

Competing through the use of big data by retail banks in South Africa

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

Johannesburg, 2016

(VERSION FEBRUARY 2016)

ABSTRACT

Organisations striving to achieve competitive advantage are no longer an exception, as it has become a basic requirement for their survival. The explosion of machine-generated data through varied sources provides organisations with a unique opportunity to create value, and compete effectively in the market.

The current research study provided a guideline for retail banks operating in South Africa to manage, efficiently use and achieve competitive advantage using big data. Since big data is still an emerging technology, not many studies have been conducted on the topic. This research is empirical in nature and therefore a qualitative methodology was selected for the study. The respondents were purposefully selected using social networks, participant references, e-mails, and telephonic calls.

The research revealed that banks in South Africa are still in the infant stage of embracing big data in accordance to study conducted by Davenport and Dyché (2013) and there are currently neither hard findings nor case studies to prove the success stories. The fear of falling behind the market and believing in big data's potential has created an enabling environment for South African banks to invest in big data infrastructure. On the contrary, few South African banks are actively using big data for their various operations, and others are still catching up with the technology.

As expected, the study revealed that banks gain competitive advantage through various factors, provided they embrace, implement and execute big data strategies relevant to their business. In addition, the study was not able to conclude whether the competitive advantage gained using big data was sustainable or transient due to mixed responses. The analysis identified innovations, fraud prevention, organisation culture, and customer segmentation as crucial factors for banks to gain competitive advantage. Analysis further presented that big data plays a crucial role in excelling on these identified factors that provide competitive advantage for South African banks. However, the

analysis of the data also indicated that other aspects such as infrastructure and data ownership are crucial for banks to gain a competitive advantage.

Key words: Big data, Competitive Advantage, Customer Segmentation, Fraud Prevention, Infrastructure, Data Ownership

DECLARATION

I, Saikiran Pinnapala, declare that this research report is my own work except as indicated in the references and acknowledgements. Research is submitted as partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Saikiran Pinnapala

Signed at

On the day of 2016

ACKNOWLEDGEMENTS

I would like to thank my supervisor Mr. Antony Soicher for sharing his enormous knowledge on the topic and for motivating me throughout the research life cycle. In addition, would like to thank all our Wits Business School professors, management team and other support staffs who directly or indirectly supported my MBA journey.

I feel so grateful to “Ms. Monica Singer (CEO, STRATE Pty Ltd)”, “Mr. Rudi Steenkamp (Head of IT, STRATE Pty Ltd)”, and “Ms. Monica Olwagen (Manager Settlement Service, STRATE Pty Ltd)” for their care, direction, and enthusiasm. This MBA journey would have been much tougher without their assistance.

“Behind every successful man, there is a woman” and I am immensely grateful to my wife, “Ms. Shailaja Jayaraj’s (Assistant Consultant, Tata Consultancy Services)” for showering her unconditional love and support. The agony, hardship and sacrifices that she challenged is forever etched in my heart and memory. The maturity level of my then two-year-old son “Aarav Saikiran” in cooperating with our MBA journey was a blessing in disguise. I am thankful for my family, extended family, and selective friends for their motivation and support.

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CHAPTER 1: INTRODUCTION

1.1 Purpose of the study

The purpose of this research was to identify how South African retail banks gain sustainable competitive advantage by using big data.

1.2 Context of the study

According to Huhtala, Vaniala, and Tikkanen (2016), organisations face various challenges to gain competitive advantage because of high volatility in the market competition. In addition, to gain a sustainable competitive advantage, organisations need to concentrate on their subsequent transient competitive advantages. Organisations, while discussing their business strategies have started to include competitive advantage due to their growing necessity and its importance in an organisational survival (Rumelt, 2003). The success of an organisation not only depends on satisfying current markets' demands, but also on maintaining an innovative edge ahead of competitors. However, just matching the demand and competing with competitors does not provide competitive advantage (Kotler, 2000). Organisations that know how to analyse the received information have a high probable rate of gaining competitive advantage in the market ahead of their competitors who are late in processing the information (Kotler, 2000).

Customers' expectations are increasing frequently and it is becoming difficult for organisations to keep up with volatile demand (Kotler, 2000). Organisations typically gain competitive advantage by using advanced training methodologies, trained employees, advanced information technology (IT), efficient distribution channels and by offering differentiated products or services. The need for a competitive advantage is increasing at an exponential rate and it is becoming mandatory for organisations to reconsider the ways that achieve competitive advantage (Kotler, 2000).

Ulrich and Lake (1991) in their study on organisational capability described that organisations traditionally gain competitive advantage through technological capabilities, strategic capabilities and financial capabilities. Although these capabilities are important factors, that influence competitive advantage for organisations, there are also several other factors that create competitive advantage. In this context other factors refer to effectively managing competitive human resources, offering high quality products or services or both, pricing less than the competitors, technology innovation, and creating customer value (Ulrich & Lake, 1991). In addition to previous findings Kocaoglu and Acar (2016) describe that refining the sales order and their cycle lifetime is vital for organisations' success. Organisations gain competitive advantage by embracing information systems that manage customer orders efficiently.

Sorescu, Frambach, Singh, Rangaswamy, and Bridges (2011)'s research study on a retail business model affirmed that the retail business is always oriented towards the customers who constitute the market. A retailer can gain a competitive edge if he is aware of the information, which can create value to customers in the market. The increasing expectations from the customers, market demand, pure competition from the competitors, and dynamic change in technology motivates retailers to strive for competitive advantage to survive market competition (Sorescu et al., 2011). Organisations need to invest in both big-data analytics skills and IT infrastructure to produce significant returns. Moreover, investing in big data has been found to be similar to investing in IT during intense earlier days (Bughin, 2016).

Labrinidis and Jagadish (2012) describes that the necessity of big data in decision-making is receiving worldwide recognition and the interests in using big data are seemingly rapidly increasing. Although there are challenges to analysing information using big data, the perceived value is key for companies to create customer value and drive profit. The acknowledgment of big data by famous new channels has created a buzz across the industries and has showcased the promises of big data (Labrinidis & Jagadish, 2012). In addition to previous studies, He, Tian, Chen, and Chong (2016) describes how organisations gain a competitive advantage not only by analysing customer generated data from competitions social media websites. Social media sites are the main source for

user-generated digital data and companies can create customer value by employing the appropriate analytical skills and tools.

1.3 Problem statement

1.3.1 Main problem

The main purpose of this research study was to identify how South African retail banks compete by using big data.

1.3.2 Sub-problems

The first sub-problem analysed the factors of how retail banks compete.

The second sub-problem analysed how retail banks compete by using big data.

1.4 Significance of the study

The big data concept is a relatively new concept. As such, there have been a few controversial statements issued about big data, which state that it is called big data just because of its big size in nature. Organisations started using big data even before the uses of big data were evident (Labrinidis & Jagadish, 2012). The use of electronic devices has multiplied due to an increased use of internet, digital marketing, smartphones, laptops, personal sensors, cloud computing, and technology. The high frequency usage of digital devices in turn has increased the pool of new unstructured information (Bollier & Firestone, 2010).

Earlier studies conducted by Bollier and Firestone (2010) described internet and electronic device proliferation as the main source for digital data expansion. In contrast Dull (2014) suggested that both big data and the internet of things (IoT) are dual edges of the same coin. In addition, there exists a strong positive correlation between IoT and big data. According to earlier research concerning big data's growth, Figure 1 depicts the growth of big data in terms of size, starting from year 2004 until 2012 (Marx, 2013).

DATA EXPLOSION

The amount of genetic sequencing data stored at the European Bioinformatics Institute takes less than a year to double in size.

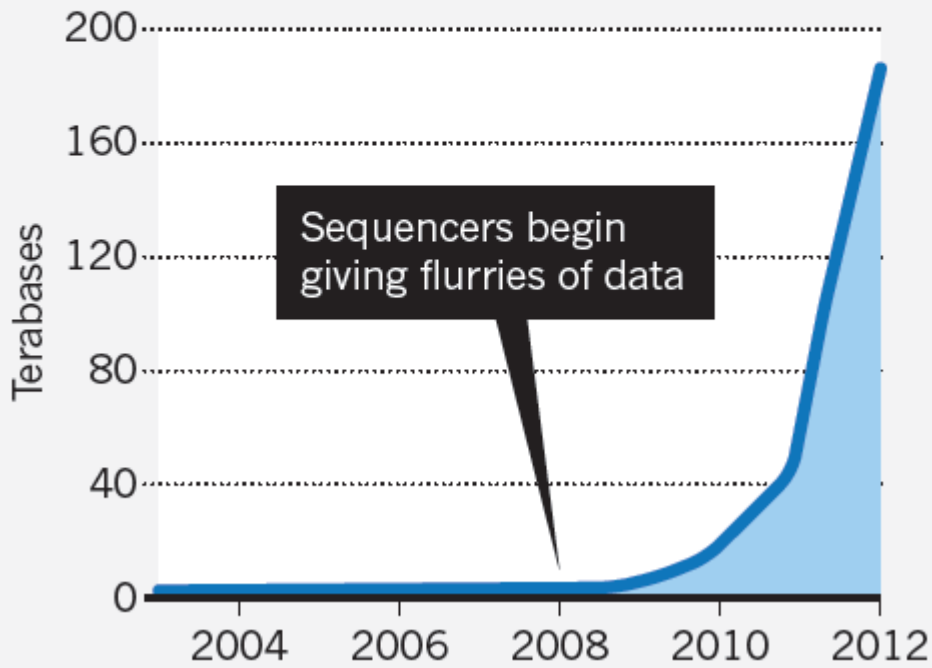


Figure 1: Data Explosion, Marx (2013)

Organisations benefit by improving data management, data science, and data analytics methods, which increase the efficiency of converting raw data into useful information. The developing new trend or technology of converting a pool of data into valuable information is called big data by the scientists (Murdoch & Detsky, 2013). Several studies have been conducted around the world on big data's usage across various industries. However, has been very little research conducted in the retail-banking sector and more specifically in the South African retail-banking context. Sectors such as retail sales, politics, search engines, astronomy, healthcare and pharmaceuticals have already been using big data with success (Murdoch & Detsky, 2013).

This research sought to provide an insight into the various advantages of using big data in the South African retail-banking environment. The most important use

of big data in the banking and financial sectors are shown in the table 1 (SAP, 2016).

Table 1: Five uses of big data in financial industry, (SAP, 2016)

Number	Uses of Big data
1.	Improving customer security and illegal transaction detection (SAP, 2016)
2.	Transaction monitoring and reporting system (SAP, 2016)
3.	Segmentation and profiling of customers (SAP, 2016)
4.	Differentiated product offering based on individual customer needs (SAP, 2016)
5.	Managing risk (SAP, 2016)

In the banking service an increase in convenience to customers also provides the possibility for a rise in fraudulent activities. Customers transact using different platforms such as mobile banking, internet banking, credit cards, automated teller machines (ATM) and online banking. Out of many, only a few channels are more prone to fraud attacks when compared to others (Moss, Berkery, Johnson, & Geertz, 2016). Hoffmann and Birnbrich (2012) in their research on fraud prevention describe that even a small impact in bank security could trigger a huge impact on the relationship between the customers and the organisation.

This research study examined the factors that influence retail banks to achieve competitive advantage by using big data, e.g.: fraud detection and customer security is highly essential for any bank to protect both banks and customers' money from illegal thefts (SAP, 2016). A bank with a higher rate of hacking issues has less trust among its customers in comparison to banks with lower rates of hacking issues will have more trust among the customers. Through the use of big data, it is possible for an organisation to understand the behaviour of a customer even across multiple organisations by sharing information where needed (Bradley & Stewart, 2016). Thus, banks using big data for fraud prevention create a competitive advantage and helps them with creating customer value for their customers (SAP, 2016).

1.5 Delimitations of the study

The following delimitations were noted for this study:

- This research is focussed towards how big data was used by the retail banks to achieve sustainable competitive advantage. The purpose of the research did not include different big data analytical tools, methods, software or hardware used by the banks.
- The study was focussed only on the advantages of using big data for retail banks and not focussed on the big data analytical techniques used by them.
- The research investigated how retail banks in South Africa were competing by using big data. This research did not discuss the direct relationship or correlation between big data usage and competitive advantages for banks.
- To an extent, these research findings could be generalised even for organisations operating in other sectors. The findings suggested that big data is still in the infant stage and that currently, banks in South Africa now do not have hard findings to prove big data's potential. The same study conducted after a few years might result in similar findings backed by supportive hard findings.
- To maintain the confidentiality of the respondents, their names, gender and the organisations they represent were not recorded.

1.6 Definition of terms

Following were the relevant definitions used in this research:

- 'Retail Banks' are the financial institutions or banks that provide banking and financial services (BFS) to the customers (Byers & Lederer, 2001).
- 'Big data' in Latin means "things given" and in English means "mass" as it refers to size and volume of the data (Jacobs, 2009). Big data does not mean that volume of data is large and the terminology remains ill defined

if only data volume is considered. Also, there is no clear understanding of what amount of data can be referred to as 'Big data' (Mohanty, 2015).

- 'Business Intelligence and Analytics (BI & A)', is defined as a set of analytical methods that are used to create value from raw datasets (Chen, Chiang, & Storey, 2012).
- 'Customer service' is defined as a set of activities designed by the organisations to satisfy customers' needs (Kotler, 2000).
- 'Customer retention' is defined as a set of activities designed by the organisations to retain their existing clients (Coyles & Gokey, 2005).
- Organisations create 'customer value' by providing services or products or both that pleases the customers' expectations (Kotler, 2000).
- 'Competitive advantage' is defined as an advantage organisations achieve by offering distinctive products by creating customer value (Kotler, 2000).
- 'Customer relationship management (CRM)' is defined as a set of customer oriented operations used by the organisations to strengthen their products or services quality (Tseng, 2016).

1.7 Assumptions

Following were the relevant assumptions used in this research:

- This study is limited only to a South African framework and the research focussed solely on South African retail banks.
- It is assumed that big data technology is still in its infancy stage, considering the context of South African retail banking sector (Davenport & Dyché, 2013). Only a few banks in South Africa are actively using big data, while others are still building big data infrastructure, and the rest are yet to embrace big data.
- Branches of foreign banks operating in South Africa were not considered for this study.
- There were no legal barriers preventing South African Retail Banks from using clients' information.

- Respondents were not influenced by the interviewer to generalise research findings.
- Respondents had minimal knowledge on the topic.
- Respondents had knowledge about big data's potential for their respective organisations.
- Respondents shared authentic feedback and did not provide satisfying interviewer biased answers.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

According to a study conducted by McAfee, Brynjolfsson, Davenport, Patil, and Barton (2012) big data permits managers to make decisions based on evidence rather than by following their instinct. According to Hargreaves, Morton, Braun, and Gurn (2015), big data has an enormous potential to provide answers for all our business problems. An organisation's decision-making processes are more inclined towards data and organisations can make efficient decisions by possessing rich and superior data. According to Russom (2011) big data is an opportunity in business to create value, where high volume of data was once considered a data storage problem.

De Mauro, Greco, Grimaldi, O'Connor, and Broady-Preston (2016) define big data as a form of an information asset that requires relevant technology and analytical tool support in order to be converted into valuable information. Bughin, Chui, and Manyika (2010) had a different perspective and described big data as a trend. According to them, the word trend refers to increasing the rate of public information available to organisations through purchase transactions, frequent use of smart assets, and cloud usage for storing.

The following topics are discussed in the literature review to provide a base for the research propositions mentioned in Section 1.3. The factors that create competitive advantages for retail banks, how big data is used in retail bank environment, and the effectiveness of big data in influencing competitive advantage for retail banks.

The chapter begins with explaining how retail banks achieve competitive advantage ahead of their competitors. The literature review explains the basic concepts that financial institutions such as banks use to gain competitive advantage. The literature section goes on to explain ways in which big data is used in the retail-banking environment. The last section of this chapter explains

how big data plays a vital role in providing a competitive advantage for South African banks.

2.2 Background discussion

Big data is a concept which flourished vastly in the early decades of 21st century. Most of the online firms such as Google, Facebook, LinkedIn, and eBay have embraced big data and have become successful for using it efficiently. Like any other technology or trend, big data can stand-alone by using appropriate technology architecture and analytics to analyse data (Davenport & Dyché, 2013). While Davenport and Dyché (2013) defined big data as an evolution, Katal, Wazid, and Goudar (2013) describes it as a huge volume of raw data that can be used to extract value by using appropriate technology and analytical methods. All the above-mentioned firms were early adopters in using big data and the efficient analysis of data gave them a competitive advantage in their respective market (Davenport & Dyché, 2013). Big data didn't gain attention due to its large size, but attracted companies due to the low cost of technology associated with it, the opportunities offered, and the absence of structure (Labrinidis & Jagadish, 2012).

Russom (2011) describes that big data is not simply about volume as it also has other important features as depicted in figure 2. De Mauro et al. (2016) and McAfee et al. (2012) describe the features of big data (variety, velocity and volume) as mentioned in table 2.

Table 2: Three features of big data (De Mauro et al., 2016; McAfee et al., 2012)

Features	Definition
Variety	Different channels through which big data is collected, which include smartphones, internet, laptops, ATMs, clouds, global positioning system (GPS), tablets, and social networks (De Mauro et al., 2016; McAfee et al., 2012).
Volume	The huge amount of data collected per unit time (De Mauro et al., 2016; McAfee et al., 2012).
Velocity	The ability to collect data at a faster rate, which includes both real time and non-real time information (De Mauro et al., 2016; McAfee et al., 2012).

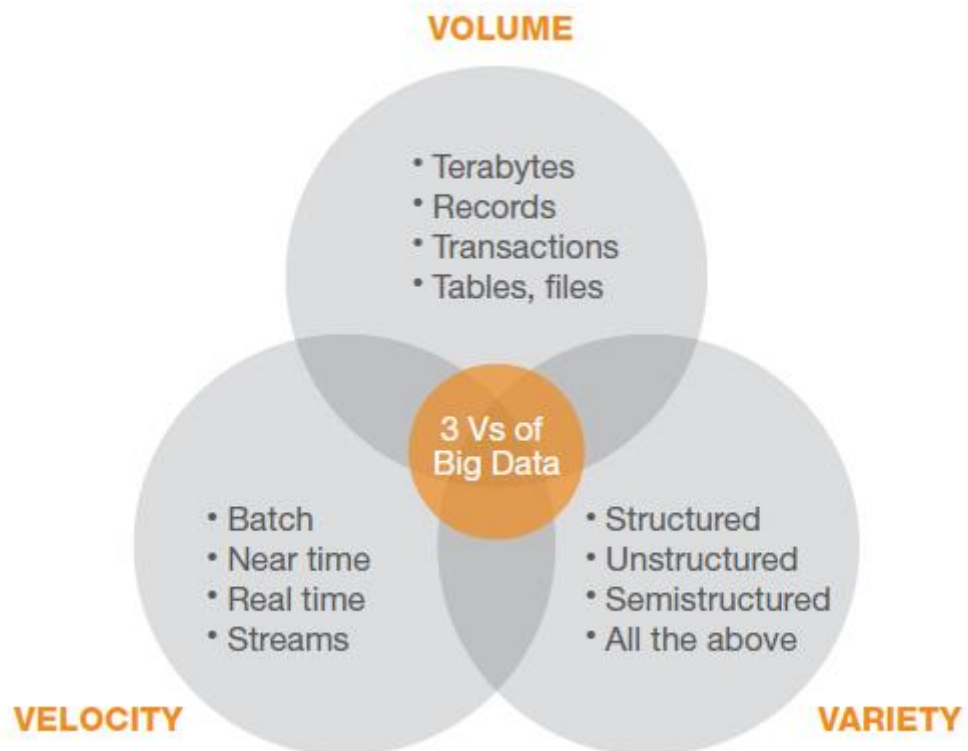


Figure 2: Three V's of Big data (De Mauro et al., 2016; Russom, 2011)

2.3 Competitive advantages for retail banks

In any business a discussion about the need for competitive advantage is taking the centre stage of attraction, and organisations are striving to achieve it (Rumelt,

2003). It is becoming increasingly difficult for organisations to preserve competitive advantage due to volatility in the market, continuous technology advancement and an increase in research and development (R&D) expenditures (Eckblad & Golovko, 2016). According to Barney (1995) organisations gain competitive advantage by practising two important methods. The first method maximises organisations' internal strength and external opportunities. The second method minimises organisations' internal weaknesses and external threats. This section explains the ways in which retail banks gain competitive advantage over their competitors.

2.3.1 *Competitive advantage through innovations*

The generation of effective innovation assists organisations in sustaining profits, customer satisfaction, and competitiveness. Organisations operating in a competitive environment tend to achieve competitive advantage by embracing successful innovation (Erturk, 2016). The retail banks' primary focus has moved from traditional innovations in cost savings to innovations in revenue generations (Frei, Harker, & Hunter, 1997). According to Ireland and Webb (2007), strategic entrepreneurship (SE) is defined as a balance between firms' current operational practices versus firms' future exploration practices in order to sustain this competitive environment. Guimaraes, Brandon, and Guimaraes (2009) describe advancement in technology is one of the key determinants factors for successful innovation in business. Intensive competition between banks in the banking industry forces them to adapt to new technologies to improve their operational performance.

The banks that actively and consistently innovate, achieve superior financial performance compared to their competitors. The superior financial performance of the bank provides them with an opportunity to invest in future innovations (P. W. Roberts & Amit, 2003). Slater and Narver (2000) describe that intelligence creation is one of the main sources of creating competitive advantage for an organisation. They also included that intelligence creation is similar to any other tangible asset that depreciates over time. Therefore, organisations are continuously required to generate intelligence to sustain competitive advantage. Organisations gain competitive advantage by successfully generating intelligence

(Slater & Narver, 2000). The research conducted concerning internet banking service quality by Jun and Cai (2001) described that the quality of internet banking service can be judged on three broad dimensions or features. The features include the quality of internet banking services offered to customers, the quality of banking applications, and the quality in the ease of use of the online applications. An organisation can increase the value of a product by incorporating service innovation that helps them with differentiating their services from competitors(Xing, Belusko, & Min, 2016).

The emergence of digital technology, which constitutes interactive communications, marketing, data analytics, cloud computations, cloud storage, and data mobility has transformed business operations (Safeena, Hundewale, & Kamani, 2011). The growth of internet technology and the further innovations following it have led to changes in financial service operations and their delivery methods. With the introduction of internet banking services many retail banks have used it as an opportunity to increase their operation performance while simultaneously reducing their operating costs (Nui Polatoglu & Ekin, 2001). One of the most relevant outcomes of digital technology is mobile banking, which has completely transformed banking business operations and has also provided organisations with an effective communication channel with which to communicate with customers (Safeena et al., 2011). Safeena et al. (2011) describe mobile banking is a subset of internet banking. While both the internet banking and mobile banking applications use internet to provide banking services to the customers, service innovation is one of the substantial factors where banks should strive to sustain competitive advantage and offer superior mobile or internet banking service to strengthen their importance (Wang, Chen, Huang, & Shen, 2016).

2.3.2 *Competitive advantage through customers and internal resources*

Parasuraman, Berry, and Zeithaml (1991) defined customer satisfaction as a process of fulfilling customer expectations. To provide superior customer value, organisations should first understand customer requisites and then act according to them. In addition to understanding the customer, Eisingerich, Merlo, Heide,

and Tracey (2016) describe customer participation and customer input as helping organisations with understanding customers' purchasing behaviour and their satisfaction levels. Organisations are forced to focus on customer relationship due to the fear of losing customers to their competitors. The growth in competition between the organisations has led to a positive exponential increase of customer relationship importance (Nelson 2007). According to Coyles and Gokey (2005) describe it is cheaper for the organisation to retain old customers than to acquire new ones. Retail banks have also realised that retaining customers has a substantial impact on an organisations' profits (Levesque & McDougall, 1996).

Organisations shouldn't perceive the cost of customer loyalty casually as it contributes to the business's sustainability, profit and competitive advantage (Wicker, 2016). Woodruff (1997) describes that the companies could gain competitive advantage by creating customer value. The main source of competitive advantage for the company comes through their customers. In order to attain a competitive advantage, organisations were forced to look for alternative ways to match the continual increase in demand from customers, increase in local and international competition, rising inflation and economic pressure. An organisations' relationships with their customers provides them with an insight for current and future marketing strategies (Nelson 2007). Levesque and McDougall (1996) describe that an increase in customer loyalty are inversely proportional to operational cost. They also posited that customer loyalty possesses a direct relationship with an organisation's financial gains and sales.

Organisations gain a sustained competitive advantage through the effective use of internal resources, uniqueness and capabilities in executing their strength (Barney, 1995). The internal strengths of an organisation are one of the most important and potential sources of competitive advantage (Popescu, 2015). Levesque and McDougall (1996) identified the main determinants of customer satisfaction, namely the quality of service offered by the organisation, the turnaround time taken by the organisation to resolve issues, and the banking products used by the organisation to serve the customers. Organisations sustain competitive advantage in longer tenure by retaining their overqualified employees from their workforce (Sikora et al., 2016).

Frei et al. (1997) stated that the retail banking innovation architecture is simple and it consists of operations, research and development (R&D), and marketing. All these entities work closely with each other and the origin for innovation can come from any of these three entities. figure 3 depicts the relationship between the basic entities of innovation in banking processes (Frei et al., 1997). Coyles and Gokey (2005) describe that companies spend a great deal of money to understand customers and the different ways of influencing them. Similarly, Alrubaiee and Al-Nazer (2010) describe that in the long term, customers are the sole entity responsible for financial performance of the companies. Therefore, a modern innovation relationship diagram will be enhanced to have an additional entity called “customers” and all four entities will be linked to each other, producing a customer-focussed innovation.

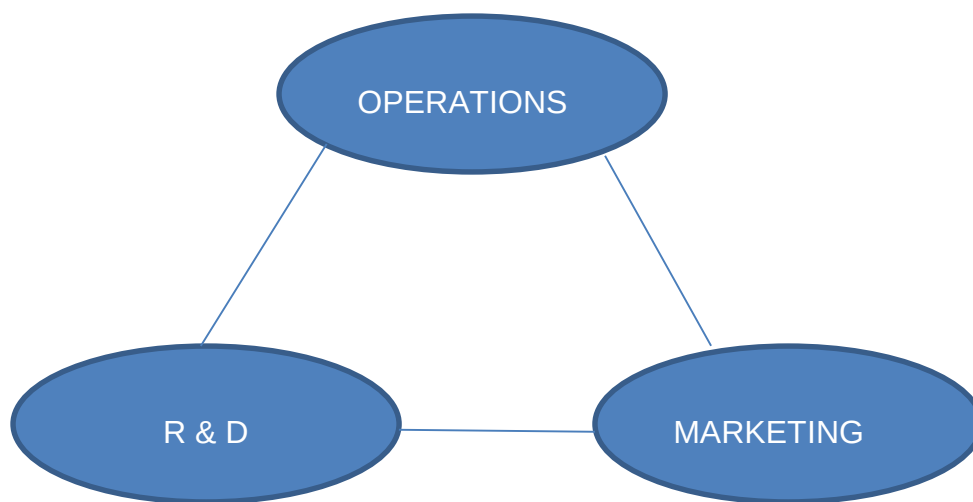


Figure 3: Basic Relationship in innovation process (Frei et al., 1997)

2.3.3 *Research proposition 1*

The factors that allow financial institutions such as banks to achieve sustainable competitive advantage are excellent operational service, continuous innovation, and efficient customer service.

2.4 Uses of big data in the retail bank environment

The value produced by analysing big data is very widely recognised and it is difficult for the organisations to avoid mentioning the benefits of big data in their routine operations (Labrinidis & Jagadish, 2012). The following section covers the possible ways in which big data is adapted by retail banks for their operational use.

2.4.1 *Providing security to banks*

Hipgrave (2013) in his research study in the United Kingdom (UK) projects that approximately 36.5 billion pounds have been lost to the economy due to fraud. The continual increase in fraud applies immense pressure on organisations to combat fraud and protect their reputation. Morris (2009) in his study on combating fraud in the healthcare industry confirmed that approximately 75 to 250 billion dollars have been lost due to fraudulent billings and illegal transactions.

The financial crimes executed by criminals deliberately and frequently change regarding the nature of actions, strategies and methods. Financial institutions must protect their customers from financial crime by adapting appropriate methods since millions of customers every year are impacted by financial crime (Sudjianto et al., 2010). The number of fraud cases reported increases annually instead of decreasing and it adds pressure to organisations to take effective actions and handle fraud in a smarter way (Hipgrave, 2013).

Gates and Jacob (2009) describe payment fraud as an illegal activity of making payments using the information generated through different channels of payment methods such as cheques, debit and credit cards, online transactions, mobile transactions, and ATMs. One of the most basic services expected from banks is security and fraud prevention. Any disruption in security can affect customer satisfaction, customer loyalty, customer retention and relationship quality (Hoffmann & Birnbrich, 2012). Fraud is becoming a significant threat to the banks' payment systems. The Opportunity to perform fraudulent activities is increasing due to an increase in online transactions, shared database, and social networks (Gates & Jacob, 2009). Using interactive analytics, predictive and other hybrid

analytical tools on big data have enormous potential to reduce the average time taken by an organisation to identify fraudulent transactions (Bradley & Stewart, 2016).

figure 4 depicts information on estimated fraud losses reported in UK by the national fraud authority (NFA) (Hipgrave, 2013).

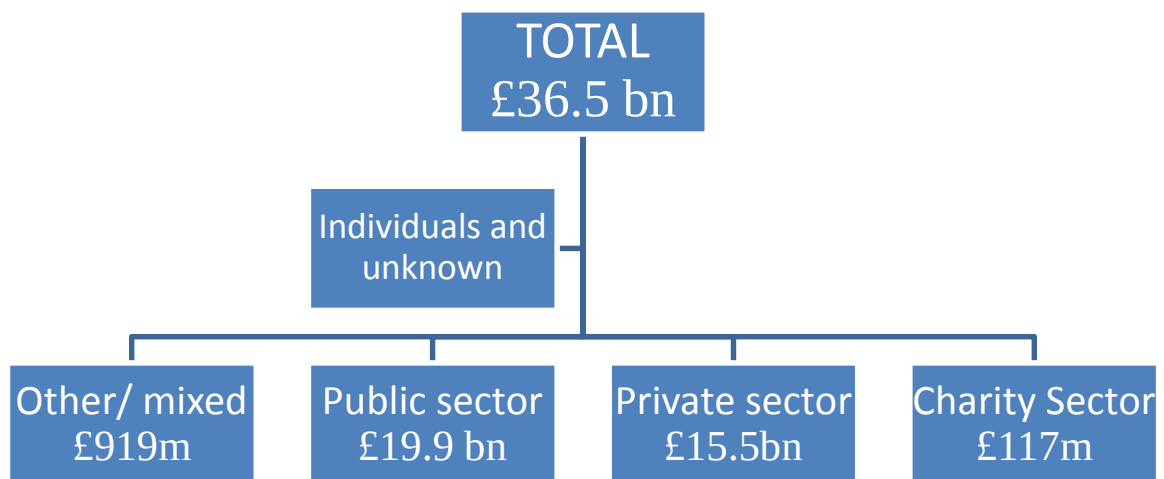


Figure 4: Estimated Fraud loss – NFA, (Hipgrave, 2013)

Big data creates immense value for the world economy, products and service innovations, and for achieving performance targets (Polonetsky & Tene, 2013). The ability to understand big data analysis is very important, as it adds no value if the user does not understand the analysis (Labrinidis & Jagadish, 2012). Banking fraud can be prevented by using appropriate big data technology and analytics methods to determine the differences between the normal activity and illegal activity. Big data helps with understanding customers' transaction behaviour and the perceived which insight can be used for customers' authenticity differentiation (SAP, 2016).

Organisations can identify fraud risk by uncovering the fraud trends and their patterns. There is a possibility for organisations to identify fraudulent activity by using appropriate smart fraud prevention and detection solutions (Hipgrave,

2013). Converting raw data into valuable information is not a one-step activity and it involves various steps of pipelined sequential activities (Labrinidis & Jagadish, 2012). The prime weakness of the advancement in technology is by paving the way for new forms of smart threats. At the same time, advancement in technology also provides strength to combat threats by analysing big data (Hipgrave, 2013). Credit card fraud is one of the most prevalent problems faced by banks, financial institutions, and other mortgage companies. Adequate big data analysis can identify the pattern in difference between doubtful and non-doubtful transactions and prevent the misuse of stolen or lost credit cards by unauthorised users. This technique prevents the banks from sustaining a huge amount of financial and reputation loss (Bentley, Kim, Jung, & Choi, 2000).

2.4.2 *Customer segmentation*

According to Frank, Massy, and Wind (1972), market segmentation is described as the segmentation of market, so that organisations can offer differentiated products or services to customers to gain competitive advantage in the market. Zakrzewska and Murlewski (2005) describe although marketing segmentation is vital for an organisations' marketing strategies, market segmentation in the banking environment is challenging due to the high volume of transactional and multidimensional data. Banking institutions understand their customer's behaviour, and segment usage by creating customer profiles and offer differentiated products and services to satisfy each individual customer's needs.

IT service providers often use big data as a "buzzword" for a smarter understanding of data analysis. Organisations need to understand that the usage of big data is more than that. To provide new differentiated products and services, organisations need to collect, store, interpret and analyse big data (Davenport, Barth, & Bean, 2013). The operation cost of capturing and analysing information with the use of technology is available at low cost and this is one of the reasons influencing organisations to embrace big data. Few companies are taking data analysis to the next level by using IT support services, rigorous analytical methods, and different experimentation with business models (Bughin et al., 2010).

Banks are no longer only involved in providing basic banking services to the customers. They are forced to adapt a market-oriented approach where they segment the customers, understand their needs and provide the required banking and financial services to them (Kaynak, 1986). While organisations are trying to understand consumers, the consumers are more worried about their private space being taken by the organisation (Graeff & Harmon, 2002). Although banks' marketing teams adhere to the defined customer concern policy, Graeff and Harmon (2002) stated that customers have a negative perception that organisations are intruding too much into their personal information. Bughin et al. (2010) explains three levels of big data users. On the first level sits the early adopters like e-Bay, Amazon, and Google who identified the potential of big data as a prime force to drive organisational performance. The second level includes the financial institutions that use big data regularly for customer segmentation, risk profiling and altering products. The third level has of the manufacturers and retailers that conduct big data experiments to understand customers purchasing and sales behaviour (Bughin et al., 2010). One of the major contributors for big data is social media and big data helps organisations with segmenting their customers efficiently (Chan, 2016).

2.4.3 *Return on investment (ROI)*

The important factors that influence organisations to gain competitive advantage are organisational capability, competence in adapting good strategic decisions, competence in utilising technological advancement and competence in making good financial decisions (Ulrich & Lake, 1991). Big data should be used in integration with other on-going activities in the organisation and not as a separate tool (Davenport & Dyché, 2013). Organisational capability can be defined as the efficient execution of strategies by the human capital of the organisation to increase organisations competitiveness (Ulrich & Lake, 1991).

Davenport and Dyché (2013) explained that organisations find it difficult to measure ROI after using big data technology. Refer figure 5 depicts the financial performance of big data technology versus data warehouse technology (Davenport & Dyché, 2013). Thus retail banks using big data gain superior ROI, providing them with a competitive edge against their competitors. Recent studies

conducted on the banking industry by a major consulting firm suggested that investing in IT does not necessarily improve profits but directed investment in IT tends to improve profit (Hoene, 2016). Refer to figure 5, which depicts the correlation between IT investment and banks' profitability. Research suggests that spending on big data and analytics has a higher profitability ratio with a positive correlation of 36% (Hoene, 2016).

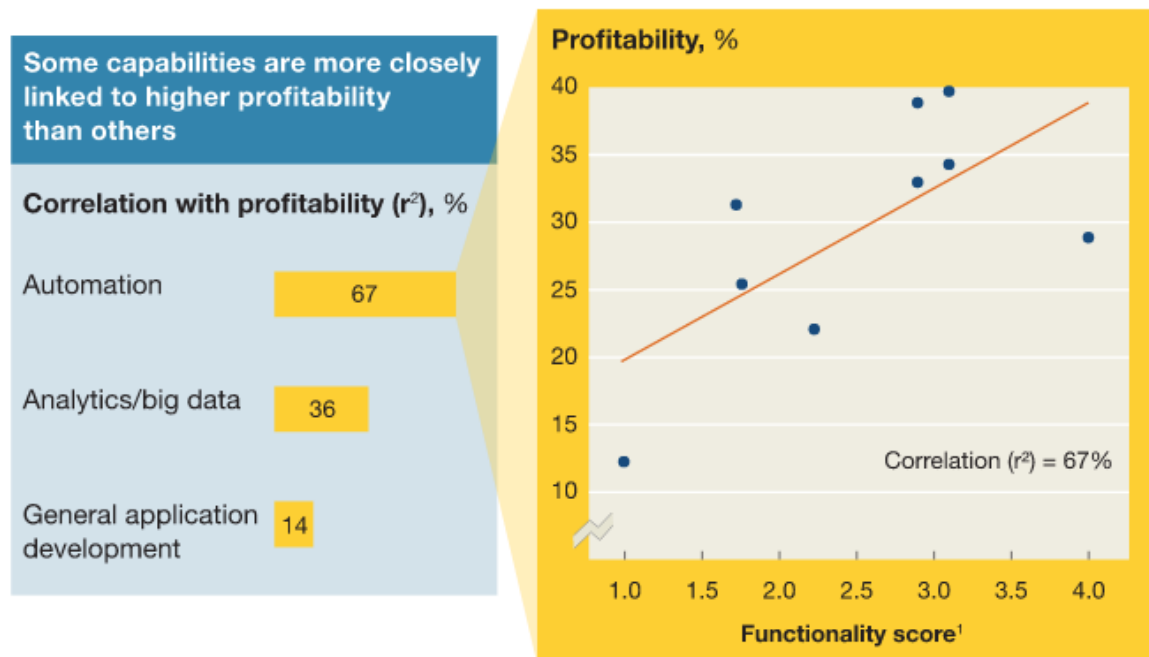


Figure 5: Study on Investment in IT and banks profitability by Mckinsey, (Hoene, 2016)

2.4.4 Customer Value

Organisations are struggling in all ways to satisfy customers, either by providing goods or services that have more added values (Ulrich & Lake, 1991). Davenport and Dyché (2013) describe big data provides an opportunity for organisations to launch products or services first to the market and at a faster rate. According to Davenport and Dyché (2013) big data can assist organisations with creating customer lifetime value, with identifying privileged customers, and with to offering an insight to organisations on customer preferences by exploiting their

customers' shopping patterns. Bughin et al. (2010) describes that big data has become a vital element in organisations' decision-making processes.

The concept of big data is different from a normal customer relationship management (CRM) analytical method. In fact, CRM was widely used long before big data gained recognition by organisations. The energy of big data is enormous, that it can provide valuable insights to organisations to create endless customer loyalty and customer value (Davenport & Dyché, 2013). The features of big data such as volume, velocity and variety differentiates it from other older approaches such as CRM (McAfee et al., 2012). In general it has been observed that the companies using big data in their operational decision-making processes are five percent more productive and six percent more profitable than their competitors (McAfee et al., 2012). Therefore, we can conclude that retail banks using big data technology can achieve competitive advantage by creating superior customer value, better ROI, customer loyalty, and customer satisfaction (Bughin et al., 2010; Davenport & Dyché, 2013; Kotler, 2000).

2.4.5 *Research Proposition 2*

Big data provides an opportunity for banks to excel in factors such as customer security advancement, return on investment, fraud prevention, customer segmentation, reduction in operation cost, and creating customer value.

2.5 Conclusion of Literature Review

2.5.1 *Research proposition 1:*

The factors that allow financial institutions such as banks to achieve sustainable competitive advantage are excellent operational service, continuous innovation, and efficient customer service.

Table 3: Proposition 1 - Category and their associated references

Category	Reference
Efficient operational service is one of the factors that allow banks to achieve sustainable competitive advantage.	• Ireland and Webb (2007)

Factors that allow banks to achieve sustainable competitive advantage are continuous innovations in technology, services, business models, products, and business practices.	• Guimaraes et al. (2009) • P. W. Roberts and Amit (2003) • Slater and Narver (2000) • Nui Polatoglu and Ekin (2001) • Jun and Cai (2001) • Safeena et al. (2011) • Xing et al. (2016) • Erturk (2016) • Wang et al. (2016)
Efficient customer service is one of the factors that allow banks to achieve sustainable competitive advantage.	• Parasuraman et al. (1991) • Nelson (2007) • Coyles and Gokey (2005) • Levesque and McDougall (1996) • Woodruff (1997) • Barney (1995) • Frei et al. (1997) • Alrubaiee and Al-Nazer (2010) • Eisingerich et al. (2016) • Wicker (2016) • Sikora et al. (2016)

2.5.2 *Research proposition 2:*

Big data provides an opportunity for banks to excel in factors such as customer security advancement, return on investment, fraud prevention, customer segmentation, reduction in operation cost, and creating customer value.

Table 4: Proposition 2 - Category and their associated references

Category	Reference
Value produced by big data analytical methods.	• Labrinidis and Jagadish (2012)
Big data provides an opportunity for financial institutions such as banks to excel in customer security advancement and fraud prevention.	• Hipgrave (2013) • Morris (2009) • Sudjianto et al. (2010) • Gates and Jacob (2009) • Hoffmann and Birnbrich (2012) • Labrinidis and Jagadish (2012) • Polonetsky and Tene (2013) • SAP (2016) • Bentley et al. (2000) • Bradley and Stewart (2016)
Big data provides an opportunity for financial institutions such as banks to excel in organisations' vital factors such as customer segmentation and profiling, return on investments, reduction in operation cost, and creating customer value.	• Frank et al. (1972) • Zakrzewska and Murlewski (2005) • Davenport et al. (2013) • Bughin et al. (2010) • Kaynak (1986) • Graeff and Harmon (2002) • Chan (2016)
Financial institutions such as banks achieve financial gains by using big data.	• Ulrich and Lake (1991) • Davenport et al. (2013) • Davenport and Dyché (2013) • Hoene (2016)
Financial institutions such as banks achieve non-financial gains by using big data.	• Ulrich and Lake (1991) • Davenport et al. (2013) • Davenport and Dyché (2013) • Bughin et al. (2010) • McAfee et al. (2012)

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Research methodology/paradigm

Qualitative method strategies are more inclined towards interpreting verbal data rather than measuring, collecting and analysing numbers (Alan, 2012). Creswell (2013) has identified three key elements (refer table 5) to identify an appropriate methodology that can be used in a research process.

Table 5: Three key elements to identify research method paradigm, (Creswell, 2013)

Number	Elements
1.	Data collection and analysis methods used in the research process (Creswell, 2013).
2.	Mode of inquiry (Creswell, 2013).
3.	Researcher's knowledge on his study (Creswell, 2013).

This research study examined the framework that creates competitive advantage for South African retail banks using big data. Based on the three key elements as identified in Table 5, the research method used for this topic was qualitative. The data collection method used for this research study was qualitative and as Creswell (2013) described, a qualitative approach allows the respondents to express their views openly and broadly. Davenport and Dyché (2013), since big data technology is still in its infancy stage within the context of the South African retail banking sector, adapting a qualitative approach allowed respondents and the researcher to share, interpret and communicate knowledge on the benefits of using big data in retail banks.

A qualitative approach allowed the researcher to raise questions based on his understanding of the research topic and convert the received feedback into themes (Creswell, 2013). In this research, the questions were chosen based on the derived research propositions as outlined in Section 2.6.1 of literature review. To reiterate, very few research studies are available on this topic and current study was more focussed towards the exploration of the research topic. Therefore, a qualitative approach was used as it was more suitable for the topic

and also it allowed both the researcher and respondent to share their perceptions, knowledge and facts on the research topic (Burke, 1997).

3.2 Research Design

The data was collected using semi-structured interviews and as Alan (2012) described, semi-structured interviews allowed the researcher to have flexibility in raising questions following the respondents' responses. Semi-structured interviews allowed the researcher to change the order of questions from the standard list, thereby allowing the researcher scope to innovate further on the topic (Alan, 2012).

Semi-structured interviews were conducted using face-to-face interactions and interviews were conducted based on the availability and convenience of the respondent (Alan, 2012). The interview output resulted in the extraction of respondent's field experience, private opinion, professional opinion, and awareness on the research topic. Since few respondents' responses were contradictory to each other, it was challenging to aggregate the responses using a semi-structured approach (Alan, 2012).

3.3 Population and sample

As research generalisation is very sensitive to the selected population, this topic demanded that the researcher identified and interviewed the right population (Flick, 2009). Therefore, this research had chosen the precise population and sampling methods to generalise the research findings.

3.3.1 Population

The population were derived from all persons working in the South African banking sector. More specifically, the population constituted big data professionals working or used to work within the retail-banking environment. Professional includes big data strategists, data scientists, entrepreneurs

operating in big data space and business heads representing big data service providers.

3.3.2 *Sample and sampling method*

Alan (2012) described snowball sampling as one of the purposive sampling methods where sampled respondents propose other respondents with similar knowledge, experience, and skillsets. The snow-ball sampling approach was relevant to this research study and it provided an opportunity to expand the sample. The higher the number of respondents, the better the generalisation of the research topic but since big data technology is still in the infancy stage, appropriate selection of respondents helped in the generalisation of the research topic (Davenport & Dyché, 2013). According to the information published by the banking association of South Africa there are approximately 31 retail banks in South Africa inclusive of both local and international banks and very few banks have been identified as having embraced big data ("Member Banks," n.d.). The sample does not include international banks operating in the South African banking environment.

The snowball sampling method was used in this research study and it allowed the researcher to initially sample a small set of respondents pertinent to the research questions. Using the sampled respondents' proposals of other potential respondents made sample networking efficient in finding the relevant expertise and also adding value to the research findings (Alan, 2012).

Respondents were initially contacted using telephone or e-mail or through social networking platforms such as LinkedIn or Facebook. Few respondents declined to participate considering ethical concerns however they later agreed to participate in an interview after the ethical clearance and non-disclosure forms were shared. Few respondents declined to participate stating that they won't be able to contribute much to the research topic. Luckily one of the respondents who was part of the study sample had already conducted a qualitative study on big data and this, in turn, helped to identify potential respondents relevant to this research study. Only one interview was conducted with each of the respondents and the calls were recorded using two recording devices, i.e. 'recorder' and

‘mobile phone’. Guest, Bunce, and Johnson (2006) describes that normally data saturation occurs on completing twelve interviews. Although this research study attained convergence after completing ten interviews and the decision to stop at ten respondents was based on data saturation.

3.4 The research instrument

The research instrument that was used in this study was an interview guide (refer to Appendix A) and the semi-structured interview were conducted with respondents selected from the sampled population. The interview questions were drafted in the order of the propositions structured in the literature review. Respondents were first made comfortable with the topic by asking basic questions relevant to the topic. In order to make the interview process highly interactive, the order of the questions was altered according to the respondent’s feedback. By analysing the findings, a framework was derived to enable the researcher to draw conclusions on the impact of big data on banks gaining a sustainable competitive advantage.

3.5 Procedure for data collection

First the primary target population was identified through social media, and official and personal platforms. Second, the identified target population was then approached by sharing the brief information about the topic via email, LinkedIn, telephone call, VOIP call or VOIP chat. On receiving a positive response from the respondents, interviews were scheduled based on the respondents’ convenience and comfort level. For this research, all respondents were interviewed using face-to-face interviews (Alan, 2012). Before the interview commenced, respondents were informed about the intentions of research, the research topic, data confidentiality, recording procedures, and the purpose of the research. Only upon receiving positive affirmation from the respondents, did the interviewer begin the interview process. The respondents were requested to sign a mutual consent letter (refer to Appendix B) agreeing to participate in the interview and this was the final step carried out as the last step of interview process. Finally, the

respondents were requested to propose other potential respondents who the sampled respondent thought could add value to the research findings. By practising the snow-ball sampling method the respondents network increased and provided accuracy and scope in generalising the topic (Alan, 2012).

Table 6: Data Collection process, (Alan, 2012)

Steps	Action
1.	Primary set of target population was identified through social media, official and personal platforms.
2.	Identified target population was then approached by sharing the brief information about the topic via email, LinkedIn, telephone call, VOIP call or VOIP chat. A few respondents were even contacted using multiple platforms.
3.	Only interested respondents were invited for a formal interview. The date, time, venue and duration of the interview based on their convenience were confirmed. In order to keep the respondents notified, an electronic meeting request was sent using outlook email.
4.	Respondents were informed about the importance of recording the interview, followed by a request to record the interview. The respondents were also informed that the conversations would not be recorded if they were not comfortable with the process (Alan, 2012).
5.	Respondents were then interviewed and the interviewer used two sources of recording media as an extra step of caution. Recording sources includes a recorder and a mobile phone turned to airplane mode.
6.	After the interview, the respondents were requested to sign a mutual consent forms (refer to Appendix B) stating their co-operation in attending the interview. The respondents were also requested to propose other potential respondents who they thought could add value to the research findings. Potential respondents were again contacted as mentioned in step 2.
7.	The data was transcribed on the same day of the interview and key points were highlighted for future analysis.

3.5.1 Data recording and transcribing

As Alan (2012) described, the transcription and recording provided an opportunity for the researcher to understand the tone of the respondents while answering the questions. Moreover, a few respondents were not comfortable with answering when the interviewer was taking notes in between, although they were informed about the process in the beginning. As the interview was recorded, it provided an opportunity for the qualitative researcher to transcribe, analyse and derive conclusions from the collected data.

3.6 Data analysis and interpretation

Data was analysed using 'Atlas.ti' software that brought together various pieces of the work into one common pool(Friese, 2014). Refer Appendix section D for a sample theme report generated using 'Atlas.ti' software. Content analysis was used to interpret data and for qualitative research, content analysis is one of the most popularly used data analysis methods (Hsieh & Shannon, 2005). As we have already mentioned in the previous sections, not many studies were conducted on this research topic. Elo and Kyngäs (2008) describes that it is appropriate to use qualitative content analysis when the number of previous studies conducted on the topic is minimal. Directed content analysis technique was used in this research study. The directed content analysis method was chosen to be appropriate for this topic, since it provided the researcher an opportunity to validate the propositions raised in literature review. Validations have been performed by transcribing the collected data into variables and building relationships between these variables (Hsieh & Shannon, 2005).

3.7 Limitations of the study

The target population of this study was focussed towards a smaller population group and the results were generalised based on the feedback provided by the population. The same study might have resulted in different generalisations if a bigger population was considered. Also, the findings on this study are only applicable for the retail banking industry and it can be justified for other industries to a certain extent. The study was very sensitive to the identification of the correct target population and sample size. Any changes in the combination of target population or sample size would provide different results (Alan, 2012). Refer to table 7, which summarises the potential weaknesses and limitations in the study and the methodologies used.

Table 7 : Research methods weakness and limitations

Topic and methods limitation	Weakness
Small sample size	The research generalisation was volatile as the results would vary if the sample size was changed.
Retail Banking	The outcome of this research study can be applied to an institution other than retail banks to an extent, but the findings might be different.
Qualitative research method	Issues with generalisation, not flexible for using the replicating study for other topics, not as transparent as a quantitative approach (Alan, 2012).
Semi-structured interviews	It was challenging to aggregate the respondents responses since a few responses were contradictory to one another (Alan, 2012).
Snow-ball sampling	Respondents proposing other respondents assisted in expanding the sample size with relevant knowledge.
Face-to-face interview	Physical presence of the interviewer did not influence the respondent to provide biased answers. No communication gap was recorded between the interviewer and the respondents as respondents were educated on the topic before the interview commenced (Alan, 2012).

3.8 Validity and reliability

3.8.1 External validity

The data was collected over a period of two months to ensure that the respondents' responses were not affected by diverse external inducements. The topics may vary in time, sampling size, industry, population, and people (Calder, Phillips, & Tybout, 1982). Although this research study is focussed towards the retail banking industry, the findings to an extent can be used by organisations even in other industries. The benefits for the organisations in achieving competitive advantage are almost the same but the ways to achieve it might differ from industry to industry and within an industry it might differ from organisation to organisation. Therefore, the findings of the research topic are meagrely valid and can only be used across other industries on making relevant industry specific adjustments.

3.8.2 *Internal validity*

Cook, Campbell, and Day (1979) described internal validity as a measure of how confident a researcher is that his perceived affiliation is pivotal. The target population for the study was very carefully selected using the snowball sampling method. The snowball sampling method helped the researcher to minimise errors by excluding respondents who didn't have relevant knowledge on the topic. Interviewing respondents with poor knowledge would lead to an improper generalisation of the findings.

Semi-structured interview provided an opportunity for the researcher to deviate from the chosen set of questions and raise new questions based on the respondents' responses. This, in turn, aided the researcher to come back and make necessary amendments to the research literature, thereby improving the validity of the research (Alan, 2012).

3.8.3 *Reliability*

The dependability of the research findings was highly consistent in the way in which reliability, integral validity, and external validity of the research was handled (P. Roberts, Priest, & Traynor, 2006). Reliability is a way of testing the research findings by keeping a few things constant and by changing other things. The "things" here refer to the methodologies, tools, questionnaires, interview methods, sampling techniques, and assumptions used in this research study (P. Roberts et al., 2006). The reliability of the research study was maintained by transcribing the data soon after it was collected, analysing the transcribed data using Atlas.ti software, and checking the reliability of understanding by comparing one paragraph of the transcribed data with another.

3.9 Demographic profile of respondents

This research study assumed that the top banks in South Africa (number of customers/sales margin) have a higher probable rate of using big data technology. However, in reality, not many top banks in South Africa use big data technology and this challenged the researcher to identify the correct population.

According to Flick (2009) expounded that research generalisation is very sensitive to the chosen population, so the research study identified the respondents with extreme caution. All the sampled respondents work in the South African BFS and their roles include big data analysts, data scientists, IT entrepreneurs, IT big data service providers and digital marketing. Profiling diversified professionals increased the creditability of the study by analysing a holistic view of big data and the potential advantages for South African banks.

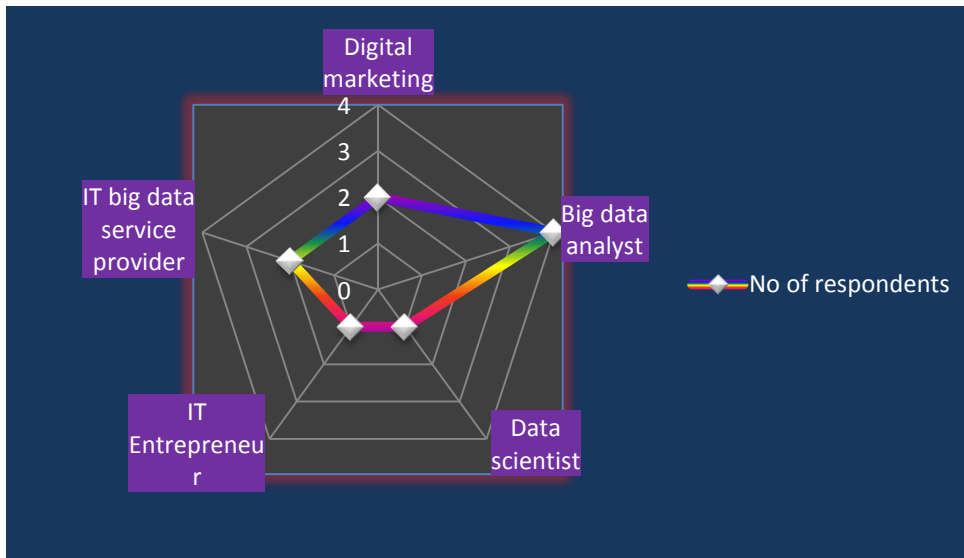


Figure 6 : Demographic profile of sampled respondent's role

CHAPTER 4: PRESENTATION OF RESULTS

Both the research propositions and relevant semi-structured interview findings are presented in this chapter.

4.1 Introduction

In total, the study sampled ten respondents and the results are presented based on their feedback.

4.2 Research Proposition 1

The factors that allow financial institutions such as banks to achieve sustainable competitive advantage are excellent operational service, continuous innovation, and efficient customer service.

The proposition originated from the fact that banks can gain sustainable competitive advantage by understanding their customers, providing efficient customer service, embracing innovation and possessing a strong workforce (Guimaraes et al., 2009; Ireland & Webb, 2007; Jun & Cai, 2001; Nui Polatoglu & Ekin, 2001; P. W. Roberts & Amit, 2003; Safeena et al., 2011; Slater & Narver, 2000) .

One section of the interview guide was designed to establish the respondent's knowledge on South African banking environment and also the factors that allow financial institutions to gain a sustainable competitive advantage. The respondents were cited individually; for example, respondent one as RESP_1: if the results are only specific to them. Similarly, two or more respondents were cited explicitly if the consolidated results are generic among them.

4.2.1 *Exploring the topic ‘competitive advantage’ in South African retail banking context*

Almost half of the respondents shared their understanding about what competitive advantage entails for banks in South Africa.

- RESP_1: Corporates operating in competitive environment always wanted to use cheaper technology in order to gain competitive advantage
- RESP_2: A company can achieve competitive advantage using different sources and channels.
- RESP_1: Differentiating factors that allows banks to gain competitive advantage are innovation, customer service, and distribution channels. There are several competitive advantage strategies and banks can choose one or many among the pool based on their differentiating factor.
- RESP_2 and RESP_3: Competitive advantage for banks can gain achieved in various ways and it is vital to understand the organisation’s key differentiators. There needs to be an understanding about the targeted market and further segmentations. Then, it is important to search within the organisation and determine how the structure can help to offer products or services relevant to the chosen segments. RESP_2: Organisations should be asking, what we should offer to attract targeted segments.
- RESP_7: banks achieve competitive advantage by understanding their customers better.
- RESP_8: “Competitive advantage that banks have over another is at inch level and stays for a very shorter period of time”. RESP_6 and RESP_8: it is very difficult to have competitive advantage over your competitor for a longer period. Products once available in the market are easily copied or duplicated.

4.2.2 *Creating customer value a source of competitive advantage*

Most of the respondents communicated a belief that it is vital for organisations, especially for banks, to understand their customers and be relevant to them.

Banks gain competitive advantage by rendering relevant services and the correct products for their customers. Concerning the factors that allow banks to create customer value, one main theme emerged, namely creating customer value by providing relevant products/services to the customers.

- RESP_1, RESP_2, RESP_3, RESP_4, RESP_5, RESP_6, RESP_7, RESP_9 and RESP_10: Banks should first listen to their customers and it is very important to understand their customers in order to provide relevant products or services that can create value for customers. Once banks understand their customers, they would be in a better position to improve their customer service.

- RESP_2 and RESP_3: Banks are operating in a turbulent environment and in order to launch solutions that can create value for customer, banks should try to be relevant to customers. Banks would do like what their competitors do in order to be relevant to their customers. One of the banks in South Africa has provided cheaper banking services to their customers and other banks have incorporated the same by providing cheaper service for targeted customers, especially during economic crisis.

- RESP_2 and RESP_3: Banks must make sure that their products and services are relevant to their customers. This is applicable even if the market competition is high or the industry is under immense turbulence.

- RESP_4: New product development is highly saturated because there are many existing products that serve the customers purpose.

- RESP_4: Offering better customer service is the primary goal for all the banks. Banks need to understand their customers first in order to offer a new product in a sense that is provides better customer service.

- RESP_10: Customer service is very important and it can provide competitive advantage for the customer. Targeting the existing customers with new products and targeting the new customers with right advertising/marketing channel provides a competitive advantage for banks.

- RESP_4: “Now, they eventually know who their customers are individually; they would be able to create new niche product[s] where this new product that they

develop is only targeted at ten thousand people and they could have 90% cap rate because that's how targeted that it can get".

- RESP_4: Customer acquisition comes with a cost for the company and customer longevity is vital because, the longer the customer stays with the bank the higher the profit for the banks.
- RESP_4: The longer the customer spends time with you, the higher the chances to cover the cost for customer acquisition. Therefore, banks need to keep their customer's loyal in order to manage their profits for longer period.
- RESP_2, RESP_3, RESP_4, RESP_5, RESP_6, RESP_7, RESP_9 and RESP_10: Customer experience is primary and all other factors are dependent on it. When the customer is the centre point and customer experience is driven, then it is important to analyse other factors that can improve customer experience by creating customer value.
- RESP_5: Big data and digitization should be working hand-on-hand to better customer experience.
- RESP_5: "By understanding the customer-spending pattern, banks can have a tie-up with retailers to offer discount to their customers".
- RESP_1, RESP_2, RESP_3, RESP_4, RESP_5, RESP_6, RESP_7, RESP_9 and RESP_10: Banks need to understand what markets they are going after, understand the individual segments, and understand what is important to them.
- RESP_7: Everything is about knowing the customers and companies irrespective of their size should strive for validation.
- RESP_2, RESP_3, RESP_4, RESP_7 and RESP_10: Banks achieve competitive advantage by providing unique products when compared to competitors that create customer value.

4.2.3 *Embracing innovation a source of competitive advantage*

Almost half of the respondents communicated the importance of embracing innovation as part of an organisation's business strategy and their importance in

creating a competitive edge for banks. One respondent (RESP_4) stated that innovation is a by-product of customer experience and not a separate entity on its own.

- RESP_2 and RESP_3: The South African financial industry is currently under immense pressure due to increase in competition from Fintech companies. Continuous innovation and embracing new technologies is mandatory to provide relevant products or services to the market, which is highly essential to survive market turbulence.

- In contrast to RESP_2 and RESP_3, RESP_9: “SA banks operate in an oligopoly environment”. Although they are not colluded, coopetition is the way that South African banks currently operate and they really do not compete for survival.

- RESP_2: Innovation has become an important source to combat turbulence in the South African banking industry. The interest rates, credits; willingness of customer, unemployment, incoming qualities, and those types of things is definitely placing our local financial industry under lots of pressure to look for sources of competitive advantage.

- RESP_3: Since the world is changing exponentially, any organisations in today’s time, being able to continuously innovate and staying relevant to the customer is very important”.

- RESP_4: Customer experience is primary and all the innovations or improvisations should be built on delighting customers.

- RESP_5 and RESP_7: South Africa’s large rollout of loyalty programmes a few years’ back helped banks to create value for their customers. Nowadays mobile applications and web applications are becoming more and more powerful and the trend is moving from loyalty cards towards online or mobile applications. Applications are being treated as digital version of cards and online applications have extra capability to gain more information about the customer. As such, organisations gain a competitive edge by embracing innovation in their business strategy.

- RESP_4: Innovation in product development is a subdivision of customer loyalty and customer satisfaction.
- RESP_1: Innovation in decreasing customer's dependency on ATMs is becoming more important for banks. Mobile money is one such example that decreases the dependency on ATMs and at the same time reduces the operational cost for banks.

4.2.4 *Internal factors a source of competitive advantage*

Almost half of the respondents communicated the importance of managing banks' internal factors efficiently in order to gain a competitive edge ahead of competitors. Internal factors include human capital, infrastructure, business-culture, inward focus, and culture expertise.

- RESP_2 and RESP_3: If you are in a company where culture is not data driven, or from an EXCO perspective, they do not understand the strategic importance of big data, then it actually moves them down in the competitive market. However, managing internal factors such as cultural expertise is vital for organisations' growth and competitive advantage.
- RESP_1: Maintaining and implementing banks infrastructure is one of the primary costs for the banks For example, launching and maintaining ATM is one of the biggest cost factors for the banks.
- RESP_1: "Non-industrialised countries have still has large population of people who are unbanked" and one of the main reasons for being unbanked is the lack of infrastructure facilities. RESP_1: Mobile proliferation is significantly high across several countries and "people can afford a phone even though if they cannot afford food". Reducing infrastructure footprints and decreasing infrastructure cost provides competitive advantage for banks.
- RESP_4: "Culture of the bank employees is for the lack of better word – Lazy". Being active and responding to customer's queries instantaneously increases customer satisfaction and thus provides competitive advantage for banks.

- RESP_10: That is why people are saying that next “CEO” should be your current “CTO or CIO”, provided they understand the business. The reason is that is believed that “CTO or CIO”; understand their IT system better and majority of the core businesses are dependent on IT systems.

4.2.5 *Summary of Results*

Four main themes were developed regarding sources that create competitive advantage for South African banks.

- Exploring the topic ‘competitive advantage’ in South African retail banking context
- Creating customer value a source of competitive advantage
- Embracing innovation a source of competitive advantage
- Internal factors a source of competitive advantage

4.3 *Research Proposition 2*

Big data provides an opportunity for banks to excel in factors such as customer security advancement, return on investment, fraud prevention, customer segmentation, reduction in operation cost, and creating customer value.

The later section of the interview guide was designed to understand the respondents’ knowledge on big data; factors allowing financial institutions such as banks to embrace big data, big data’s influence on institutions in achieving competitive advantage, analysing gained advantage (sustainable/transient) and scope for big data’s exploitation in future.

4.3.1 *Exploring the topic big data in South African retail banking context*

Almost all the respondents communicated their understanding of what they thought about big data through a bank’s lenses. Most of the respondents felt that

big data is an old technology and the advancement in analytical tools has made big data even more powerful than before. A few respondents felt that organisations started using big data without even knowing that it was big data. In addition, a few respondents communicated that organisations use different names and have unique conventional methods for using big data.

- RESP_1: Big data is something, which can help in data analysis and take business decisions based on the analysis. Even few years back we had tools but they were very expensive and complex. The emergence of strong analytical tools at a cheaper cost made big data even more powerful

- RESP_2, RESP_3 and RESP_4: The definition of big data is still ambiguous as everyone has their own terminologies associated with it. People find it difficult to define big data or to explain what big data is actually about. Is that about the volume, or is it about how quickly the data is accumulated, or is it concerned with the un-structuredness of the data? People are unsure about what big data is with regard to the definition.

- In addition to the previous statements, RESP_2: “Big data is like a teenage sex. Everybody says they are doing it. Everybody thinks everyone else is doing it. However, no one knows how to do it. I think for me that’s really what I think about big data this comes to mind”.

- RESP_3: “A lot of what people talk about in terms of big data is very much about [a] word but it doesn’t seem as though [people] have an idea of how to approach it.” The importance of having lots of data is awesome but if you don’t have an objective of what you want to do with it then it kind of becomes irrelevant. However, many companies do not define what their objectives are and what they want to do with the data so it becomes a big black hole.

- RESP_4: “Big data are the datasets that are too big to fit in one computer or in a single server. Under the surface big data is kind of just data. The way how I look at it is you have structured and unstructured data”.

- RESP_4: Big data in particular is just a term given too many different things but one that particularly strikes me is because big data is not a well-defined term. It

is often interpreted as many data across many nodes or that the data is split across many nodes. This means the unique features of big data is the speed of retrieval”.

- RESP_1: “The big data stuff has been there for a long time and it is not a new term. Whenever we talk about ‘tera’ bytes or ‘penta’ bytes of data, in olden times also it was there. It is just that the latest trend when Google started to conduct analytics on top of it, like how to get customer loyalty points, customer insights using it”.

- RESP_6: “In short, big data is not a new technology but an old one, and much new functionality have been adopted into it. For banks, big data is not a buzzword and it is an extension of analysis that has already commenced”.

- RESP_7: “Whenever I hear the buzzword big data, I can visualise lots of people, electronic transactions and companies involved. Big data provides [and] expands the scope for the organisations to understand their customers”.

- RESP_8: “Very exciting phase of discovery at the moment; it marks the age of beginning of automatic analytics. Big data provides scope to identify hidden information across large datasets by identifying the patterns using appropriate analytical tools”.

- RESP_9: I got many theories on the word big data because it is largely a buzzword. Big data is just data and today’s big data is tomorrow’s just data because it can be stored at a cheaper cost so and who cares if the cost is negligible. The industry around big data is largely becoming a sort of commodity.

- RESP_10: “So the traditional datasets were just about volume or about structured data. With big data, there are four V’s of it - Volume, velocity, variety and I do not remember the last one”. From that perspective, the data is accumulated at high speed and in real time basis. The traditional data base systems are not able to cater for this requirement. The traditional database storage system is also expensive. With big data technology, you can store data in a both batch and real-time process at a cheaper cost.

4.3.2 *Factors enabling banks to embrace big data*

Almost all the respondents shared their opinion concerning factors that have enabled banks to embrace big data and that big data is a cheaper technology found as the common response. A few respondents felt that banks embrace big data for the fear of being left behind in the competitive market. Other respondents felt that banks embrace big data because it is cheaper and easy to adopt. RESP_2 and RESP_3 were confident enough that both the external factors and internal factors are responsible for banks embracing big data. Only one respondent shared a completely different perspective, stating that South African retail banks have not yet embraced big data technology. On the contrary, RESP_7 in conjunction with other respondents agreed to the fact that big data technology is new to the South African market and that embracing it is essential.

- RESP_1, RESP_6: Organisations operating in competitive businesses always wanted to use cheaper technology to achieve their objectives. Anyone who is in a competitive market will always look for cheaper technology to gain advantage concerning cost saving. The primary reason to embrace big data is because it is cheap and it has a wider capability than previous applications. Adoption is easy and the technology is cheaper, therefore these are the main reasons that attract corporates to embrace big data.
- RESP_2 and RESP_3: External factors such as cheaper broad bands, proliferation of devices, cheaper technology, free basic internet, Internet of things are responsible for adoption of big data. There are more generators of digital data now than a few years' before.
- RESP_2 and RESP_3: Internal factors such as employee's appetite in understanding big data internally, data driven organisation culture, EXCO understanding in big data and its strategic importance, internal technology and analytical tools were considered vital for organisations in embracing big data.
- RESP_4: The primary motive for all the banks to use big data is profit. Since big data allows banks to make decisions using huge volumes of data at a faster pace, it provides first mover advantage for the banks that are using it.

- RESP_5: IoT is one reason for why data's are exploding at an exponential rate. We need cumulative data to analyse predictive stuffs and not all these things are new. However, blending of this data is very important and that is where big data plays a key role.
- RESP_6: "The drivers of big data are the fear of being left behind. Companies have that fear of not catching up with the trend and being left a little bit behind the curve". Nevertheless, the big drive for big data is the ability to do analysis real-time at large scale. That is something people were not able to do before and big data allows you to do it.
- RESP_1, RESP_2, RESP_3, RESP_4, RESP_5, RESP_6, RESP_7, RESP_8, RESP_9 and RESP_10: The technology has made it possible to embrace big data with ease. The emergence of cloud storage, powerful analytical tools and advancement in open source technology has made big data more powerful than before.
- RESP_8: "The interesting thing is, specifically in SA financial sector, there hasn't been any embracing of big data". Big data is a new technology and organisations are still working on setting up big data infrastructure.
- RESP_9: "[There are] problems with traditional IT gatekeepers such as archive, data retrieval. [By] using big data technology, we can store tons and tons of both structured and unstructured data. High computational tools are influencing business to make use of their big data and create value of it. [The] Buzzword is telling people that everyone else is doing it, so I should do it".
- RESP_10: The consumer needs in today's world are volatile and their behaviour trends changes very rapidly. Using traditional database systems, even though you can understand the trend, it is still late by the time they implement the right product or service in the market. To keep up with the customer expectations in the market, it is very important to know or understand your customer. Big data helps in both cross-sell and up-sell of our products.

4.3.3 *Potential benefits for banks in using big data*

Most of the respondents communicated a belief that the potential benefits of big data are very vital for financial institutions, especially for banks and these benefits take on several forms. Concerning the potential benefits for banks in using big data, three main themes emerged:

4.3.3.1 *Impact of big data in fraud prevention*

Most of the respondents expressed that big data has huge potential in preventing fraudulent transactions. It is not only big data which can be influential in fighting fraud, but with the help of other technologies, preventing fraud is possible using big data. Although big data has the potential to prevent fraudulent transactions, eradicating crime completely is not feasible and to an extent, it can be minimised. Many international case studies prove that big data has the potential in fighting crime. RESP_8 had a slightly different opinion from others and stated, “At the point now, we are looking into mechanisms to make big data into actuality” and I completely that big data has the scope to reduce fraud loss.

- RESP_1: “Big data has infinite opportunities to catch fraud. The challenge would be to identify use cases to identify fraud, identify the fraud patterns”. Fraud will continue to happen as long as technology is expanding. Fraud transactions are like viruses in the IT industry. It is difficult to stop fraud completely but fraud can be minimised using big data”.
- RESP_2 and RESP_3: If the international case studies are analysed, there are actually a few good examples of how big data is being used to proactively detect fraud and terrorism, and help with anti-money laundering processes and those types of things. From what is evident in literature from international case studies, it definitely does seem to help the financial services sector.
- RESP_2, RESP_3: “If South African banks’ offering is scrutinised considering what is publically available fraud detection is not high on the priority list, probably because it is a slight source of competitive advantage”. However, it can be assumed that many competitors probably do not want to disclose the details of

their exact actions because it is probably something where a great deal of activity does not necessarily amount to an assured system.

- RESP_1, RESP_2, RESP_3, RESP_4, RESP_5, RESP_7,RESP_9 and RESP_10: It is very applicable to use big data in fraud prevention, because customers are using many different social platforms, therefore it is possible to gain a better understanding of where the customer is, what he is doing, and what his tastes/preferences are.

- RESP_5: “Using big data you are able to detect any sort of frauds that is occurring on his credit card or his account very quickly”.

- It is definitely very feasible to forecast crime using big data. From a customer stand point or a banking corporate standpoint it is very effective if they can get the data through all possible means real time.

- RESP_6: “Again, this is a big-data-related technology kind of question. Are you doing predictive analysis to stop fraud? Yes, of course. Big data is not the sole player. Can big data add value with the help of other tools? Then, yes”.

- RESP_1, RESP_2, RESP_3, RESP_4, RESP_5, RESP_6, RESP_7, RESP_8, and RESP_10: Big data technology helps you to identify trends and it is easy to stop fraudulent transactions by taking appropriate decisions.

- RESP_4, RESP_5 and RESP_10: By using big data, the response time to handle fraudulent transactions is minimal.

- RESP_8: “Using big data has scope to prevent fraud loss. Geographic information system (GIS) technology can be used to identify patterns. Banks already know that. For me, what systems are in place for banks to ensure to prevent fraud?”

- RESP_9: “One hundred percentage big data influence banks in achieving competitive advantage. POPI, the Protection of Personal Information Act protects data and organisation need to compliance with the legislation. Big data can produce massive results when it comes to competitive advantage. For example, if bank can share all their customer data, I can put everything in Google cloud,

run strong analytical tools on the data which hardly takes 8 minutes and produce a result to identify the customer spending pattern”.

4.3.3.2 *Effect of big data on banks to expand horizontally*

Most of the respondents expressed that big data provides an opportunity for banks to understand their customers' spending and this in turn allows them to expand horizontally across other sectors.

- RESP_1, RESP_2, RESP_3, and RESP5: Banks are trying to protect their businesses. Most of the businesses are trying to grow horizontally. Public or state-owned entities like Telkom are attempting to expand into banking and other sectors. In response, banks are trying to capture the entire wallet-share of the customer.
- RESP_2 and RESP3: Organisation chooses several competitive strategies to leverage benefits from using big data. Organisations should analyse a particular market segment or all of them and consider examining the non-traditional financial services markets, like ‘Bank-X’ is doing with the launch of ‘Connect Product’ and organisations should attempt to broaden their service and product offering according to their client’s needs.
- RESP_3: “As soon as UBER disrupted the taxi industry, so something like that in terms of financial services probably would do well”.
- RESP_2 and RESP_3: In South Africa the financial services industry has quite an interesting challenge concerning things like mobile money, especially regarding the relationship with the Telecommunications companies. Maybe how you use your core values, how you transfer your core capabilities to offer another service or another product to the same customer? It is about using your core capability and launching a new product. More of the banks are now offering mobile money applications and that is a good example of banks offering something new, which is now something all of the banks are trying to offer.
- RESP_2, RESP_3, RESP_4, RESP_6, RESP_7, RESP_9, and RESP_10: A banking player knows where the customer wallet is getting filled or emptied. Say

for example, if telecom/retailer wants to buy this data, then banks and other institutions can go ahead for a tie-up. Everyone in the world is looking for luxury and convenience, and for opportunities for discount.

- RESP_5: “By creating a new ecosystem banks can boost profit for all players in the supply chain, provided they effectively use big data”.

- RESP_1, RESP_2, RESP_3, RESP_4, RESP_5, RESP_6, RESP_7, RESP_8, RESP_9 and RESP_10: By using big data, banks can start creating profiles of the kind of customers they are dealing with and they can then decide, “are these people satisfied with what we are doing, and satisfied with saturation?” Then banks have to assess the new ways of attracting customers. When bank 'X' now offers a telecommunication service with simcards, this is an example of horizontal integration. There is the potential to unlock a particular set of people and create value out of it”.

4.3.3.3 *Investing on big data is vital and a new normal*

Most of the respondents expressed that investing in big data is vital and that it is becoming a new norm to invest in big data. A few respondents felt that there are no standard performance indicators to measure ROI for investing in big data or at least they are not aware of these. Investing in big data increases the revenue by reducing operating cost and increasing sales. RESP_6 compared investing in big data to investing in re-engineering during 1990s. RESP_8, contrary to all other respondents stated, “It is more than good or bad. At this point, it is critical. It is a necessary tool now. You can no longer sit on warehouses of information and sit not doing anything”.

- RESP_1, RESP_4 and RESP_9: It is a critical investment, and investment in big data is paramount. When it comes to big data, investment is not only provided for software or storage, there is also the investment in talents. Human talent is required to make the machines perform analytics and take decisions on its own.

- RESP_6: “I compare this to re-engineering in the ‘90s”. Big data is kind of process re-engineering in the 90s which allows you to perform many business operations in an efficient and cost effective way. Like there were few failures

because of faulty implementation of process engineering. However, if you are not doing this with the right objectives then probably you will be spending lots of money without making any returns.

- RESP_2, RESP_3, and RESP_5: Unless or until there is a key performance indicator (KPIs), it is very difficult to measure ROI (Reunanen, Salo, & Luostari, 2016). At this moment, there is no KPI to scale big data potential, or at least South African banks are not aware of it.

- RESP_10: KPIs should be set in order to leverage the complete values of big data.

- RESP_5: For banks, investing in big data is a good investment. Embracing big data will definitely increase the revenue. Using big data will increase the quality of the application and that is one reason why data scientists' jobs are becoming increasingly famous.

- RESP_4: "Of course it is a good investment. The biggest reason why I want banks to be spending on big data is that you are able to process data a lot faster and it helps in taking decisions faster".

- RESP_1: "Of course investing in big data is a good investment. However, it increases the cost for the company. IT is the biggest expenditure for most of the company".

- RESP_1, RESP_2, RESP_3, RESP_4, RESP_5, RESP_6, RESP_7, RESP_9 and RESP_10: Of course spending on big data is good investment. However, spending alone does not make that investments, transforming the information into results is important.

- RESP_10: "ROI depends on how we implement big data. It is an enabler. Big data is never going to be a bad investment if the organisation knows what they want from big, if their business strategies are linked to big data, if they have right KPIs in place. Just investing on big data can never be a good investment".

- RESP_9: “Banks should invest in big data if—and only if—it is relevant to their business requirement. Banks A's requirement might be different to bank B's requirement”.

4.3.4 *Big data provides competitive advantage for banks*

Almost all the respondents expressed that using big data provides competitive advantage for banks. After consolidating the responses from the respondents, the pertinent factors that provide competitive advantage for banks using big data were identified as improved customer service, reduction in infrastructure cost, increased revenue, improved credit scoring models, and efficient customer segmentation. On the contrary, RESP_4 expressed that, “I cannot give you hard evidence that big data provides competitive advantages” and RESP_6 expressed that the “benefit using big data is the challenge, closing the gap between the hype and reality is also challenging”. A few respondents felt that there are no standard parameters to measure success, or at least they are not aware of it. Whether the advantage was sustainable or transient, the respondents expressed mixed response. RESP_2 and RESP_3 firmly believed that if organisations know what they want and if they use big data appropriately then the advantages gained can be sustainable. RESP_6 felt that big data provides first mover advantage and soon the competitors could adapt it. RESP_7 in harmony with RESP_6 stated that, “I think is that as soon as you get competitive edge, we are in a society where other organisation tries to copy the ideas”.

- RESP_1: “I think big data allows in reducing infrastructure footprints and increasing the scale provides sustainable advantage”.
- RESP_2 and RESP3: In financial services sector quite a large portion of competitive advantage is concerned with credit scoring models and that is the real practical example of how all of the banks in the industry have used data to refine their credit scoring models.
- RESP_3: “I think for a bank to get a competitive advantage over his peers, and then he would need to use big data system to probably provide better customer service”.

- RESP_2, RESP_3, RESP_4 and RESP_6: In South African retail banking environment, there is no well-documented or well-publicised data to support the success stories of big data.
- RESP_5: Corporates use big data to reduce infrastructure cost by converting legacy data into a data lake.
- RESP_2, RESP_3, RESP_6, RESP_7 and RESP_9: If we are not keeping our business in line and using data to create value someone else is ready to be left behind in the market.
- RESP_2, RESP_3, RESP_6, RESP_9 and RESP_10: Companies are yet to leverage the actual potential of big data. There are many pockets of excellence, and there are many examples of how companies locally and internationally are using big data.
- RESP_1, RESP_2, RESP_3, RESP_4, RESP_5, RESP_7, RESP_9 and RESP_10: If business objectives are aligned and organisations know what they want to do then big data it is helpful and all otherwise it is pointless.
- RESP_2, RESP_3, RESP_4, RESP_5, RESP_7, and RESP_10: If organisations know what they want and if they use big data appropriately then the advantages gained can be sustainable.
- RESP_6: "I would not say it is sustainable, I do not know if I can call it sustainable or not but it becomes a new standard". Suppose, a bank implements it and other banks see that this is happening and they do the same. So now, you have raised the bar of standard services to a higher level and therefore if any one bank's stops providing services underpinned by big data system then that bank will start losing money by losing customers.
- RESP_6: "It provides a transient advantage in the short term. You will get first mover advantage. Once everybody starts deriving value, using big data (like sigma) then all the players will be in same level. Everybody will adapt it and advantages will be neutralised in the late state".

- RESP_1, RESP_2, RESP_3, RESP_4, RESP_5, RESP_7, RESP_9 and RESP_10: In terms of sustainability, the thing is that banks constantly have to be innovative; banks constantly have to identify trends, take proper decisions based on the identified trend, and implement the actions successfully.
- RESP_9: “One hundred percentage influence banks in achieving competitive advantage. Big data can produce massive results when it comes to competitive advantage. The banks, which move fast within the legislation, will be the ones succeeding in the market. With the powerful encryption techniques and cloud services, banks are catching up with the big data trend”.
- RESP_10: “By using big data, banks can gain competitive advantage. IoT, AI, and there is something in the middle called machine learning so what happens is down the line, the main focus will be on cognitive and artificial analytics on top of it”. However, big data itself does not add any value; you need to have proper mining capability, proper visualisation capability, proper use cases, and mainly someone has to make use to of the derived information to take business decisions. The data has to be analysed and converted into information where it can create value for both businesses and the customers. Based on that information, insights can be derived.

4.3.5 *Civil liberty loss versus potential benefits of big data*

Almost all the respondents expressed that the potential benefits of big data are enormous and customers are actually empowered to protect their privacy. RESP_8 had a different perspective and stated, “I don’t think so big data is cause for civil liberty”. In reality, it is correct to state that individuals have lost their privacy. A few respondents felt that it is not only big data that is responsible for civil liberty issues, and already people have lost their liberty due to the proliferation of internet, mobile and social networks.

- RESP_1: “Everything has pros and cons. A few years back when I leave office, nobody can reach me. However, introduction of mobile phones increased my connectivity but reduced time spent on other things. Did the mobile industry kill

civil liberty? A little bit of civil liberty is negotiable, and customers do not care about it. They are not worried about civil liberties. The customer is empowered”.

- RESP_2 and RESP3: Customers actually need to take more responsibility in understanding these various laws and policies better, as well as being more responsible when they do share data about themselves. Customers are empowered.

- RESP_4, “I personally prefer to keep civil liberties as intact as possible. The risk is real. Banks can scan all prior transactions and learn everything about the customer. If the banks start exploiting it then people will get angry. People will go to legislations to change the policy”.

- RESP_4, RESP_6: At times having too many insights about the customer is also a problem.

- RESP2, RESP_3, and RESP_10: Within the South African context w POPI, the “Protection of Personal Information” Act exists and banks need to adhere and comply with the legislation. Customers are empowered. The default is that customers have privacy and banks need to abide. The more information the customer shares the greater the ability for the banks to provide good service. Conversely, the more customers share the more they feel unsecured. There needs to be a balance.

- RESP_1, RESP_2, RESP_3, RESP_4, RESP_5, RESP_7, RESP_9 and RESP_10: Big data allows organisations to understand customers and solve their problems. However, a great deal of information can give power to the banks to understand their customers properly. RESP_4 and RESP_6: if customer information is abused then it can backfire.

- RESP_6: “Banks might not be big players when it comes to big data right now, but once they get that kind of information, we have to make sure that they are responsible in using the data”.

- RESP_2, RESP_3, RESP_4, RESP_7, RESP_9 and RESP_10: Banks maintain some of the richest information about the customer and they know where the customer is actually spending.

- RESP_9: South African legislation is hindering banks in moving forward and banks are forced stay laggards.
- RESP_8: “Privacy settings give you a false sense of security. In the digital world, the privacy is completely eroded. Big data acts like big brother, who is simply symptomatic of what actually happened; not that it makes it right but that’s the reality”.
- RESP_9: Banks are sitting with a massive amount of information. Customers choose what kind of marketing they wanted to be involved with while signing the agreement. “I don’t care what banks are doing with the customers’ information generically. However, I do care if name 'X' is attached to banks profiling on customers. Banks can unlock enormous value just with the data they already have”.

4.3.6 *Summary of Results*

Five main themes was developed supporting how banks gain competitive advantage ahead of their peers and compete in the market South African market using big data.

- Exploring the topic big data in South African retail banking context
- Factors enabling banks to embrace big data
- Potential benefits for banks in using big data are fraud prevention, horizontal integration, and ROI.
- Big data provides competitive advantage for banks
- Civil liberty loss versus potential benefits of big data

CHAPTER 5: DISCUSSION OF THE RESULTS

5.1 Introduction

The following section discusses the literature in conjunction with the results which emerged from interviewing respondents. In total, ten respondents were samples for this research study.

5.2 Research Proposition 1

The factors that allow financial institutions such as banks to achieve sustainable competitive advantage are excellent operational service, continuous innovation, and efficient customer service.

The consolidated results that emerged from the interviews are in accord with the research literature. Almost all the respondents agreed to the fact that banks gain competitive advantage by creating customer value, embracing innovation and managing banks' internal factors efficiently.

The emergence of digital technology had transformed business operations in the South African banking environment and most of the respondents were in consensus with digitization. Digital technology advancements include data analytics, cloud computations, cloud storage, and mobile proliferation (Safeena et al., 2011). The consolidated response from almost half of the respondents concluded that, it is vital for banks to embrace innovation in their business strategies, as the fear of being left behind in the market competition is very high. Respondents further added, innovation is something very important for them to sustain in the competitive market, mainly because of the increase in non-traditional banking competition (Ireland & Webb, 2007). Embracing innovation helps in reducing IT costs and at the same time, few respondents agreed that innovations supports in generating revenue (Frei et al., 1997).

Results from majority of the respondents concluded, banks understanding their customers is very important for them to create customer value by providing relevant products or services (Davenport & Dyché, 2013). Results are in agreement with study conducted by Alrubaiee and Al-Nazer (2010) describes customers will be vital for organisations financial success. Organisations should first attempt to understand their customers and any deviation in doing this would result in losing customers. Organisations failing to understand their customer might lose a competitive edge in the market, inasmuch as the organisations that understand their customer can gain competitive advantage in the market (Nelson 2007; Woodruff, 1997). Few of the respondents strongly expressed that organisations can cover the customer acquisition cost if they can hold the customer for a long time. According to Coyles and Gokey (2005), it is cheaper to retain customers than to acquire new customers. Customers are solely responsible for the financial wellbeing of the company and almost all the respondents felt this is to be appropriate and true (Alrubaiee & Al-Nazer, 2010).

Only a few respondents strongly expressed that an organisations internal work culture, employee competencies and sticking to their strength allows them to gain a competitive advantage (Barney, 1995).

5.3 Research Proposition 2

Big data provides an opportunity for banks to excel in factors such as customer security advancement, return on investment, fraud prevention, customer segmentation, reduction in operation cost, and creating customer value.

The consensus among the interview respondents concluded, big data unquestionably provides an opportunity for the banks to gain competitive advantage by excelling in factors such as fraud prevention, customer value, cost reduction, and customer profiling.

The respondents consolidated response concluded, big data was not a new technology but an emerging trend, and the emergence of new analytical methods

made it even stronger than before. This response was in agreement with the previous study which states that big data can have value when used with appropriate technology and analytical methods Katal et al. (2013).

The definition of big data still remains ill-defined and there is no clear understanding of what 'big data' actually is (Mohanty, 2015). RESP_2, RESP_3, and RESP_4: firmly communicated that the definition of big data is still ambiguous and people really find it difficult to define big data. The majority of the respondents directly or indirectly expressed that speed, volume and the structured data makes big data unique and it was in agreement with previous study conducted by McAfee et al. (2012) describes three unique features of big data as volume, velocity and variety.

The consensus among the respondents was found to be related to previous study conducted by Bollier and Firestone (2010), the usage of electronic devices , internet, digital marketing, smartphones, laptops, personal sensors, cloud computing, and technology has increased in recent years. Big data and IoT are just two sides of a same coin and digitization is one of the key factors causing the explosion of data (Dull, 2014; Marx, 2013). A few of the respondents even mentioned saying that firms such as Google, Facebook, and Amazon have already started using big data even before big data had become popular and it was in line with a previous study by Davenport and Dyché (2013). According to (Nelson 2007), organisations are forced to focus on customer relationship due to the fear of losing customers to their competitors and three of the respondents clearly stated that organisations are embracing big data because of the fear of losing customers and being left behind.

Respondents firmly communicated that any disruption in customer security can disrupt banks relationship with customers and the findings was in accord with the previous studies (Hoffmann & Birnbrich, 2012). A previous study conducted by Hipgrave (2013) found that opportunities for fraudulent transactions are increasing due to the continual increase in online transactions and social networks, which is in line with RESP_1: Fraud will continue to exist as long as the technology grows. It is impossible to eradicate fraud completely but it is indeed possible to minimize fraudulent transactions using big data. Although

most of the respondents were in agreement that big data has a huge potential to combat fraud in the South African financial banking environment. A few respondents expressed that big data alone cannot combat fraud but it is possible only with the help of other technologies support. According to SAP (2016), banking fraud can be prevented by using appropriate big data technology and analytic methods to identify illegal transactions and big data also helps with understanding customer's transaction behaviour. Respondents' consolidated response adhered to the previous study and confirmed that big data is indeed very helpful in understanding customer's transaction behaviour and combat fraud.

The responses from respondents and from previous studies have not provided an exclusive answer as to whether banks using big data gain superior ROI. A previous study conducted by Davenport and Dyché (2013) describes that firms find it difficult to measure ROI after using big data technology and most of the respondents expressed that there is no scale in place to measure ROI for investing in big data or at least they are not aware of it. The consolidated response from the respondents concludes that investing in big data is a good investment and a few respondents especially RESP_1, RESP_2 and RESP_3: touched that it is critical for organisations to invest in big data. RESP_4: had a different perspective and hinted the number one motive for banks on investing in big data is profit. Hence, the proposition that claim investing in big data provide superior ROI was partially accepted by this research study, because there was no scale to measure ROI and this statement was in agreement with previous study conducted by Davenport and Dyché (2013) describes there is no scale to measure big data ROI.

The previous study conducted by Davenport and Dyché (2013) outlined that big data provides an opportunity for organisations to offer products or services first to the market and at a faster rate. Big data helps organisations with customer segmentation, and allows them to offer products/services that can create value for the customer. Almost ninety percent of the respondent's responses were in agreement with previous studies. Respondents strongly expressed that big data helps them in understanding their customers. By understanding their customers the organisations is able to provide the right products/services that satisfies their

customers by creating customer value. The previous study conducted by McAfee et al. (2012) observed that the companies using big data in their operational decision making process are five percent more efficient than their competitors and six percent more lucrative than their competitors. Most of the respondents agreed to the fact that big data assists them in decisions making. In contrary respondents were not sure about how to measure ROI using big data technology (Davenport & Dyché, 2013).

CHAPTER 6: CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

This chapter summarises the research conclusions, findings, recommendations, and suggestions for future study.

6.2 Conclusions of the study

6.2.1 *Conclusions of proposition 1*

The factors that allow financial institutions such as banks to achieve sustainable competitive advantage are excellent operational service, continuous innovation, and efficient customer service.

The results calculated from the sample were in consensus to the factors discussed in the literature section. The factors highlighted in literature section such as customer value, innovations and internal operations were found to be in consensus with sampled respondent's response. Most of the respondents prioritized customer value and innovations to be of higher priority than that of internal work culture that influence competitive advantage for banks. The combined responses were in congruence with discussed literature and respondent's response. The results depict creating customer value, embracing innovation and to an extent internal resource provide competitive advantage for banks.

Although the discussed research proposition was in concurrence with respondents' input, some of the respondents also believed there are also other possible ways in which banks achieve competitive advantage. Apart from the topics discussed in the research proposition, banks achieve competitive advantage by reducing infrastructure footprints; focussing inwards i.e. focussing

on internal operations and optimizing them; using cheaper technology, and selecting appropriate distribution channels.

Refer table 8 that provides the summary of proposition 1 conclusion.

Table 8: Summary of conclusion of proposition 1

<i>Summary of conclusion of proposition 1</i>			
Competitive innovations	advantage	through	Accept
Competitive customers	advantage	though	Accept
Competitive resources	advantage	through internal	Partially accept

6.2.2 *Conclusions of proposition 2*

Big data provides an opportunity for banks to excel in factors such as customer security advancement, return on investment, fraud prevention, customer segmentation, reduction in operation cost, and creating customer value.

Previous research agrees with the proposition that big data helps in better understanding of their customers and banks using big data gain a competitive advantage by creating superior customer value, customer loyalty, and customer satisfaction (Bughin et al., 2010; Davenport & Dyché, 2013; Kotler, 2000). Organisations using big data, create value for both customers and themselves, provided they use big data appropriately and relevant to their business. Though most of the respondents agreed that big data provides a competitive advantage for banks; nevertheless, few respondents believed that there was no hard-core evidence now to prove their stance. In addition, a few respondents also strongly expressed that banks in South Africa are still in the infant stage of embracing big data and in few years' time they might have concrete evidence to support their stance (Davenport & Dyché, 2013).

Almost all of the respondents agreed to the fact that big data can hugely influence banks in protecting their customers from fraudulent transactions. However, a few

respondents mentioned that big data alone cannot combat crime but with the help of other technology and analytical tools, the potential to combat banking crime is enormous (De Mauro et al., 2016). The Internet of things (IoT) seems to be one of the pertinent influencing factors that allow banks to understand customers' transaction behaviour. Banks understanding customer behaviour and providing non-traditional services to their customer's supports them in expanding horizontally across others sectors such as telecommunications and retail. Eventually it is easier for banks to use their existing customers to up-sell or cross-sell their new products or services. Nevertheless, at this moment, there are no standard tools or indicators to measure ROI on investing in big data and so real benefits of big data are not quantifiable least at this moment. RESP_10: few organisations are blindly investing in big data without even understanding the potential benefits of big data and relevancy towards their business. Most of the banks invest in big data just because of the fear of being left behind in the competition. However, most of the respondents consolidated response was banks should only invest in big data if it is relevant to their business strategies.

The research was inconclusive with regard to whether the competitive advantage gained by using big data is sustainable or transient, as the outcomes from the interviewed participants were not congruent with the previous study conducted by Barney (1995), where organisations gained sustained competitive advantage by effectively use of internal resources, uniqueness and capabilities in executing their strength. RESP_6, RESP_7 and RESP_8: South African banks work in an environment where other organisations attempt to copy the ideas. Furthermore, few other respondents expressed that the competitive advantage is only sustainable if the banks can continuously create value from using big data.

Refer table 9 that depicts the summary of proposition 2 conclusion.

Table 9: Summary of conclusion of proposition 2

<i>Summary of conclusion of proposition 2</i>	
Providing security to banks	Accept
Customer segmentation	Accept
Return on investment(ROI)	Partially accept
Customer Value	Accept

Big data provides competitive advantage	Accept
Big provides sustainable competitive advantage	Inconclusive

6.3 Recommendations

Banks in South Africa operate in a highly competitive and turbulent environment. Factors such as the credit crunch, low-interest rates, withdrawal of foreign investments, high inflation rates, and high unemployment rate are adding more fuel to the fire (Vermeulen, 2015). Banks operating under such a complex and competitive environment are finding it increasingly difficult to satisfy their customers and at the same time manage their profit (Erturk, 2016). It is therefore very important for the banks to use big data, so that they can sustain, develop and create value for their customers. However, the current research study assessed the effectiveness of big data in providing a competitive advantage for banks and it found that the big data has the potential and scope to provide a competitive edge for banks.

Fraud prevention, transaction monitoring, customer profiling and tailored products/services were identified as the key benefits for banks in using big data (SAP, 2016). Therefore, it is recommended for banks to use big data in an appropriate way so that they can create value for their customers by providing relevant products/services. The number of digital data generators has increased almost exponentially in the last few years and banks can't just keep the data without conducting any analysis using the data (Marx, 2013). Banks create value for their customers using and big data since it supports banks to manage, operate, and process large volume of data.

6.4 Suggestions for further research

One of the respondents explicitly requested the interviewer to carry out the same research but using quantitative methodology after two years. After two years, South Africa was expected to be in a matured stage of using big data, and by that time, there would be conclusive findings to support big data benefits. Two other

respondents suggested conducting a competitive study by comparing the potential benefits of big data in a South African context to other foreign developed countries. Apart from the actual research findings, lots of others interesting factors emerged from the consolidated response of respondents.

6.4.1 *Big data's influence on banks for embracing horizontal expansion*

Apart from what was discussed in the literature review, most of the respondents prioritized the need for expanding into other sector spaces in order to both survive and succeed in a competitive environment. RESP_1: banks are trying to protect their own business from other sector competitors since most of the businesses are trying to expand horizontally. Banks are attempting to capture the entire wallet share of the customer. RESP_2 and RESP3: the need for expanding into non-traditional financial services has become a modern world's trend. RESP_4: banks that are expanding horizontally is a good sign as it creates mutual benefit for banks, customers and other entities supporting banks in providing non-financial services. RESP_7: by creating a new ecosystem, banks can increase profit for all players in the supply chain, provided the effective use of big data. Almost all the respondents agreed that big data helps banks to understand their customers' needs, which in turn allows them to expand into non-traditional financial services. Hence, horizontal expansion in conjunction with big data provides scope for future research.

6.4.2 *Debate between big data potential and erosion of civil liberty*

RESP_1: "big data allows in reducing infrastructure footprints and increasing the scale provides sustainable advantage". The literature did not discuss the benefit of big data in reducing infrastructure cost although the literature covered reducing banks' operational costs. The literature didn't touch on the debate between civil liberty erosion versus big data's potential. Most of the respondents felt that customers are empowered and they have the power to share or not to share critical information. RESP_1: customers do not care about civil liberty erosion in spite of them being empowered. RESP_2 and RESP_3: customers need to take more responsibility in understanding these various laws and policies better.

RESP_8: “I don’t think so big data is cause for civil liberty. In reality, we have lost our privacy”. If we use Facebook as an example, the idea of privacy setting is an illusion because the data is sitting in their servers and there is access [to] anything you [have] done. Privacy settings gives you false sense of security and in [the] digital world, there is no space for privacy as it was completely eroded. Hence, the debate between civil liberty erosion and potential benefits of big data in the South African context provides scope for future research.

6.4.3 Conclusion

As expected, this study revealed that banks gain competitive advantage by using big data, primarily by understanding their customers and by being able to offer relevant products or services to the market. However, banks merely embracing big data or investing in big data does not create any value. Banks leverage benefits in using big data provided they embrace, implement and execute appropriate big data strategies relevant to their business.

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APPENDIX A: Interview guide

1. What strikes your mind where you hear this buzzword 'Big data'?
Please share your experience about big data and why do you think big data is unique?
2. According to your knowledge, what aspects are influencing corporates to embrace big data?
3. In any business discussion the need for competitive advantage is taking centre stage of attraction and organisations are striving hard to achieve it (Rumelt, 2003). What are the aspects in which financial institutions such as banks gain competitive advantage?
4. What are the other possible areas in which banks can gain competitive advantage? What is your view on gaining competitive advantage through providing outstanding customer service and/or implementing excellent marketing strategy?
5. Share your experience on how big data influence or do not influence in creating competitive advantage for banks. Do you think the advantage gained using big data can be sustainable or transient?
6. Fraud loss is becoming a universal problem. Some of the most basic services expected from banks are security and fraud less transactions (Moss et al., 2016). Any disruption in security can affect customer satisfaction, customer loyalty, and customer retention. How feasible is forecasting crime using big data? How big data assist in preventing fraud loss.
7. How is big data used or not used in customer segmentation and how do you think it creates customer value for the customer.
8. Mckinsey had conducted a research study annually across a dozen banks in United Kingdom. Study projected that investment in IT does not essentially increase organisation's profit. But investing in automation, big data, and application development are linked to have higher positive correlation compared to other investments (Hoene, 2016). According to your experience, do you think spending on big data is a good or bad investment with regards to return on investment?

9. Theoretical benefits of big data are enormous. According to your experience, do you think the expectations are matched or unmatched in reality?
10. Considering South African banking sector is big data efficiently or not efficiently used. Please provide few examples.
11. Cost to use big data technology, cloud storage and BIA tools are becoming cheaper and cheaper. Merely using big data without knowing what you want is a waste of time and knowing what you want from big data provides you value. Please provide your valuable comments on this statement.
12. Please share your view on the privacy debate between potential benefits of big data and customers' privacy issues associated with it.
13. Would you like to share anything else that you trust would contribute to the overall conclusions of this research?

APPENDIX B: Informed letter of consent form

Informed Letter of Consent - MBA Research Interview

Dear Participant,

My name is Saikiran Pinnapala, MBA graduate in the final stage of completing thesis report representing **Wits business school**.

The research topic is to analyse how retail banks are competing through the use of big data in South African retail banking environment. The purpose of this research is to analyse how big data is used by banks to gain sustainable competitive advantage. Our interview is expected to last about an hour, and will help us explore big data's usage in South Africa retail banking environment.

NOTE: “Please note that your participation is voluntary and you are able to withdraw at any time without penalty. Of course, all data will be kept confidential. If you have any concerns, please contact my supervisor or me. Our details are provided below.”

Researcher: Saikiran Pinnapala

Email: saikiran.pinnapal@gmail.com

Phone: +27 83 8568664

Supervisor: Antony Soicher

Email: Antony.Soicher@wits.ac.za

Signature of Participant: _____

Date: _____

Signature of Researcher: _____

Date: _____

APPENDIX C: Consistency matrix

Table 10 : Consistency matrix

Factors that allow retail banks to achieve competitive advantage and how they compete by using big data					
Sub-problem	Literature Review	Propositions	Source of data	Type of data	Analysis
The first sub-problem is to analyse the ways in which retail banks gain competitive advantage	• Ireland and Webb (2007) • Guimaraes et al. (2009) • P. W. Roberts and Amit (2003) • Slater and Narver (2000) • Nui Polatoglu and Ekin (2001) • Jun and Cai (2001) • Safeena et al. (2011) • Xing et al. (2016) • Erturk (2016)	The factors that allow financial institutions such as banks to achieve sustainable competitive advantage are excellent operational service, continuous innovation, and efficient customer service	Semi structured interview using interview guide	Primary data	Content Analysis method

Factors that allow retail banks to achieve competitive advantage and how they compete by using big data					
Sub-problem	Literature Review	Propositions	Source of data	Type of data	Analysis
	• K.-H. Chen et al. (2016) • Eisingerich et al. (2016) • Wicker (2016) • Sikora et al. (2016)				
The second sub-problem is to analyse how retail banks are competing with the use of big data.	• Frank et al. (1972) • Zakrzewska and Murlewski (2005) • Davenport et al. (2013) • Bughin et al. (2010) • Kaynak (1986) • Graeff and Harmon (2002) • Bradley and Stewart (2016) • Chan (2016)	Big data provides an opportunity for financial institutions to excel in customer security advancement, fraud prevention, customer segmentation and profiling, reduction in operation cost, and creating customer value.	Semi structured interview using interview guide	Primary data	Content Analysis method

Factors that allow retail banks to achieve competitive advantage and how they compete by using big data					
Sub-problem	Literature Review	Propositions	Source of data	Type of data	Analysis
	• Hoene (2016)				

APPENDIX D: Sample – Theme report generated using 'Atlas.ti' software

Query Report

HU: Thesis_Chap4_5

File: [D:\Thesis_Chap4_5.hpr7]

Edited by: Super

Date/Time: 2016-01-02 14:40:11

Document filter:

No active filter - use 8 Primary Documents in query

4 Quotations found for query:

"Innovation"

P 2: RESP_2.pdf - 2:2 [So I think if I can talk a lit..] (1:2229-1:2863) (Super)

Codes: [Innovation]

No memos

I think the South African banking industry as well the innovation has become quite an important source. 'Bank-X' is particularly positioning itself as a most innovative bank and our competitors are looking at that.

P 3: RESP_3.pdf - 3:6 [And also when we look at lot o..] (1:3682-1:3966) (Super)

Codes: [Innovation]

No memos

Guess as any organisations in today's time innovating and staying relevant in this very exponentially changing world is very important.