of the people resources employed to handle this data. This aligns with literature which asserts that MNOs are evolving their business models to enable them to utilise data and enhance the customer experience and value and competitive advantage (Asghari et al., 2017; Baroudy et al., 2018; Ghezzi et al., 2015).

It was also established by the participant that the key differentiator in achieving sustainable competitive advantage was the human resources and strategies around the use of big data analytics that prevented ease of replicability, rather than access to the technology itself.

7.3 Proposed framework

Figure 14 below presents the proposed model for big data analytics competencies as a dynamic capability. The framework was developed after careful review of the findings of this research and study of extant literature.

The proposed framework focuses primarily on the relationship between big data analytics competence and dynamic capability, and how this adds to CVM and sustainable competitive advantage. Through this, the framework encompasses the role of big data maturity (Al-Sai, Abdullah & Husin, 2019) within organisations, and factors such as the data governance process, technology enablers and investment into human resources as drivers for big data analytics competency efficacy and embedding within MNOs. Additionally, by using big data analytics for predictive modelling and deep learning (Kumari et al., 2016), the framework illustrates that big data analytics can be used as a dynamic capability which informs then CVM ecosystem for sustainable competitive advantage. The CVM ecosystem is created by understanding customer behaviour and personalised offering and customer-centric strategies (Anderson, 2015; El Houari et al., 2015; Schoemaker et al., 2018). It

should also be noted that in addition to CVM informing sustainable competitive advantage, the investment into human resources also plays a critical role in attaining sustainable competitive advantage capabilities (Mikalef, Krogstie, et al., 2018; Verhoef & Lemon, 2013; Wamba et al., 2017).

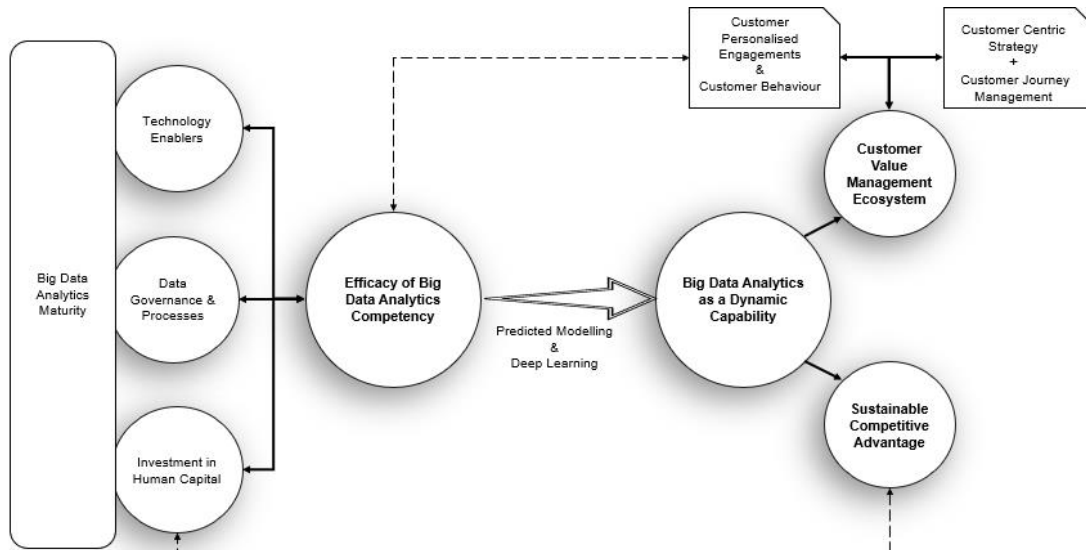


Figure 14: Big data analytics as a dynamic capability model

Source: Author's own work

7.4 Recommendations for managers

This research has provided a practical approach for managers within MNOs to understand the key constituents for using big data analytics as a dynamic capability to enhance CVM and competitive advantage. By improving the understanding of current operating models within MNOs and evolving these models to better enable the embedding of big data analytics MNOs can leverage these competencies for competitive advantage. Furthermore, the insights uncovered can be used as a guide to using big data analytics competencies as a dynamic capability. The transition from traditional analysis to big data analytics by investing in training and skills development of human capital employed to handle these technologies will add to differentiation and long-term competitive advantage. From an MNO perspective, big data analytics will offer an abundance of unique growth opportunities. Three important target markets include automation, in-depth insights, and decision-making powered by data.

7.5 Recommendations for future research

The following suggestions for future research are based on the insights gained from this research:

- To determine the relevance of the entire proposed framework or aspects thereof, it can be tested in various contexts such as different industries.
- Results indicate that big data analytics have for organisations to run businesses. However, it is acknowledged that digitalisation could impact employee retention. Further research would provide knowledge into how organisations can ensure employee retention by improving their skills and abilities and ensure that they remain technologically integrated.
- Quantification of investment into human capital skills development and the use of big data analytics competencies for competitive advantage.
- Quantification of the form of growth within Telcos, for example, endogenous or exogenous growth, can be examined for future work. Proving this would expose how big data analytics as a dynamic capability is received.

7.6 Limitations of the research

Since the study is exploratory in nature, the following limitations are noted:

- Since a small sample from a specific industry were selected for this research, this limits the application of the findings to different industries
- Qualitative research is subjective by nature, interview bias may have influenced the quality of data, especially if the interviewer conveyed personal opinions and beliefs towards the participant (Saunders et al., 2015).
- The sample consisted predominantly of CVM managers within MNOs, the perspectives of data analysts or other roles integrated with big data analytics were not obtained, hence results could be biased to a specific frame of reference.
- As participant did not necessarily provide all their decision-making reasoning and circumstances, the results of this research will not be easily quantifiable nor easy to replicate.

7.7 Conclusion

The extant literature provides a clear understanding of dynamic capabilities and the use of big data analytics competencies to create competitive advantage. However, how big data analytics competencies can be harnessed as a dynamic capability to enhance CVM for sustainable competitive advantage remained unclear. This research made use of 15 in-depth, semi-structured interviews conducted with CVM managers within the four major MNOs in South Africa. Through thematic analysis of the findings, this research has provided insights for big data analytics competence as a dynamic capability that can be utilised to enhance CVM. Maturity of big data analytics competence plays a huge role in the overall utilisation of big data analytics as a dynamic capability. Furthermore, the competence is not sufficient as a technology tool but requires a strong human capital and an improved operating model to fully realise the benefits of CVM and sustainable competitive advantage. Education, training, and upskilling of human resources were found to be the key drivers, in addition to big data analytics maturity, that contributes to competitive advantage.

Reference List

- Al-Sai, Z. A., Abdullah, R., & Husin, M. H. (2019). A review on big data maturity models. In *2019 IEEE Jordan International Joint Conference on Electrical Engineering and Information Technology, JEEIT 2019 - Proceedings* (pp. 156–161). Institute of Electrical and Electronics Engineers Inc. <https://doi.org/10.1109/JEEIT.2019.8717398>
- Aluri, A., Price, B. S., & McIntyre, N. H. (2019). Using Machine Learning To Cocreate Value Through Dynamic Customer Engagement In A Brand Loyalty Program. *Journal of Hospitality and Tourism Research*, *43*(1), 78–100. <https://doi.org/10.1177/1096348017753521>
- Anderson, K. M. (2015). Embrace the Challenges: Software Engineering in a Big Data World. *Proceedings - 1st International Workshop on Big Data Software Engineering, BIGDSE 2015*, 19–25. <https://doi.org/10.1109/BIGDSE.2015.12>
- Articles, F. (2009). Business Model, (April), 14–16.
- Asghari, M., Yousefi, S., Niyato, D., Min, D., & Wan, L. (2017). Switching factors of mobile customers in Korea. *Journal of Service Science*, *1*(1), 105–120. <https://doi.org/10.1007/s12927-009-0006-y>
- Babbie, E., & Mouton, J. (2001). *The practice of social research*. Oxford University Press: South Africa.
- Balboni, B., & Terho, H. (2016). Outward-looking and future-oriented customer value potential management: The sales force value appropriation role. *Industrial Marketing Management*, *53*(May), 181–193. <https://doi.org/10.1016/j.indmarman.2015.05.022>
- Banerjee, A. (2013a). Big Data & Advanced Analytics in Telecom : A Multi-Billion-Dollar Revenue Opportunity Prepared by, (December).
- Banerjee, A. (2013b). Big Data & Advanced Analytics in Telecom : A Multi-Billion-Dollar Revenue Opportunity Prepared by. *Huawei*, (December), 24.

- Baroudy, K., Kishore, S., Nair, S., & Patel, M. (2018). Unlocking value from IoT connectivity: Six considerations for choosing a provider | McKinsey & Company. *McKinsey Global Institute*, (February), 1–8.
- Bayer, J. (2010). Customer segmentation in the telecommunications industry. *Journal of Database Marketing and Customer Strategy Management*, 17(3–4), 247–256. <https://doi.org/10.1057/dbm.2010.21>
- Bitencourt, C. C., de Oliveira Santini, F., Ladeira, W. J., Santos, A. C., & Teixeira, E. K. (2020). The extended dynamic capabilities model: A meta-analysis. *European Management Journal*, 38(1), 108–120. <https://doi.org/10.1016/j.emj.2019.04.007>
- Björkman, F., Franco, S., & Caesarius, L. (2017). How big data analytics affect decision-making.
- Braun, V., & Clarke, V. (2006). Thematic analysis revised - final. *Qualitative Research in Psychology*. <https://doi.org/10.1191/1478088706qp063oa>
- Carroll, D., & Guzman, I. (2015). The New Omni-Channel Approach to Serving Customers. *Accenture*, 1–16.
- Chaudhry, P., & Tewari, V. . (2006). A comparison between TCM and CVM in assessing the recreational use value of urban forestry. *International Forestry Review*, 8(4), 439–448. <https://doi.org/10.1505/ifor.8.4.439>
- Chen, Preston, D. S., & Swink, M. (2015). How the use of big data analytics affects value creation in supply chain management. *Journal of Management Information Systems*, 32(4), 4–39. <https://doi.org/10.1080/07421222.2015.1138364>
- Chen, Reilly, R., & Lynn, G. (2005). The impacts of speed-to-market on new product success: The moderating effects of uncertainty. *IEEE Transactions on Engineering Management*, 52(2), 199–212. <https://doi.org/10.1109/TEM.2005.844926>
- Chesbrough, H. W., Appleyard, M. M., Chesbrough, H. W., & Appleyard, M. M.

(2007). Management.

Christensen, C. M., Johnson, M. W., & Rigby, D. K. (2002a). Foundations for Growth.

Christensen, Johnson, M., & Rigby, D. (2002b). Foundations for Growth: How to Identify and Build Disruptive New Businesses. *MIT Sloan Management Review*, 43, 22–31.

Comuzzi, M., & Patel, A. (2016). How organisations leverage: Big Data: A maturity model. *Industrial Management and Data Systems*, 116(8), 1468–1492. <https://doi.org/10.1108/IMDS-12-2015-0495>

Côrte-real, N., Ruivo, P., & Oliveira, T. (2019). Unlocking the drivers of big data analytics value in firms, 97(December 2018), 160–173. <https://doi.org/10.1016/j.jbusres.2018.12.072>

Côrte-Real, N., Ruivo, P., Oliveira, T., & Popovič, A. (2019). Unlocking the drivers of big data analytics value in firms. *Journal of Business Research*, 97(December 2018), 160–173. <https://doi.org/10.1016/j.jbusres.2018.12.072>

Di, C. A., & Hoon, K. (2016). Customer equity and value management of global brands : Bridging theory and practice from financial and marketing perspectives : Introduction to a journal of business research special section. *Journal of Business Research*, 69(9), 3721–3724. <https://doi.org/10.1016/j.jbusres.2015.03.048>

Doyle, S. (2008). Social network analysis in the Telco sector — Marketing applications. *Journal of Database Marketing & Customer Strategy Management*, 15(2), 130–134. <https://doi.org/10.1057/dbm.2008.8>

Dworkin, S. L. (2012). Sample size policy for qualitative studies using in-depth interviews, 1319–1320.

El-Darwiche, B., Koch, V., Meer, D., Shehadi, R. T., & Tohme, W. (2014). Big Data Maturity: An Action Plan for Policymakers and Executives. *Weforum*, 369 p.

El Houari, M., Rhanoui, M., & El Asri, B. (2015). From Big Data to Big Knowledge:

- The art of making Big Data alive. *Proceedings of 2015 International Conference on Cloud Computing Technologies and Applications, CloudTech 2015*.
<https://doi.org/10.1109/CloudTech.2015.7337001>
- Elgendy, N., & Elragal, A. (2016). Big Data Analytics in Support of the Decision Making Process. *Procedia Computer Science*, 100, 1071–1084.
<https://doi.org/10.1016/j.procs.2016.09.251>
- Erevelles, S., Fukawa, N., & Swayne, L. (2016). Big Data consumer analytics and the transformation of marketing. *Journal of Business Research*, 69(2), 897–904.
<https://doi.org/10.1016/j.jbusres.2015.07.001>
- Esselaar, S., Gillwald, A., & Stork, C. (2006). South African Telecommunications Sector Performance Review 2006. *LINK Centre Public Policy Research*, (8), 1–66.
- Fiedler, L., Großmaß, T., Roth, M., & Vetvik, O. J. (2016). Why customer analytics matter. *McKinsey Global Institute*, (May).
- Foss, N. J., Laursen, K., & Pedersen, T. (2011). Linking customer interaction and innovation: The mediating role of new organizational practices. *Organization Science*, 22(4), 980–999. <https://doi.org/10.1287/orsc.1100.0584>
- Fosso Wamba, S., Akter, S., Edwards, A., Chopin, G., & Gnanzou, D. (2015). How “big data” can make big impact: Findings from a systematic review and a longitudinal case study. *International Journal of Production Economics*, 165, 234–246. <https://doi.org/10.1016/j.ijpe.2014.12.031>
- Frisiani, G., Jubas, J., Lajous, T., & Nattermann, P. (2017). A future for mobile operators: The keys to successful reinvention | McKinsey & Company. *McKinsey & Co*, (February), 1.
- Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, 35(2), 137–144. <https://doi.org/10.1016/j.ijinfomgt.2014.10.007>
- Ghezzi, A., Cortimiglia, M. N., & Frank, A. G. (2015). Strategy and business model

- design in dynamic telecommunications industries: A study on Italian mobile network operators. *Technological Forecasting and Social Change*, 90(PA), 346–354. <https://doi.org/10.1016/j.techfore.2014.09.006>
- Gill, B., Borden, B., & Hallgren, K. (2014). *A Conceptual Framework for Data- Driven Decision Making*. Seattle.
- Golafshani, N. (2003). Understanding Reliability and Validity in Qualitative Research, 8(4), 597–606.
- Grossman, R. L., & Siegel, K. P. (2014). Organizational Models for Big Data and Analytics. *Journal of Organization Design*, 3(1), 20. <https://doi.org/10.7146/jod.9799>
- Gupta, M., & George, J. F. (2016). Information & Management Toward the development of a big data analytics capability. *Information & Management*. <https://doi.org/10.1016/j.im.2016.07.004>
- Heit, E., & Rotello, C. M. (2010). Relations between inductive reasoning and deductive reasoning. *Journal of Experimental Psychology: Learning Memory and Cognition*, 36(3), 805–812. <https://doi.org/10.1037/a0018784>
- Helfat, C. E., & Peteraf, M. A. (2003). The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal*, 24(10 SPEC ISS.), 997–1010. <https://doi.org/10.1002/smj.332>
- Helfat, C. E., & Peteraf, M. A. (2015). Managerial cognitive capabilities and the microfoundations of dynamic capabilities. *Strategic Management Journal*, 36(6), 831–850. <https://doi.org/10.1002/smj.2247>
- Henke, N., & Kaka, N. (2018). Analytics comes of age. *McKinsey Analytics*, (January), 100.
- Hinterhuber, A. (2008). *Value delivery and value-based pricing in industrial markets*. *Advances in Business Marketing and Purchasing* (Vol. 14). Elsevier. [https://doi.org/10.1016/S1069-0964\(08\)14011-X](https://doi.org/10.1016/S1069-0964(08)14011-X)

- Hung, S. Y., Yen, D. C., & Wang, H. Y. (2006). Applying data mining to telecom churn management. *Expert Systems with Applications*, 31(3), 515–524. <https://doi.org/10.1016/j.eswa.2005.09.080>
- Icasa. (2019). Discussion document on the market inquiry into mobile broadband services in south africa, 67(13).
- Jelonek, D. (2015). The Evolution of Customer Relationship Management System. *Proceedings of the 19th International Conference on Computers*, 29–33.
- Khade, A. A. (2016). Performing Customer Behavior Analysis using Big Data Analytics. *Procedia Computer Science*, 79, 986–992. <https://doi.org/10.1016/j.procs.2016.03.125>
- Kitchens, B., Dobolyi, D., Li, J., & Abbasi, A. (2018). Advanced Customer Analytics: Strategic Value Through Integration of Relationship-Oriented Big Data. *Journal of Management Information Systems*, 35(2), 540–574. <https://doi.org/10.1080/07421222.2018.1451957>
- Kościelniak, H., & Puto, A. (2015). BIG DATA in Decision Making Processes of Enterprises. *Procedia Computer Science*, 65(Iccmit), 1052–1058. <https://doi.org/10.1016/j.procs.2015.09.053>
- Kotler, P. (2017). Customer Value Management. *Journal of Creating Value*, 3(2), 170–172. <https://doi.org/10.1177/2394964317706879>
- Kumari, S., Patil, Y., & Jeble, S. (2016). Role of big data and predictive analytics. *International Journal of Automation and Logistics*, 2(4), 307. <https://doi.org/10.1504/ijal.2016.10001272>
- Landroquez, S. M., Castro, C. B., & Cepeda-Carrión, G. (2011). Creating dynamic capabilities to increase customer value. *Management Decision*, 49(7), 1141–1159. <https://doi.org/10.1108/00251741111151181>
- Lee, I. (2017). Big data : Dimensions , evolution , impacts , and challenges. *Business Horizons*, 60(3), 293–303. <https://doi.org/10.1016/j.bushor.2017.01.004>

- Li, D. yuan, & Liu, J. (2014). Dynamic capabilities, environmental dynamism, and competitive advantage: Evidence from China. *Journal of Business Research*, 67(1), 2793–2799. <https://doi.org/10.1016/j.jbusres.2012.08.007>
- Lin, Y., & Wu, L. Y. (2014). Exploring the role of dynamic capabilities in firm performance under the resource-based view framework. *Journal of Business Research*, 67(3), 407–413. <https://doi.org/10.1016/j.jbusres.2012.12.019>
- Malaka, I., & Brown, I. (2015). Challenges to the Organisational Adoption of Big Data Analytics: A Case Study in the South African Telecommunications Industry. In *ACM International Conference Proceeding Series* (Vol. 28-30-Sept, pp. 1–9). New York, New York, USA: Association for Computing Machinery. <https://doi.org/10.1145/2815782.2815793>
- Manyika, J., Chui Brown, M., B. J., B., Dobbs, R., Roxburgh, C., & Hung Byers, A. (2011). Big data: The next frontier for innovation, competition and productivity. *McKinsey Global Institute*, (June), 156. Retrieved from https://bigdatawg.nist.gov/pdf/MGI_big_data_full_report.pdf
- Maynes, J., & Rawson, A. (2016). Linking the customer experience to value. *Customer Experience*, 6.
- Mazzei, M. J., & Noble, D. (2017). Big data dreams: A framework for corporate strategy. *Business Horizons*, 60(3), 405–414. <https://doi.org/10.1016/j.bushor.2017.01.010>
- Mcafee, A., & Brynjolfsson, E. (2012). Spotlight on Big Data Big Data: The Management Revolution, 2012. Acedido em 15-03-2017. *Harvard Business Review*, (October), 1–9.
- Mccarthy, D. M., Fader, P. S., & Hardie, B. G. S. (2017). Valuing Subscription-Based Businesses Using Publicly Disclosed Customer Data, 81(January), 17–35. <https://doi.org/10.1509/jm.15.0519>
- Mdluli, S., & Makhupe, O. (2017). Defining leadership competencies needed for the fourth industrial revolution: Leadership competencies 4.0. *Duke CE*, 1–13.

- Meukel, M., Schwarz, M., & Winter, M. (2016). E-SIM for consumers - a game changer in mobile telecommunications ? *McKinsey Quarterly*, (January), 1–8.
- Mikalef, P., Giannakos, M. N., Pappas, I. O., & Krogstie, J. (2018). The human side of big data: Understanding the skills of the data scientist in education and industry. *IEEE Global Engineering Education Conference, EDUCON, 2018-April*, 503–512. <https://doi.org/10.1109/EDUCON.2018.8363273>
- Mikalef, P., Krogstie, J., & Giannakos, M. (2018). Information Systems and e-Business Management Big data analytics capabilities: A systematic literature review and research agenda Big data analytics capabilities: A systematic literature review and research agenda.
- Mikalef, P., Krogstie, J., Pappas, I. O., & Pavlou, P. (2020). Information & Management Exploring the relationship between big data analytics capability and competitive performance : The mediating roles of dynamic and operational capabilities. *Information & Management*, 57(2), 103169. <https://doi.org/10.1016/j.im.2019.05.004>
- Millar, C. C. J. M., Groth, O., & Mahon, J. F. (2018). Management innovation in a VUCA world: Challenges and recommendations. *California Management Review*, 61(1), 5–14. <https://doi.org/10.1177/0008125618805111>
- Moe, J., & Kallin, H. (2011). U.S. Patent No. 7,957,743. Self configuring and optimization of cell neighbors in wireless telecommunications networks. U.S. Patent and Trademark Office.
- Morgan, S., & Govender, K. (2017). Exploring customer loyalty in the South African mobile telecommunications sector. *Cogent Business and Management*, 4(1). <https://doi.org/10.1080/23311975.2016.1273816>
- Najafabadi, M. M., Villanustre, F., Khoshgoftaar, T. M., Seliya, N., Wald, R., & Muharemagic, E. (2015). Deep learning applications and challenges in big data analytics. *Journal of Big Data*, 2(1), 1–21. <https://doi.org/10.1186/s40537-014-0007-7>

- Nda, R. M., & Hamid, A. A. (2020). Assessment of Big Data Analytics Maturity Models : An Overview, 1681–1690.
- Oliveira, T., Thomas, M., & Espadanal, M. (2014). Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. *Information and Management*, 51(5), 497–510. <https://doi.org/10.1016/j.im.2014.03.006>
- Oliver, N., Letouzé, E., Sterly, H., Delataille, S., De Nadai, M., Lepri, B., ... Vinck, P. (2020). Mobile phone data and COVID-19: Missing an opportunity?
- Opresnik, D., & Taisch, M. (2015a). The value of big data in servitization. *International Journal of Production Economics*, 165, 174–184. <https://doi.org/10.1016/j.ijpe.2014.12.036>
- Opresnik, D., & Taisch, M. (2015b). The value of Big Data in servitization. *Intern. Journal of Production Economics*, 165(December 2014), 174–184. <https://doi.org/10.1016/j.ijpe.2014.12.036>
- Osioma, H. E., Nzewi, H. N., & Mgbemena, I. C. (2016). Dynamic capabilities and performance of selected commercial banks in Awka, Anambra State, Nigeria. *European Journal of Business and Social Sciences*, 4(10), 98–110.
- Ostrander, R. (2018). Foundations for Growth. *Head, Heart, and Hand*, 92–117. <https://doi.org/10.2307/j.ctt22zmb5f.10>
- Paulus, T. M., & Lester, J. N. (2016). ATLAS.ti for conversation and discourse analysis studies. *International Journal of Social Research Methodology*, 19(4), 405–428. <https://doi.org/10.1080/13645579.2015.1021949>
- Payne, A., Frow, P., & Eggert, A. (2017). The customer value proposition: evolution, development, and application in marketing. *Journal of the Academy of Marketing Science*, 45(4), 467–489. <https://doi.org/10.1007/s11747-017-0523-z>
- Payne, A., & Holt, S. (2001). Diagnosing Customer Value: Integrating the Value Process and Relationship Marketing. *British Journal of Management*, 12(2), 159–182. <https://doi.org/10.1111/1467-8551.00192>

- Pisano, G. P. (2017). Toward a prescriptive theory of dynamic capabilities : connecting strategic choice , learning , and competition, 26(5), 747–762. <https://doi.org/10.1093/icc/dtx026>
- Rust, R. T., & Zahorik, A. J. (1993). Customer satisfaction, customer retention, and market share. *Journal of Retailing*. [https://doi.org/10.1016/0022-4359\(93\)90003-2](https://doi.org/10.1016/0022-4359(93)90003-2)
- Saleem, H., Khawaja, M., Uddin, S., Habib-Ur-Rehman, S., Saleem, S., & Aslam, A. M. (2019). Strategic Data Driven Approach to Improve Conversion Rates and Sales Performance of E-Commerce Websites. *International Journal of Scientific & Engineering Research*, 10(4), 588–593. Retrieved from <http://www.ijser.org>
- Sanders, P. (1982). Phenomenology: A new way of viewing organizational research. *Academy of Management Review*, 7(3), 353–360.
- Saunders, M., & Lewis, P. (2018). *Doing research in business and management: An essential guide to planning your project* (2nd ed.). Pearson Education.
- Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students*. Prentice Hall.
- Saunders, M., Lewis, P., Thornhill, A., & Bristow, A. (2015). *Understanding ressearch philosophy and approaches to theory development. Research Methods for Business Students*. Retrieved from <http://kar.kent.ac.uk/1841/>
- Schoemaker, P. J. H., Heaton, S., & Teece, D. (2018). Innovation, dynamic capabilities, and leadership. *California Management Review*, 61(1), 15–42. <https://doi.org/10.1177/0008125618790246>
- Schrage, M. (2016). How the Big Data Explosion Has Changed Decision Making. *Harvard Business Review*, 6–11.
- Schuchmann, D., & Seufert, S. (2015). Corporate Learning in Times of Digital Transformation: A Conceptual Framework and Service Portfolio for the Learning Function in Banking Organisations. *International Journal of Advanced Corporate Learning (IJAC)*, 8(1), 31. <https://doi.org/10.3991/ijac.v8i1.4440>

- Shanapinda, S. (2019). Asymmetry in South Africa's Regulation of Customer Data Protection: Unequal Treatment between Mobile Network Operators (MNOs) and Over-the-Top (OTT) Service Providers. *The African Journal of Information and Communication*, (23), 1–20. <https://doi.org/10.23962/10539/27536>
- Sheng, J., Amankwah-Amoah, J., & Wang, X. (2017). A multidisciplinary perspective of big data in management research. *International Journal of Production Economics*, 191(June), 97–112. <https://doi.org/10.1016/j.ijpe.2017.06.006>
- Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22, 63–75. <https://doi.org/10.1111/j.1744-618X.2000.tb00391.x>
- Shenton, A. K. (2014). Strategies for ensuring trustworthiness in qualitative research projects. *The SAGE Encyclopedia of Action Research*, 22, 63–75. <https://doi.org/10.4135/9781446294406.n347>
- Srinivasan, R., & Swink, M. (2018). An Investigation of Visibility and Flexibility as Complements to Supply Chain Analytics: An Organizational Information Processing Theory Perspective. *Production and Operations Management*, 27(10), 1849–1867. <https://doi.org/10.1111/poms.12746>
- Sutherland, E. (2011). The Scramble for Africa. *SSRN Electronic Journal*, (September). <https://doi.org/10.2139/ssrn.1469190>
- Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance, 1350(august), 1319–1350. <https://doi.org/10.1002/smj>
- Teece, D. J., Ahramovitz, M., Nelson, R., Grindley, P., Scherer, F. M., Williamson, O., & Zimmer, K. (1993). The Dynamics of Industrial Capitalism : Perspectives on Alfred Chandler's Scale and Scope, (March), 199–225.
- Teece, D. J., Pisano, G., & Shuen, A. M. Y. (1997). Dynamic Capabilities and Strategic Management Author (s): David J . Teece , Gary Pisano and Amy Shuen Published by : Wiley Stable URL : <https://www.jstor.org/stable/3088148>

MANAGEMENT, 18(7), 509–533.

Teece, D., Pisano, G., & AMY Shuen. (1997). Dynamic Capabilities and Strategic Management Authors (s): David J . Teece , Gary Pisano and Amy Shuen Published by : Wiley Stable URL : <http://www.jstor.org/stable/3088R> archive indicates your a148 Accessed : 24-03-2016 16 : 22 UTC Your use of the JSTO. *Strategic Management Journal*, 18(7), 509–533.

Teece, & Leih, S. (2016). Uncertainty, innovation, and dynamic capabilities: An introduction. *California Management Review*, 58(4), 5–12. <https://doi.org/10.1525/cmr.2016.58.4.5>

Theron, N. M., & Boshoff, W. H. (2006). Vertical integration in South African telecommunications: A competition analysis. *South African Journal of Economics*, 74(3), 575–592. <https://doi.org/10.1111/j.1813-6982.2006.00085.x>

Tsai, C. W., Lai, C. F., Chao, H. C., & Vasilakos, A. V. (2015). Big data analytics: a survey. *Journal of Big Data*, 2(1), 1–32. <https://doi.org/10.1186/s40537-015-0030-3>

Verhoef, P. C., Doorn, J. van, & Dorotic, M. (2007). Customer Value Management: An Overview and Research Agenda. *Marketing ZFP*, 29(JRM 2), 105–122. <https://doi.org/10.15358/0344-1369-2007-jrm-2-105>

Verhoef, P. C., & Lemon, K. N. (2013). Successful customer value management: Key lessons and emerging trends. *European Management Journal*, 31(1), 1–15. <https://doi.org/10.1016/j.emj.2012.08.001>

Vidgen, R., Shaw, S., & Grant, D. B. (2017). Management challenges in creating value from business analytics. *European Journal of Operational Research*, 261(2), 626–639. <https://doi.org/10.1016/j.ejor.2017.02.023>

Waller, M. A., & Fawcett, S. E. (2013). Click here for a data scientist: Big data, predictive analytics, and theory development in the era of a maker movement supply chain. *Journal of Business Logistics*, 34(4), 249–252. <https://doi.org/10.1111/jbl.12024>

- Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J. fan, Dubey, R., & Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research*, 70, 356–365. <https://doi.org/10.1016/j.jbusres.2016.08.009>
- Wang. (2014). Theories for competitive advantage. *Being Practical with Theory: A Window into Business Research*, (December), 33–43.
- Wang, C., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. *International Journal of Management Reviews*, 9(1), 31–51. <https://doi.org/10.1111/j.1468-2370.2007.00201.x>
- Wang, H., & Wang, H. (2015). Theories for competitive advantage, (November).
- Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management Journal*, 24(10 SPEC ISS.), 991–995. <https://doi.org/10.1002/smj.318>
- Wu, L. Y. (2010). Applicability of the resource-based and dynamic-capability views under environmental volatility. *Journal of Business Research*, 63(1), 27–31. <https://doi.org/10.1016/j.jbusres.2009.01.007>
- Zahra, S. A., Sapienza, H. J., & Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: A review, model and research agenda. *Journal of Management Studies*, 43(4), 917–955. <https://doi.org/10.1111/j.1467-6486.2006.00616.x>

Appendices

Appendix 1: Interview consent form

Big Data Analytics as a Dynamic Capability to Enhance Customer Value Management for Sustainable Competitive Advantage

Researcher: Abongile Qwabe, MBA Student at the Gordon Institute of Business Science, University of Pretoria.

Dear Participant,

I am conducting research on big data analytics as a dynamic capability to enhance customer value management for sustainable competitive advantage, with an intention to understand the role of big data analytics competence as a dynamic capability and how it can be utilised to enhance customer value management for sustainable competitive advantage. The interview is expected to last for 45 minutes to 1 hour at most to assist in fully understanding the topic.

Kindly be reminded that, **your participation is voluntary, and you can withdraw at any time without penalty** and your anonymity and confidentiality are guaranteed. The data collected will be reported without identifiers and kept confidential. If you have any concerns, please feel free to contact my supervisor or myself. Our contact details are provided below.

Yours Sincerely,

Abongile Qwabe
MBA Student
Email: 13405170@mygibs.co.za
Tel: 083 212 7202

Danie Petzer (supervisor)
The University of Pretoria's Gordon Institute of Business Science
Email: petzerd@gibs.co.za
Direct Tel: +27 11 771 4242

Participants Details

Name: ____Anonymised ____

Signature: _____

Date: _____

Researchers Details

Name: Abongile Qwabe

Signature: _____

Date: _____

Appendix 2: Ethics approval

GIBS ETHICAL CLEARANCE APPLICATION FORM 2020

G. APPROVALS FOR/OF THIS APPLICATION

When the applicant is a student of GIBS, the applicant must please ensure that the supervisor and co-supervisor (where relevant) has signed the form before submission

STUDENT RESEARCHER/APPLICANT:

29. I affirm that all relevant information has been provided in this form and its attachments and that all statements made are correct.

Student Researcher's Name in capital letters: ABONGILE QWABE

Date: 18 Aug 2020

Supervisor Name in capital letters: DANIE PETZER

Date: 18 Aug 2020

Co-supervisor Name in capital letters:

Date: 18 Aug 2020

Note: GIBS shall do everything in its power to protect the personal information supplied herein, in accordance to its company privacy policies as well the Protection of Personal Information Act, 2013. Access to all of the above provided personal information is restricted, only employees who need the information to perform a specific job are granted access to this information.

FOR DOCTORAL AND FACULTY/RESEARCH ASSOCIATE/STAFF MEMBER RESEARCH ONLY

Approved

REC comments:

Approved.

All the best with the research.

Date: 02 Sep 2020

Appendix 3: Invitation email to participate in the study

Dear Participant,

Research Title: Big Data Analytics as a Dynamic Capability to Enhance Customer Value Management for Sustainable Competitive Advantage

I am conducting research, as per above research title, with an intention to understand the role of big data analytics competence as a dynamic capability and how it can be utilised to enhance customer value management for sustainable competitive advantage. As an industry expert, you hold an ideal position to share your own industry perspective and strengthen this research with your years of in-depth understanding of the domain. The interview is expected to last 45 minutes to an hour (at most) to assist collect data and fully understand the topic.

Kindly be reminded that your participation is voluntary and that you can withdraw at any time from the process without penalty. Please be also assured that your anonymity and confidentiality are guaranteed. The data collected will be reported without identifiers and kept confidential. I have attached the interview consent form for you to review and give consent by signing prior to the interview. Your participation will be a valuable addition to the research and findings could lead to greater public understanding of Customer Value Management and Big Data Analytics.

Please note that I am flexible on the interview times as I am aware of the work-from-home pressures and let me know what time would suit you should you be willing and able to assist with my MBA studies.

I look forward to gaining more insights from you.

Kind Regards

Abo Qwabe

0832127202

Should you have any concerns, please feel free to contact my supervisor or myself. Our contact details are provided below.

Abongile Qwabe

MBA Student

Email: 13405170@mygibs.co.za

Tel: 083 212 7202

Danie Petzer (supervisor)

The University of Pretoria's Gordon Institute
of Business Science

Email: petzerd@gibs.co.za


Direct Tel: +27 11 771 4242

Appendix 4: Non-disclosure agreement proforma



NON-DISCLOSURE AGREEMENT PROFORMA

I, the undersigned *[Full names and identity number of the transcriber]*
.....**NITHIN ISAAC**....., hereby declare that I will be transcribing the interview data recorded using audio or video as an independent transcriber to the research process. I confirm and understand that I shall not, for whatever other purpose, reason and/or use, divulge the information I will be privy to other than the transcription for the research report.



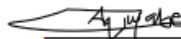
Signature

Nithin Isaac

Transcribers name and surname

17/08/2020

Date



Signature

Abongile Qwabe

Researcher's name and surname

17/08/2020

Date

Appendix 5: Consistency matrix

Title: Big Data Analytics as a Dynamic Capability to Enhance Customer Value Management for Sustainable Competitive Advantage

Research questions	Literature review	Section	Data collection tool	Data analysis tool
How do MNOs harness big data analytics as a dynamic capability to enhance CVM for sustainable competitive advantage?	Hung et al. (2006); Tsai et al. (2015); Vidgen et al. (2017); Wamba et al. (2017)	Sections 2.3 and 2.4	Atlas.ti	Thematic content analysis
How do MNOs harness big data analytics?	Wamba et al. (2015, 2017), Mikalef et al. (2020)	Sections 2.1 and 2.4	Atlas.ti	Thematic content analysis
Can big data analytics be used as a dynamic capability within MNOs, and if so, how?	Pisano (2017) Erevelles, Fukawa, & Swayne (2016), Teece (2007)	Sections 2.1, 2.3 and 2.4	Atlas.ti	Thematic content analysis
How do MNOs enhance CVM for sustainable competitive advantage through big data analytics as a dynamic capability?	Banerjee (2013), Verhoef et al. (2007), Kitchens et al. (2018), Ostrander (2018), Mikalef et al. (2018), Opresnik & Taisch (2015)	Section 2.1, 2.3, 2.4, 2.5 and 2.6	Atlas.ti	Thematic content analysis

Appendix 6: Atlas.ti codebook

Code	Code definition	Research question	Interview question
1.1.1	Traditional database setup	1	1.1
1.1.2	Maturity competence	1	1.1
1.1.3	Available data	1	1.1
1.1.4	Quality of data	1	1.1
1.1.5	Better customer understanding	1	1.1
1.1.6	Customer journey	1	1.1
1.1.7	Shared key performance indicators	1	1.1
1.2.1	Bridging the gap between technology and marketing	1	1.2
1.2.2	Diverse & rapidly evolving nature of big data makes it difficult to integrate	1	1.2
1.2.3	Understanding customer behaviour	1	1.2
1.2.4	Personalisation	1	1.2
1.2.5	Targeted propositions	1	1.2
2.1.1	Speed to market	2	2.1
2.1.2	Predictive models	2	2.1
2.1.3	Segmentation	2	2.1
2.1.4	Improved customer engagement	2	2.1
2.1.5	People as resources	2	2.1
2.2.1	Customer journey	2	2.2
2.2.2	Upselling and cross-selling	2	2.2
2.2.3	Targeted propositions	2	2.2
2.3.1	Adapt or die	2	2.3
2.3.2	Customer engagement	2	2.3
3.1.1	Targeted and personalised services	3	3.1
3.1.2	Contextual marketing	3	3.1
3.1.3	Real-time monitoring and intervention	3	3.1
3.1.4	Ability to monetise	3	3.1
3.1.5	Roaming capabilities	3	3.1
3.2.1	Ongoing adaptive process	3	3.2
3.2.2	Customer journey embedded	3	3.2
3.2.3	Predictive analysis	3	3.2
3.2.4	Customer engagement	3	3.2
3.2.5	Better service delivery	3	3.2
3.3.1	Customer knowledge	3	3.3

Code	Code definition	Research question	Interview question
3.3.2	People as resources	3	3.3
3.3.3	Customer journey	3	3.3
3.4.1	People and organisational culture	3	3.4
3.4.2	Operating model	3	3.4
3.4.3	Culture of data analytics	3	3.4
3.4.4	People competencies and experience	3	3.4
3.4.5	CVM is an ecosystem	3	3.4