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Exploring the Use of Sentiment Analysis Technologies in South African Telecommunications Businesses

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Exploring the Use of Sentiment Analysis Technologies in South African Telecommunications Businesses".

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KEYWORDS

Natural Language Processing (NLP), Digital Business Efficiency (DBE), Sentiment Analysis Technology (SAT), Telecommunications

C2 General

DECLARATIONS

I, Deshni Harricharan, with student number 2530557, hereby declare that the work presented herein is my own. As a student pursuing a Master's in Digital Business at Wits Business School, I have diligently researched, analysed, and composed this piece. While I have utilised an AI generative tool for editing purposes, specifically Grammarly, the ideas, thoughts, and content expressed in this work are entirely my own. I take full responsibility for the authenticity and originality of this work, and I am committed to upholding the highest standards of academic integrity.

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Signature

Signed at: Johannesburg, South Africa

Date: 11 February 2024

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LIST OF ACRONYMS.

Acronyms	Description
AI	Artificial Intelligence
IoT	Internet of Things
IT	Information Technology
NLP	Natural Language Processing
RPA	Robotic process automation
SA	South Africa
SAT	Sentiment Analysis Technology
VAR	Virtual Augmented Reality

C2 General

CHAPTER 1. INTRODUCTION

1.1 Statement of purpose

"This qualitative study will explore the use of sentiment analysis technologies in South African Telecommunication businesses."

1.2 Background of the study

South Africa's Telecommunication sector has been looking at how to get a better wallet share from consumers as the percentage declined in the fourth quarter of 2022 (Focus Economics, 2023). Therefore, many organisations have been evaluating their strategies to be more effective and ultimately more competitive, as cited by authors Lee & Armstrong (2023). Some of these 4IR technology operations have been used by companies cited by Lee & Armstrong (2023) to improve efficiencies; however, some have been used to gain a competitive advantage for their organisations. The top five 4IR technologies identified by these authors include cloud computing, the Internet of Things (IoT), robotic process automation (RPA), virtual and augmented realities, artificial intelligence, and machine learning help II.

AI and ML can change how companies operate and breathe new life into enterprise systems that companies have relied on for years to conduct business and ensure they can stay competitive in a constantly changing marketplace at breakneck speed. One of the AI Tools that is proving most popular is natural language processing (NLP), which is concerned with interactions between computers and humans.

Sentiment analysis or opinion mining refers to using natural language processing, text analysis, and computational linguistics to identify and extract subjective

information from source materials. Sentiment analysis is widely applied to the voice of customer materials such as reviews and survey responses, online and social media, and healthcare materials for applications that range from marketing to customer service to clinical medicine. The growing business and marketing activities are expected to drive the Sentiment Analysis software market.

Work first began to develop methods for identifying positive and negative sentiments in text, and the academic background of the SAT can be traced back to the early 1990s. A prime example of early research in sentiment analysis is the work by Lillian Lee (2008), who developed a machine learning algorithm for classifying movie reviews as positive or negative.

Since then, much research has been done to solve the sentiment analysis problem, and many different techniques and algorithms for extracting opinions and emotions from textual data have been developed.

Lexicon-based approaches use sentiment lexicons, lists of words and phrases associated with positive or negative sentiment, to determine whether a text is negative or positive. For example, in a sentiment lexicon, the word “happy” is associated with positive sentiment, while in the same lexicon, the word “sad” is associated with negative sentiment.

Machine learning approaches use training sets of labelled data to train a machine learning algorithm to recognise text as positive, negative or neutral. Deep learning models extract opinions and emotions from text using a deep learning-based approach. Sentiment analysis has also been used to monitor and analyse customer reviews and opinions of products and services.

Social media sentiment analysis is analysing people's sentiments on social media regarding actual events or incidents, products or services by applying data analysis techniques.

The SAT can be used to monitor brand perception, catch emerging trends and determine the effectiveness of marketing and advertising programs. Political sentiment analysis can be used to analyse or extract the sentiment hidden in the data. Sentiment analysis is done on data from social media sites like Facebook, Twitter, etc. The primary aim of political sentiment analysis is to gauge the public opinion on political candidates, issues, policies, etc.

Education: Sentiment Analysis can be used to analyse student feedback to determine where teaching and learning can be improved. However, functional SAT is only sometimes the best method to pull data from text. A better way of analysing text is sentiment analysis. Sentiment analysis is critical but better to have. SAT is not always going to Identify the sentiment of the text, as I previously said; however, even with small sources, it is only sometimes clear what the sentiment means. This is especially true when the text is long, the sentiments are based on complex linguistic evidence, or the text is ironic.

Additionally, if you use SAT to verify the sentiment of the text, sentiment analysis could improve your SAT results. This will be especially true if you use a sophisticated form of sentiment analysis because models for sentiment analysers are trained on labelled data; they are bound to need help to classify text accurately in areas of text space that are barely full (Cambria, 2017).

Although sentiment analysis is imperfect, it offers excellent value and has many applications. NLP is not a decade old; we expect to see far greater techniques shortly.

1.3 Research problem

South African service providers operate in a competitive environment, with customer service and brand loyalty as critical differentiators. Understanding and analysing how customers/employees feel is crucial for a business to improve its

services, products, and customer experience. With so many self-service platforms introduced by telecommunications service providers, have you wondered what customers have to say about them? In addressing this question, sentiment analysis is one capability that a business can use to gain customer opinion, sentiment and needs. However, limited studies investigate how businesses use the capability and what challenges South African telecommunications service providers face when implementing sentiment analytic technologies.

The 2017 study by Morgan and Govender, “Exploring Customer Loyalty in the South African Mobile Telecommunications Sector,” explores what drives customer loyalty in the South African mobile telecommunications market and points out the importance of customer satisfaction and brand image (Morgan, 2017). In the 2019 article “What Social Media Sentiment Tells Us about Why Customers Churn” by Ngwenya and Ngoepe, the authors use social media sentiment analysis to understand better what is driving South African customers to move from one retail bank to the next. This is a perfect example of how social media sentiment analysis technology could be used to gain insights into customer behaviour.

While many South African telecom companies know the benefits of using sentiment analysis, how they implement it must be adapted to be consistent. Current research in sentiment analysis in South Africa is confined to looking at quantitative approaches to customer feedback analysis. It overlooks the information on the customer from sentiment analysis’s ability to provide qualitative insights. Businesses' questions of how and why a business implements the technology, as well as the benefits to the organisation, will be answered, and the limitations of this technology will be observed through a South African lens.

This study examines the South African telecommunications industry and those responsible for all telecommunications technology decisions within their organisation. It needs to address the technical aspects of developing sentiment analysis technology and concentrate on the practical application of sentiment analysis and its consequences within organisations.

1.4 Research questions

Main Question: *Exploring the use of sentiment analysis technologies in South African Telecommunication businesses*?

Sub Questions – The following research was conducted to answer the above main question:

I. How and why did companies implement the technology?

II. Has sentiment analysis enhanced customer experience?

III. What are South African companies' main limitations in adopting SAT technologies?

This qualitative research will include South African Telecommunications companies of different sizes and market containment. Semi-structured interviews will collect information from key subsidiary participants, such as data analysis, customer service and support, marketing, and executive leadership.

South African telecommunications companies can utilise the findings of this study, which will help enhance their clients' experiences and lead towards maximising customer relationships. The research aims to examine the implications and benefits of sentiment analysis. Another value of the proposed research is that it fits in a gap in the current research culture limitations. To extend the knowledge base on how sentiment analysis could be used and applied in business contexts, the research results could also provide a basis for future

research and marketing and consumer relationship management activity (Kosinski et al., 2015).

1.5 Rationale

This research seeks to achieve the following theoretical and empirical objectives:

Theoretical Significance:

I. Provide a solid theoretical framework for understanding how sentiment analysis is implemented in the unique South African telecoms landscape.
II. Explore the challenges and opportunities of effectively implementing sentiment analysis in South African Telecom businesses.
III. Contribute to a broader understanding of sentiment analysis within specific industry contexts.

Empirical Objectives:

I. To identify and analyse how and why the South African Telecom industry uses SAT.
II. Conduct an empirical study to identify if SAT made a difference in the customer experience. This will be conducted by interviewing executives across South African organisations using SAT.
III. To identify South African businesses' main limitations and challenges in adopting SAT technologies. A qualitative study will be conducted on this. Interviews will be the methodology. The key stakeholders will be business leaders, customer service and support, marketing, and data analysts.

This research has the potential to provide a wide range of people, such as industry leaders, policymakers, and other scholars, with invaluable insight. It

could improve the effectiveness of customer communications strategies and engagements in the South African telecommunication industry.

These results could add value to digital business and management practice by offering insights into SAT's potential uses and advantages in South Africa. They could also assist in identifying the constraints businesses face in successfully implementing this technology and make recommendations for businesses that wish to use SAT**.**

1.6 Delimitations of the study

I. Geographical Boundaries: The research will limit its scope to the companies operating in South Africa. It will not expand to other territories for broader viewpoints and external validity.

II. Industry Boundaries: The research will involve Telecommunications Corporations in South Africa, where SAT was implemented or could still be implemented.

a. Time Horizons: The study will focus on SAT solutions implemented within a specific timeframe, such as the past five years, to provide up-to-date and relevant insights.
b. Methodological Approaches: An interview will be conducted to collect information and investigate strategies.

1.7 Definition of terms

4IR Technologies: Technologies related to the Fourth Industrial Revolution, which include artificial intelligence, robotics, cloud computing, and the Internet of Things (Lee & Armstrong, 2023).

Customer Experience (CX): A customer's overall perception of a company or its products/services based on all interactions (Simon Morgan, 2017).

Customer sentiment analysis is a helpful tool that enables the company to analyse the customer's reviews and feedback and so many forms of communication; it also analyses what the customer thinks of the company, how they feel about it, and what they need (Cambria, 2017).

Deep Learning is a machine-learning approach that enables computers to learn. It is “Deep” because it uses deep neural networks to learn, as insects and mammals have evolved. Deep Learning is a game changer in today’s world. Deep Learning has become part of most aspects of our lives, such as healthcare, music, and social media. Many companies use Deep Learning to learn from knowledge bases or to provide a service such as answering questions. Homemade robots also use Deep Learning for navigation. Chatbots also use it for conversation. Waston from IBM uses deep Learning to understand human expressions and movements. For this reason, deep learning is the sole hope behind bringing us robots. (Patterson, 2017).

Lexicon-based Approaches: It examines the textual data to locate the prevalent polarity of opinion. Several lexicon-based approaches used weighting schemes like bag of words, presence or absence of the words in the text and presence of targeted words in the region. (Xiaowen Ding, 2008).

Machine Learning: It has always been confirmed that the definition of machine learning is easy to understand when you know what machine means and what Learning means. Machine means some object that reduces human efforts and gives us some comfort. What does Learning mean? It means understanding something well and properly. So, machine learning is designed to develop some algorithms, and it can learn from experience (Armstrong, 2023).

NLP: The study of the interaction between computer and human language is known as Natural Language Processing (NLP).

Sentiment Analysis Technology (SAT) – also known as opinion mining – is the ability of text to identify and extract opinions and emotions from data (Lui, 2012).

South African Telecommunications (SA Telecom) is the industry that includes South Africa's telecommunications network operators and service providers, including landline and wireless telecommunications.

1.8 Assumptions

Technology Assumptions:

I. Effectiveness: Sentiment analysis technology accurately identifies and classifies customer sentiment in text data.

II. Adoption: South African telecommunications businesses readily adopt and implement sentiment analysis solutions.

III. Integration: Sentiment analysis technology integrates with existing customer service and data management systems.

IV. Return on investment (ROI): Implementing sentiment analysis technology results in measurable improvement in customer experience and business outcomes.

Assumptions for this scenario are as follows:

I. Customer awareness: South African telecommunications customers know and use their service providers' various digital channels.

II. Data availability: Telecommunications businesses can access high-quality customer feedback data for reliable sentiment analysis.

III. Technical skills: Businesses have the technical skills to implement and maintain the sentiment analysis capability.

IV. The regulatory environment: South Africa has a pro-business regulatory environment for using customer data and artificial intelligence (AI) technologies.

Our assumptions about the stakeholders are that:

I. Management support: Telecommunications businesses will already have solid executive buy-in and commitment to using sentiment analysis technology.

II. Employee training: Employees will be trained to interpret and use sentiment analysis insights to enhance customer service.

III. Ethical considerations: Businesses will be aware of and are already addressing potential data privacy issues and potential algorithmic biases in sentiment analysis.

1.9 Chapter Outline

I. Introduction

   a. Background and context of the research

   b. Research problem and questions

   c. Research objectives and significance

   d. Definition of terms

II. Literature Review:

   a. Overview of Sentiment Analysis (SAT) and its applications and benefits to Telecommunication businesses.

   b. Impact on customer experience

   c. Limitations of the technology

III. Methodology

   a. Research design and approach

   b. Data collection and analysis methods

c. sampling and Sample size

d. Ethical considerations

e. Results and Analysis

f. Results about the three propositions.

IV. Discussion and Implications

a. Interpretation of results in the context of research questions and objectives

b. Discussion of practical implications for businesses in South Africa

c. Discussion of theoretical implications and contribution to knowledge

d. Limitations and future research directions

V. Conclusion

a. Summary of findings and critical points

b. Implications for practice and policy

c. Suggestions for future research

VI. References

a. List of all references cited in the research report.

VII. Appendices

a. Additional supporting materials such as surveys, interview questions, and data tables

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

Customer satisfaction and brand loyalty are critical differentiators in the highly competitive South African telecommunication landscape. With the ability to process and interpret customer feedback, potentially improving the customer experience and strengthening relationships, Sentiment Analysis Technologies (SAT) could play a decisive role. Despite this, more research still needs to be done regarding the employment and implications of SATs in this context.

Primary research questions The fundamental research question has been divided into three sub-questions, each corresponding to this study's critical objective. The three research sub-questions are as follows: What is the use and performance of SATs in the South African telecommunications context according to literature? According to the literature, what are some challenges to implementing SATs? According to the literature, what are some benefits of implementing SATs?

Information Technology (IT) advancements have significantly impacted the introduction and implementation of various business innovations and strategies. It has contributed to the development of businesses into a more effective and productive form, enabling them to achieve their goals at a faster rate than they used to before the introduction of Information Technology (IT). It has also made it easier for employees and employers to make decisions affecting their workplaces more conveniently. It has also enabled them to store, share and utilise knowledge effectively (Peter J.Shera, 2003).

All journal articles agree on the following aspects of technology

Aspect of Technology	How Technology Can Be Used
Collaboration and Communication	Technology can be used to improve collaboration and communication by providing employees with tools and platforms to share information, work together on projects, and communicate with each other more effectively.
Automation	Technology can be used to automate tasks by freeing up employees to focus on more strategic and value-added activities.
Knowledge Management	Technology can be used to improve knowledge management by providing employees with tools and platforms to store, share, and access knowledge more effectively.
Decision-Making	Technology can be used to improve decision-making by providing employees with tools and platforms to collect, analyse, and visualize data more effectively.

Table 1: Summary of Aspects of the technology and how they can be used.

In the first paper, Peter et al. (2003) contended that knowledge creation and how it is facilitated by IT are some of the critical factors for enabling the dynamic capabilities of a firm. Companies can create more dynamic capabilities by creating new knowledge transfer (creation, acquisition) and integration. Then, dynamic capabilities can be solved by transferring to the organisation to become a competitive advantage.

Surajit Bag (2021) argues that a Closer AI Framework helps companies improve their overall marketing strategies and marketing performance in B2B marketing. Using this framework, companies can become known, think, and decide rationally and provide bulk marketing campaigns, thereby helping and providing many features to other marketing tools.

Conboy, Mikalef, Dennehy, and Krogstie (Kieran Conboy, 2020) emphasise using business analytics to strengthen dynamic capabilities. According to scholars, business analytics can allow organisations to collect, analyse and interpret data from the environment in real time, making accurate decisions, moving faster, and improving their dynamic capabilities.

Conboy et al.'s research also shows that looking at Business Intelligence Skills and Strategies influences dynamic capability resources in Operations management research and immediately intelligent answers that business analytics can improve dynamic capabilities in operations research. However, the

research of Reihanah et al. found that IT capability is essential to improve environmental performance in the Indonesian ICT sector.

The articles diverged in various matters. For example, Alexandra Balahur1 in 2009 suggested that sentiment analysis in the news should be reconsidered by the recent work done, encouraging to step out of the so-called sentiment lexicons and integrate state-of-the-art natural language processing (NLP) techniques that would provide state-of-the-art classifiers by creating a more extensive coverage sentiment lexicon. On the other hand, finally on our list is an exciting journal by Susan Turner (2017), which comes up with a list of some exciting strategies and tips for small business owners to significantly increase their chances of success, including always embracing their skills and abilities and model their businesses in line with them, seeking out mentors and not burning out.

While these articles each took slightly different approaches to exploring the role of technology in organisational performance improvement, they collectively support the idea that leveraging innovative technologies and strategies is critical to improving effective decision-making, knowledge management, and dynamic capabilities.

Journal	Technology Focus	Key Argument	Commonalities	Divergences
Shera & Lee (2003)	Knowledge Management	IT facilitates knowledge creation, acquisition, and transfer for competitive advantage.	Technology enhances organizational capabilities.	Focuses specifically on knowledge management.
Bag (2021)	AI Framework for B2B Marketing	Integrated AI framework improves marketing strategies and decision-making.	Technology improves knowledge creation and rational decision-making.	Focuses on a specific application within B2B marketing.
Conboy et al. (2020)	Business Analytics	Business analytics enhances dynamic capabilities through real-time data analysis.	Technology improves operational decision-making and agility.	Applies to a broader range of organisational capabilities.
Reihanah et al. (2019)	IT Capability and Environmental Performance	IT capability is critical for enhancing environmental performance.	Technology can be used for various organizational objectives.	Focuses on a specific context (Indonesian ICT sector) and objective (environmental performance).
Balahur & Steinberger (2009)	Sentiment Analysis in News	Rethinking sentiment analysis using advanced NLP techniques.	Technology requires continuous innovation and adaptation.	Offers a different approach to a specific technology (sentiment analysis).
Turner (2017)	Strategies for Small Business Success	Specific strategies (mentoring, marketing) enhance small business success.	Importance of strategic approaches alongside technology.	Focuses on a specific type of organization and different aspects of success.

Table 2: Summary of Journals of global view

The South African telecommunications industry is characterised by constant innovation and responsiveness to customer needs. In this context, sentiment

analysis (SAT) is a powerful tool that can extract valuable insight from customer feedback, enhancing the insights for customer experience (CX). However, to what extent and how SAT has been used in this context remains to be seen, with unknown implications. This research paper will conduct a critical literature review of the body of knowledge around SAT in order to attempt to address this knowledge gap.

Exploring the Drivers and Obstacles of Sentiment Analysis Adoption in South African Telecommunications

This section critically evaluates the motivations and barriers impacting the adoption of SA Telecom firm SAT. Analysing theoretical frameworks of organisational adoption of AI-driven technologies, utilising sources cited by Oliver Neumann, 2022. Critically assessing existing research on the drivers of customer feedback analysis adoption and existing research on the value proposition of SAT for telecom companies.

Roles and perspectives of Executive stakeholders, developmental analytics personnel, and customer service teams within the assessment development and delivery process influence whether and how SAT is implemented. Technical limitations, Organisational processes, or concerns, such as constraints in data collection, privacy concerns for target populations, or data that might not match or be collected in a manner that would render the analysis meaningful. As organisational issues, there might be a need for sufficiently trained personnel or misaligned incentive systems.

Assessing the Impact of Sentiment Analysis on Customer Experience in South African Telecommunications:

In this part of the work, we will look at the potential effect sentiment analysis could have on CX within SA Telecom. Firstly, the conceptual approaches to CX will be evaluated, including reference to liabilities like Lemon & Verhoef (2016) or

liabilities such as Lemon & Peters (2009) (Lemon Katherine, 2016). Also, we will critically review studies that have examined the link between SAT and CX within the industry. Samples may include Yoo Boonghee (2005). Case studies have been identified in Ngwenya and Ngoepe (2019) (Mfanasibili Ngwenya, 2022). Their work has also established the limitations or unforeseen consequences of correctly implementing SAT, including algorithmic bias and depersonalisation with customers in the telecommunications industry, to name a few.

Identifying Limitations and Challenges for Enhancing the Effectiveness of Sentiment Analysis in South African Telecommunication:

This section will discuss approaches to improve the utilisation of SAT within SA Telecom. The research will investigate the best practices for SAT implementation, data integration, and algorithm accuracy found in related works (Thomas et al., 2019). Evaluate the impact of regulatory landscape, social norms, and data privacy on the effectiveness of SAT within South Africa. Identify areas for future research and development of SAT utilisation within SA Telecom.

Author	Key Arguments	Commonalities	Divergences
Exploring Drivers & Obstacles:	AI adoption frameworks & customer feedback analysis research explain SA adoption drivers. - Stakeholder perspectives: executives, customer service, & data analysts influence SA implementation. - Technical limitations, data privacy, & organizational factors are potential barriers.	Emphasis on understanding motivations & challenges for SA adoption. - Recognizes multi-faceted impact of stakeholders and organizational context. - Highlights concerns around data privacy and technical limitations.	Focuses specifically on South African telecommunications context.
Assessing Impact on CX:	SA can enhance CX in South African telecommunications. - CX frameworks unpack the relationship between SA and various CX aspects. - Analyses research from various industries & specific SA Telecom examples. - Acknowledges potential pitfalls of SA implementation (bias, impersonal interactions).	Shares common goals of understanding SA's impact on CX. - Leverages existing CX frameworks and industry research. - Provides specific examples from the South African context.	Focuses on qualitative research and potential downsides of SA.
Identifying Limitations & Challenges:	Best practices for SA implementation, data integration, & algorithm accuracy are key for effectiveness. - Regulatory landscape, social norms, & data privacy influence SA effectiveness in South Africa. - Identifies gaps & opportunities for further research & development in SA applications.	Shares interest in optimizing SA effectiveness for CX improvement. - Recognizes the influence of external factors in the South African context. - Focuses on concrete strategies and future research opportunities.	May not delve deep into specific technological challenges mentioned in the first section.

Table 3: Summary of Journals of South African view

These concepts are analysed in detail, and the literature review aims to provide a comprehensive analysis of the theoretical frameworks explored in the selected

journals, highlighting their contributions to the current understanding of the research topics.

2.2 Background discussion

AI or artificial intelligence can radically improve understanding and rational decision-making in B2B marketing. However, we must be careful of the potential ethical issues that can be caused, as (Sarajit Bag, 2021) has argued. For example, we need to be cautious of AI algorithms' bias and AI replacing humans and decisions that only humans can make.

While sentiment analysis (B.Pang et al., 2008) can be a helpful tool for extracting valuable insights from news articles (Alexandra Balahur, 2013), cite that the accuracy of sentiment analysis(B.Pang et al., 2008) is still relatively low. More advanced natural language processing (NLP) techniques may be needed to improve the accuracy of sentiment analysis (Alexandra Balahur, 2013).

Environmental performance and information technology: While information technology capability can enhance a company's environmental performance, some scholars argue that there is a potential trade-off between environmental performance and other business goals, such as profitability. Companies must carefully balance these competing priorities to achieve long-term success (Peter et al., 2003). Overall, while the concepts explored in the selected journals are all important and worthy of further exploration, there are also potential debates and critiques surrounding each.

The research focuses on the South African Telecommunications Industry, a fast-paced industry characterised by fierce competition and the never-ending need to innovate in line with customer demands. This has caused the emergence of Sentiment Analysis (SAT). This powerful tool has the potential to deep dive into customer feedback and unlock valuable insights in the context of business. The

application and implications of SAT within this specific context have not been extensively researched, which gives rise to the use and applicability of the SAT method in South African Telecommunications being so evident yet to be extensively researched. This defines the importance of this literature review in exploring these unexplored and critical waters; hence, suitable literature is used to review sentiment analysis in South African telecommunications, relying on the three key research questions.

2.3 How and why did business implement the technology?

Sentiment analysis technologies (SAT) estimate texts' opinions, attitudes, or emotions. It has many applications, including customer feedback analysis, social media monitoring, and market research (Yuli Astuti, 2023). This research paper aims to dig into the sentiment analysis (SAT) field thoroughly. SAT is a natural language processing (NLP) technique that identifies and extracts subjective information that has been processed. It involves analysing the texts, including the attitude or emotions, to gauge the sentiment or opinion. The discussion investigated is sentiment analysis technologies (SAT) that have become a requirement part of the global software development challenges. Sentiment analysis is essential, with a few applications, to result in wider attention to the trend of the application of SAT in increasingly broad areas, including customer feedback analysis, social media monitoring, and market research.

The SAT can also be used as a social media monitoring tool. Twitter and Facebook posts are now valuable business intelligence sources for understanding customer sentiment toward products and brands. Sentiment analysis can help reveal how customers feel about a brand or product on social media and thereby help business organisations make informed business decisions (Alexandra Balahur1, 2009).

Market research is another application of the SAT. Businesses can now identify opportunities to improve products and services by analysing customer feedback and reviews. Sentiment analysis provides insights into how customers feel and get emotional about products, which can assist in guiding a company's marketing and branding. Customer feedback analysis is also an application of difficult SAT. Analysing customer feedback allows businesses to understand customer sentiment toward a product or service and what areas need improvement. Sentiment analysis can categorise and identify feedback as either positive, negative, or neutral in sentiment, allowing businesses to take appropriate action.

Machine learning-based methods: An essential aspect of understanding sentiment is being able to work with text. In recent years, several algorithms have been developed that are capable of working with text; these types of algorithms have been taken from everyday tasks such as categorising and clustering of the text in order to analyse people's sentiments, and which have been based on pattern who identified in the document and sentiment analysis who can voice their opinion about the given articles and naturally documents posted in a given webpage.

Different approaches, such as machine learning-based and lexicon-based approaches, Involve training a model large dataset of label examples and their sentiment to automatically classify the sentiment of news text. Reached a high level of accuracy but needed to be trained on large amounts of labelled data. It is much work and needs more machine learning techniques (sentence looks at the creative ways machines could be used for sentiment analysis). It is based on lexicon-based; they build a sentiment analysis of a text based on pre-defined word scores of a particular sentiment. It is based on machine learning or the LEXION-based approach. The based approach is more straightforward than the machine learning-based approach. (Klinger, 2019).

The above sentiment analysis will be helpful for businesses as it can help them analyse customers' sentiments and frame business decisions. Understanding sentiment in feedback helps companies improve their products, services, and customer satisfaction. Many sentiment analysis methods exist, and finding the appropriate means depends on the application and resources.

2.4 Has sentiment analysis enhanced customer experience?

The need for data has been sought to help companies make more effective and educated decisions ever since the early 1970s, with the start of systems like the decision support system (DSS). This was the start of the decision to support the data management era when data is sought to make specific applications useful in aiding individual decisions related to sets of decisions. However, as the 90s unfolded, companies wanted data to support multiple business intelligence (BI) and analytical applications. These applications did not just focus on decision support but on other functions of a company: Reporting, queries, online analytical processing, or analysis (OLAP), telling everyone how the company is doing, telling the executive how the company is doing, and so on. This is a changing time in the era of decision support data management, as it is changing to more than just fitting other types of ways the data should be managed. (Watson H. J., 2014).

Sentiment analysis is a field of natural language processing (NLP) that determines the sentiment or opinion expressed in a text. This can be used to gain insights into customer attitudes, opinions, and emotions. Business analytics is a field that uses statistical techniques and data analysis to extract insights from large volumes of business data. Combining sentiment analysis and business analytics allows businesses to better understand their customers and make data-driven decisions.

Business analytics helps sentiment analysis in NLP (natural language processing) in various ways. Boumaiza (2015) has highlighted some critical ways business analytics help sentiment analysis. Here, it will be discussed where he mentioned and then analysed how valid/ invalid it is. One way is visualisation techniques. This technique helps businesses visually represent complex data or components of data and makes it easy, thus allowing businesses to identify patterns and trends. This is very important to sentiment analysis because, in sentiment analysis, businesses require a quick and effective mechanism to identify critical questions related to sentiment analysis as the considerable discomfort of sentiment analysis is to identify key themes and sentiments from an extensive line (say 1 million lines) of unstructured data and so when it comes to analysing sentiment of one product or any market research feedback of product or services of some company. One way to deal with this is to use some data visualisation techniques mentioned previously. The data visualisation technique is about making big data short and visually understandable. You can draw some graphs, heat maps, word clouds, etc.

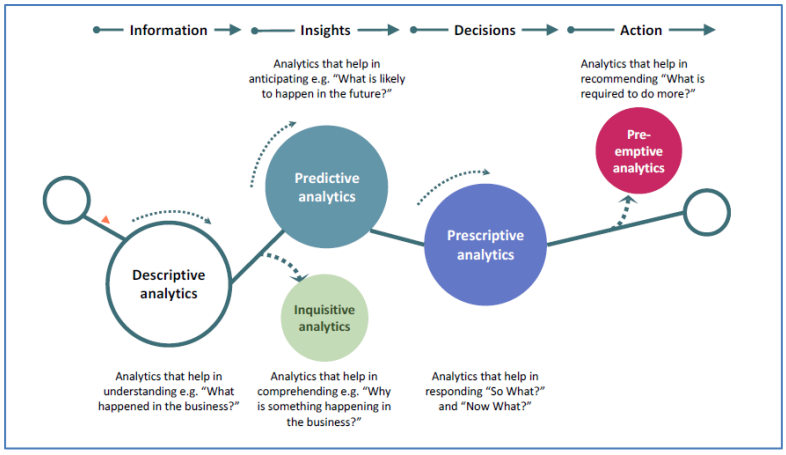
Machine learning algorithms can analyse customer sentiment data to identify trends and make more educated/ data-driven decisions. One way this could be done is by using machine learning algorithms to conduct sentiment analysis on customer social media posts or comments to identify trends in customer sentiment towards their product or service, which they could use to inform product development or marketing strategy. (Wang, 2019).

Sarcasm and irony are difficult to detect using traditional sentiment analysis techniques, as the sentiment expressed in the text is often the opposite of the intended meaning. However, using more advanced techniques, such as sentiment analysis based on deep learning, businesses can better identify Sarcasm and irony in text, enabling them to assess customer sentiment more accurately (Karthik Sundararajan, 2020).

Deep learning is an advanced methodology for masking sarcasm and training symptoms in a very detailed manner from a vast collection of data. It then uses that data to analyse the newest category of data for the most accurate result. It has been a human analysis, but it is necessary to fulfil all the credited tests. It expounds the syllabus well and gives users the whole functionality to get better results (Karthik Sundararajan, 2020).

Sentiment analysis can be used by searching for customer sentiment over time, tracking it, interpreting it, and using it. An excellent example of sentiment analysis for a business is searching for whether people are happy with the customer service a business provides. By doing this, you can see the difference between happy and angry people, and then you can use that information to find out what makes people happy or mad with your customer service. You can do this by seeing what the people who are happy with your customer service say. Then, you can read what the people who are unhappy with your customer service say and see the difference and what you need to do to make people happier. (Yakobi, 2022).

Authors Lee and Armstrong (2023) cited the possibility of using and analysing data at different levels, as depicted below.



Source: (Brian Armstrong, 2021)

Figure 1: The analytics progression of usefulness

The described levels were described as follows:

Descriptive Analytics summarises historical data, such as averages and distributions, among other metrics. It is a level of data understanding that looks at what has happened and always looks backwards.

Inquisitive Analytics: This step involves seeking patterns in past data through statistical techniques like correlation and regression. It aims to understand why certain variables may be associated with each other, such as demographic indicators being linked to product sales.

Predictive analytics borrows from inquisitive analytics. It uses past performance to indicate future outcomes. It is a step ahead of inquisitive analytics and focuses on using techniques to forecast outcomes, such as the kind of brand a customer is likely to use and whether the equipment is likely to fail or not.

Prescriptive Analytics: This step goes beyond prediction and involves prescribing possible responses to the predicted outcomes. The goal is to suggest the best action based on the projections. For instance, it may recommend an immediate

shutdown in the case of equipment failure or scheduling maintenance at a repair shop.

Several levels of analytics provide different types of customer sentiment insights that are relevant to strategic enterprise decision-making. Descriptive analytics helps understand what happened in the past. Inquisitive analytics help you understand relationships and correlation. Predictive analytics helps predict future outcomes. Prescriptive analytics recommends actions to take, given what is most likely to happen in the future. By understanding these different levels of analytics and what they offer, there are sentiments where a business can make informed decisions each time it goes through the strategic enterprise decision-making context cycle. Several kinds of sentiments were given by Watson et al. (2014).

Both authors Watson and Angelov also reported that through understanding these levels, organisations can allocate resources appropriately depending on the desired level of customer insights and the complexity of analytics. The book Advanced Business Analytics (Isson, 2012) also said that the SAT could enable businesses that needed more resources to decide following the outcome in the SAT reports. Watson noted that companies can develop a maturity roadmap that allows them to grow their analytical maturity, unlock more values from their inside, and make more sophisticated decisions over time (Watson, 2014).

Today, any enterprise, industry, or sector must be able to leverage social media to gain a competitive advantage in today's data-driven business landscape. Social sentiment analysis enables us to improve our ability to predict by increasing the effectiveness of our models and responsiveness to changing conditions by improving our forecasting abilities to give us more significant lead time; this enables more accurate planning and more flexibility in our operations. Having advanced analytical algorithms in place can allow us to leverage insights before our competition does (Plamen Angelov, 2017).

The authors cited that not understanding the different levels and capabilities of SAT analytics in a business can lead to issues in strategic decision-making, allocating resources, scalability, efficiency, competitive advantage and effectiveness. By understanding each capability and potential in SAT analytics, businesses can utilise it to innovate and improve processes to reach their organisational objectives.

As discussed above, integrating business sentiment analysis in NLP will help businesses understand customers and make data-driven decisions. We learned that businesses need to use data visualisation tools, machine learning, and advanced sentiment analysis techniques to identify the trends and patterns in customer sentiment data and use this information to inform business strategies. As a result, all the businesses that invest in sentiment analysis and business analytics are more likely to get a competitive edge over other businesses in the market. All the various authors agree that it will provide the business with better efficiency, but some are concerned about the lack of skilled resources; they also think that BA will compensate for that, so there is no need to have many resources.

2.5 What is South African businesses' main limitation in adopting SAT technologies?

Sentiment analysis is a well-known technique preferred among data analysts because it provides valuable insights from the data collected. Many businesses have applied this tool to understand behaviour, opinions, and preferences, which helps them improve. Although the above-mentioned analysis, such as sentiment analysis, has many more benefits, there are also some limitations. So, this discussion will be based on the advantages and limitations of sentiment analysis.

Advantages

Customer feedback analysis: Sentiment analysis enables businesses to analyse customer feedback at scale, including online reviews, social media comments, and customer support interactions. By understanding customer sentiment, companies can identify areas for improvement, enhance customer satisfaction, and strengthen brand reputation (Chih-Ping Wei, 2010).

Brand monitoring and reputation management: Sentiment analysis allows businesses to monitor their brand mentions and reputation across various platforms. By analysing sentiment trends and identifying positive or negative sentiment shifts, companies can proactively manage their brand image and address potential issues.

Market research and competitive analysis: Sentiment analysis can provide a competitive advantage by enabling businesses to gather data on consumer sentiment towards their and competitor product and services and industry trends to make data-driven decisions (David et al., 2014). Product and service improvement: Based on sentiment data, businesses can identify what features, aspects, or pain points their product or service has. Then, based on the results of the sentiment data, companies can refine, add, or subtract aspects to suit their customer's needs and wants better. This approach is feedback-driven and helps ensure that companies meet the target market’s needs and wants.

Crisis management and risk assessment: Sentiment analysis is very useful for early detection of crises, shifts in public sentiment, or sentiment spikes that may subject a business to risks (Faxi Yuan, 2020). Monitoring sentiment patterns allows companies to proactively deal with potential risks, address issues promptly, and contain the damage to reputation by taking remedial measures. Personalised marketing and customer segmentation. Sentiment analysis helps businesses understand customers’ preferences, interests, and sentiments. Using sentiment analysis results, companies can segment customers, personalise their

marketing campaigns and messaging, and offer targeted promotions to boost customer engagement and conversions.

Sentiment analysis is a powerful tool to help businesses understand customers' feelings about their products and services. By analysing customer feedback, companies can identify areas for improvement and make data-driven decisions to improve customer satisfaction (Yadav, 2023).

Yadav, 2023 also cited that sentiment analysis can give businesses a competitive advantage by identifying emerging trends and preferences. Staying ahead of the curve is essential for companies that want to remain competitive and meet the ever-changing demands of their customers. By monitoring industry trends, listening to customers, and being innovative, businesses can develop new products and services to keep their customers returning.

“Better customer service: authors (Y. Astuti, 2023) claim that sentiment analysis can lead to better customer service by stocking the issue. In other words, when customers respond to a marketing campaign, they can quickly discover if something goes wrong by using sentiment analysis and act by fixing and apologising to customers in no time frame. Thanks to sentiment analysis, customers can have customer services at their doors whenever they need them as soon as possible. Better marketing strategies: By conducting a case study on Nokia (RAJ Humaira, 2019 and AJ Devi, 2021), discover some useful facts about sentiment analysis. They mentioned that the use of sentiment analysis will improve a company's marketing strategies; a better understanding of customers’ sentiment leads to targeted and focused approached marketing campaigns.”

Limitations:

Credibility: It is also important to note that while sentiment analysis can be helpful, it is not always accurate. The technology still has limitations, especially with more complex language and sarcasm. Businesses do not want to depend solely on

sentiment analysis software to make significant business decisions because the company could make the wrong decision. Example: “Sentiment analysis, also known as opinion mining, is the analysis of the sentences and of the author's views to determine the attitudes of the relator concerning some topics or the orientations of the speaker towards certain subjects” (Yi et al., 2003).

A disadvantage of a sentiment analysis program is that it may need more context. If a customer leaves a negative review, it may take extra time to understand what specifically caused their dissatisfaction.

Bias can be an issue with sentiment analysis. The sentiment analysis will be biased if the training data is biased. The same concept follows if the training data is narrowly pessimistic. The results will be less extensively accurate (Thelwall, 2018).

Privacy concerns: Businesses must legally obtain any customer feedback that can be used for sentiment analysis. They must follow specific data protection laws, rules, and regulations when obtaining customer feedback. If businesses use it unethically, following all the rules and regulations regarding customer feedback would be useless.

Yi (2003) also highlighted some challenges: Subjectivity and context: Sentiment analysis requires interpretation and understanding of the text’s subjective opinions, attitudes, and emotions. It is very challenging to capture the nuances of language, such as sarcasm, irony, and cultural contexts, which can affect the accuracy of sentiment analysis results.

The quality and relevance of the data will affect sentiment analysis, and results will be unreliable and less precise if the user uses poor quality and irrelevant data for analysis. For instance, according to Alexandra (2009), if the dataset contains much noise, the accuracy of sentiment classification may drop seriously.

Researchers studying sentiment analysis have examined the technical obstacles to analysing sentiment in multicultural and multilingual texts. Sentiments like “threats” are expressed in very different ways in different languages and cultures, so language-specific models were built to handle the text processing of a given language. Addressing each language's differences and cultural nuances can be an additional challenge.

Volkova (2013, p. 3) stated that sentiment analysis should be domain-adaptable because a model for sentiment analysis in one industry will not work in another. Each industry has a different language, vocabulary, and jargon. Building sentiment models for different domains and staying current with industry terms is complex.

Sentiment ambiguity and variability: Texts frequently contain ambiguous statements or sentiments, making it challenging to determine the correct sentiment. Also, conflicting sentiments are sometimes found in texts from different domains. To tackle such issues, contextual understanding is one approach and disambiguation techniques are employed.

Overall, sentiment analysis is helpful for businesses in gaining insights. However, we must also recognise the limitations of this method of guiding decision-making and ensure that we are using it effectively in a data-driven environment.

2.6 Framework

It was inferred from the research and reading that dynamic capabilities were the underlying framework adopted in most of the journals. Lectures learnt last year by Armstrong & Lee (2023) (who wrote a book on the digital business framework) the author in their book describe the digital business framework as a company's ability to integrate, build, and reconfigure internal and external resources to address rapidly changing business environments and seize new opportunities.

They argue that this framework is essential for companies that want to stay competitive in the digital age.

2.6.1 *Dynamic Capabilities Framework*

“Dynamic capabilities” was first introduced by Teece (1997) in a paper that he co-wrote with Pisano and Shuen; the paper was called “Dynamic Capabilities and Strategic Management.” In that paper, Teece and his colleagues defined “dynamic capabilities” as “the firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments”. The main point of their paper was that the resource-based view of strategy failed to consider flexibility, learning, and the ability to innovate as a by-product of experience in dynamic environments. Since that paper was published, the idea of “dynamic capabilities” has experienced great notoriety and has become a popular way to explain how organisations can gain and sustain competitive advantage in rapidly changing markets (David, 2006; Teece, 2007).

Lee and Armstrong (2021) took it a step forward in their book Digital Business: Concepts and Strategies, cited during their lecture that Dynamic capabilities refer to the organisational processes that enable a firm to sense, seize and create value from opportunities in its environment. They allow a firm to reconfigure its function in response to environmental changes. Being that we are in a world that is so rapidly changing, they are also known as the capabilities that are essential for long-term success. (Brian Armstrong, 2021)

There are three significant dynamic capabilities. Sensing capabilities are about how companies can identify new opportunities and threats in the market in which they are involved. Companies develop this dynamic capability by constantly researching and developing new products and doing market research. Seizing capabilities is about taking up new opportunities and defending against new threats. Companies develop this dynamic capability by introducing new products

and changing their business models. Transforming capabilities is all about how a company adapts to change and renews the effects of the actions it is involved in. Companies develop this by introducing new systems and production strategies to change how they do things.

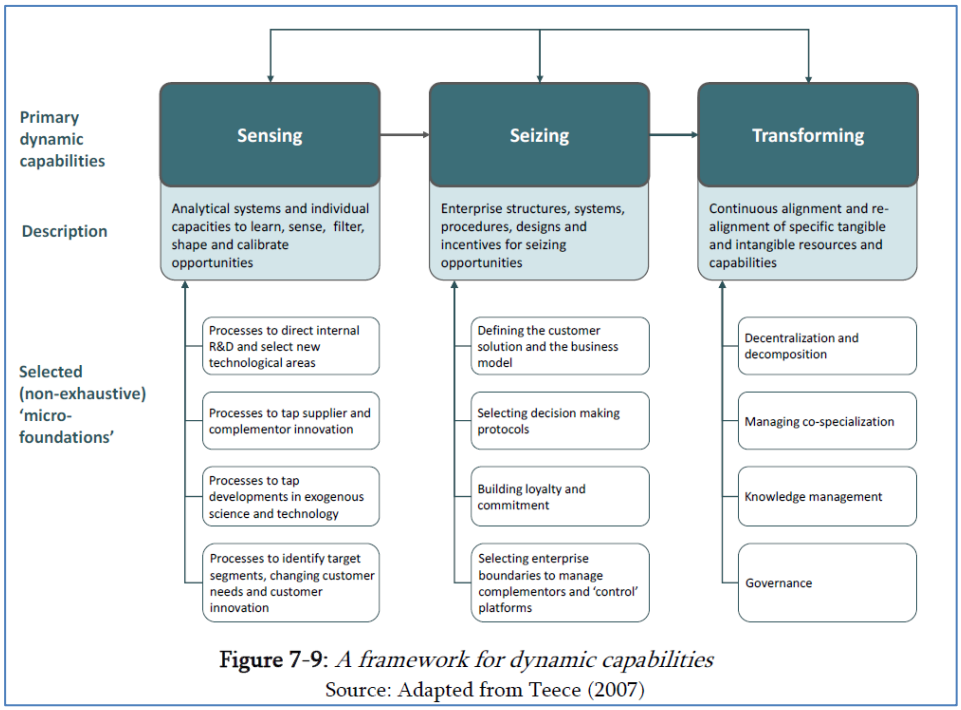


Figure 7-9: *A framework for dynamic capabilities*
Source: Adapted from Teece (2007)

The dynamic capability theory is based on the notion that a firm can acquire, integrate, and reconfigure resources and capabilities to develop dynamic capability. The literature review of the dynamic capability theory provides potential evidence of its impact on the firm's performance. The journals cited in the review explain that the firm can improve its knowledge management, decision-making ability, and marketing strategy by applying dynamic capability.

Also known as opinion mining, sentiment analysis refers to using natural language processing, text analysis, and computational linguistics to systematically identify, extract, quantify and study affective states and subjective information. The sentiment analysis system can determine the sentiment or opinion of the individuals expressed in one or more text fields. It is widely used

among companies who want to utilise blog data to see how they stand in the market compared to their competitors. Open-source sentiment workflows can be utilised to extract information from news articles, blog posts, and tweets. Users can privately utilise an open-source developer tool workflow, like the sentiment analysis created by code trigger. Users can also build their workflow. Companies, for example, would like to use that information to learn more about their products and what is missing. It is widely used in social media monitoring. Social media project managers utilise sentiment analysis and want to know the number of positive and negative comments.

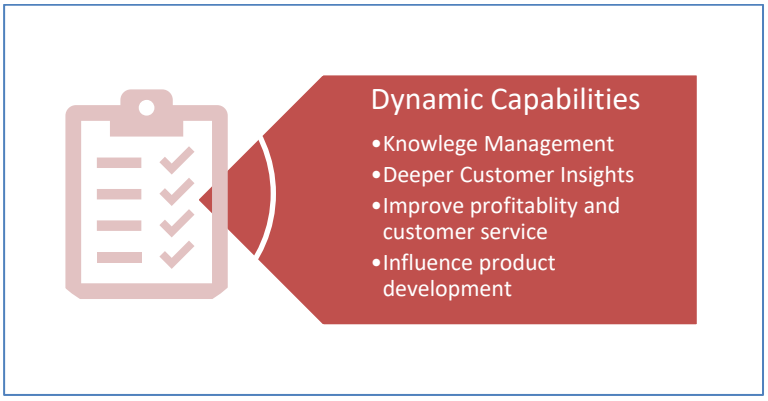
The literature proposes several examples of how dynamic capabilities and sentiment analysis can be used to gain business efficiencies and increase knowledge management. Organisations can use dynamic capabilities to identify new knowledge, combine it with old knowledge and create new knowledge. The literature states that this could improve decision-making, innovation, and new product development (Yakobi, 2022).

Dynamic capabilities have been proposed to improve decision-making. Companies can use dynamic capabilities to identify and interpret environmental changes and develop new strategies, allowing a company to rejuvenate continuously in the long run. With an improved decision-making process, companies will align their activities to their decisions. This, in turn, improves company performance and profitability. (Lemon Katherine, 2016) referenced in understanding customers, developing new marketing campaigns, and targeting marketing efforts. This, in turn, leads to increased sales and market share.

Regarding customer service, sentiment analysis can help companies identify customer complaints or concerns mentioned in a text. Doing so will help the company respond faster, increase customer retention, and reduce churn. (Yadav,2023)

Sentiment analysis can be used to improve product development. Companies can use sentiment analysis to identify customer preferences and needs. This can help companies develop new products and services that meet the needs of their customers.

In conclusion, dynamic capabilities and sentiment analysis are crucial to business. They allow businesses to work together better and know what their customers feel to provide better service. They also allow businesses to develop better products that the customer will want and use all the time.





The authors' comparison and synthesis of literature with the three overriding dynamic capabilities directed us to the following summaries.

Sensing Shera & Lee (2003) claim that firms will develop sensing capabilities using information technology to collect and analyse environmental information. DR Bag et al. (2019) claim that to establish sensing capabilities, companies can use artificial intelligence to understand what is changing in the environment. Balahur and Steinberger (2009) claim that the sensing of emotions can develop by examining texts such as newspapers. They studied to find out the sentiment of the texts made by firms in interest.

Seizing Conboy et al. (2019) argue that business analytics allows organisations to capture, analyse, and interpret real-time data, improve operational decision-making, increase agility, and enhance their dynamic capabilities. Reihanah et al. (2019) claim that in the Indonesian Information and Communication Technology (ICT) sector, the capability of information technology for IP enables environmental performance to be made better by providing favourable economic performance.

Transforming Turner and Endres (2019) claim that specific strategies can enhance their success rates, including looking for a mentor and preparing a clear marketing strategy.

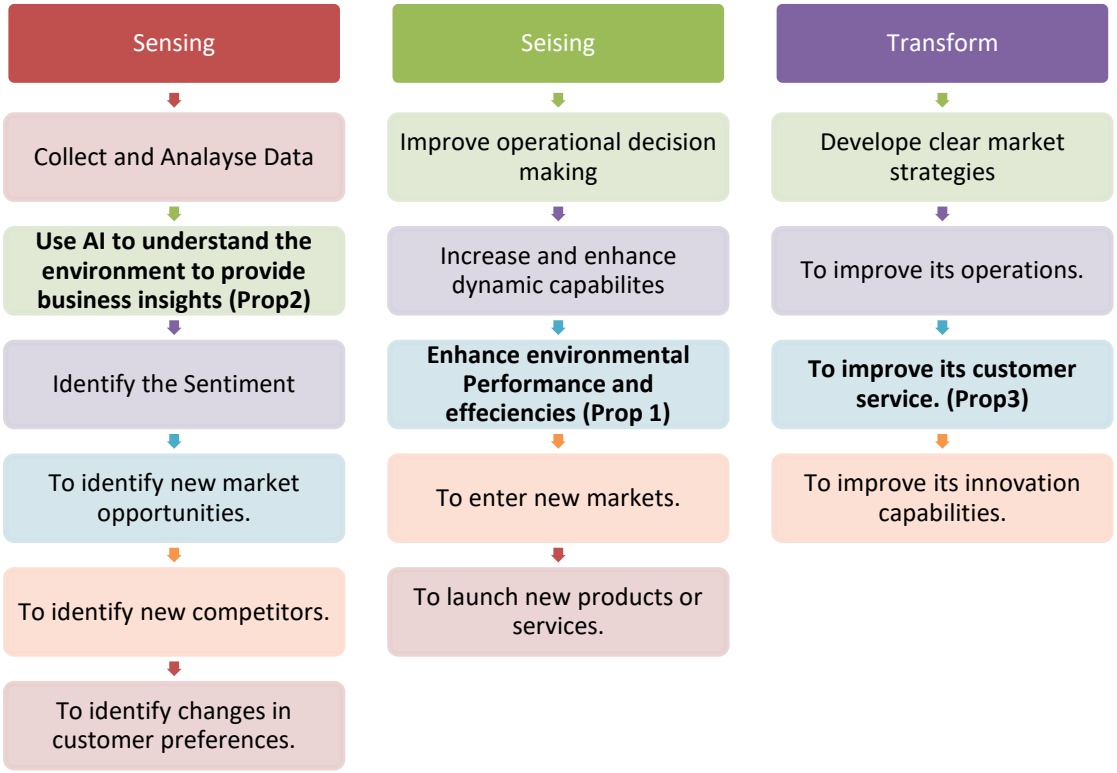
All these approaches are valid, which means that they are all correct when utilised by a company to develop its dynamic capabilities. Reading this also makes one realise that a particular approach a company should take towards its dynamic capabilities depends on the interpretations and divisions of all the players involved in the company. All these approaches can be used differently for a company to develop its capabilities.

In addition to the approach discussed by the authors cited above, companies can also develop dynamic capabilities, including investing in research and

development. Companies that invest in research and development are more likely to identify new opportunities and develop new products and services. A company creating a culture of innovation can encourage employees to develop new ideas and solutions. Companies that are open to change can adapt to changing environments. Companies should develop dynamic capabilities to succeed in today's rapidly changing business environment.

2.6.2 *Conceptual Framework*

Some examples the literature indicated that companies could use sensing, seizing, and transforming capabilities to improve their performance are as follows:



It is important to note that dynamic capabilities are enabled by sensing, seizing, and transforming capabilities; therefore, a company can only possess dynamic capabilities by first having sensing, seizing, and converting capabilities.

The relationship between the various factors can be seen in terms of dynamic capabilities, which can be broken down into three different forms: Sensing capabilities, seizing, and transforming. Sensing capabilities sense the opportunities and threats in the market. This will allow the business to build up its dynamic capabilities. The seizing capabilities allow the company to benefit from the different types of opportunities in the market, and the company will also take action in defence. This is about reducing all kinds of threats shown in the market or expected to create any adverse situation. Transforming is the capability of the business to change or adopt itself for betterment or to move the business to a better condition.

Sensing, seizing and transforming capabilities, the assumption behind these would be that all companies could build dynamic capability. The result of the assumption behind these is that these dynamic capabilities are what it takes for companies to have and maintain a competitive advantage in a swiftly changing market.

2.7 Propositions

2.7.1 *Proposition 1: South African telecommunications businesses primarily implemented sentiment analysis technology (SAT) to improve customer service quality and ensure customer retention.*

The following main concepts stood out in the literature review, where the elements of SAT were used to improve service quality and ensure customer retention:

Automation of industry: The introduction of SAT can help a company by automating the tasks done manually by a worker. It can help a company in customer service, data entry, and marketing, Allowing the employees to concentrate on more strategic work, which can help the company improve accuracy and efficiency.

Increase your customer service by providing customers with more personalized and lightning-fast support. For example, SAT can be used to determine a customer's sentiment, answer their questions, and finally resolve their issues.

To make better decisions, based on that, the SAT can define better decisions based on customer behaviour, market trends, and competitive dynamics; for example, the SAT can help define customer preferences, predict customer churn, and define new market opportunities (Lamrhari, 2022).

Increase productivity; based on that, SAT can help drive higher productivity by automating and optimising business operations.

In summary, SAT can improve the company's work as part of business strategies. In so many ways, like customer service, decision-making, and productivity, it can save businesses a lot of time and money, and it can help businesses add an additive to their competitiveness.

These are simply a few examples of how businesses are putting SATs to use today to improve the quality of customer service they provide and ultimately keep their customers happy. As SATs increasingly develop, more examples of how businesses use the tested and tried customer satisfaction rubric online can be found.

2.7.2 *Proposition 2: The effective use of SAT technology leads to a measurable improvement in customer satisfaction and loyalty within South African telecommunications businesses.*

Sentiment analysis was crucial in the literature review for businesses to analyse customer feedback, social media comments, and reviews to understand opinions, attitudes, and emotions towards the products or services. Business analytics is vital in analysing sentiment using data visualisation tools, machine learning algorithms, and big data analytics techniques.

SAT is a powerful compass that helps businesses understand who their customers are, make data-driven decisions, and drive bottom-line improvements. And then, businesses can capture new opportunities and overcome challenges to gain a competitive edge. Unlike Viitanen's study, they used NPS (net promotor score) to measure customer experience (Viitanen, 2021).

2.7.1 *Proposition 3: The potential benefits of SAT technologies can be significant, and businesses that can overcome the limitations may significantly improve efficiency and customer service.*

The literature review showed that sentiment analysis has some limitations and challenges, such as identifying sarcasm and irony and the effect of different languages and cultures. Additionally, the study showed that depending on the accuracy of the sentiment analysers, the relevance of the dataset and the suitable technological model use of sentiment may add value to the customers as it can be used to category customer feed into the different groups and provide guidance to the company and able to identify the problem earlier than other data analysis technique.

Sentiment analysis, with a few limitations, can be a powerful tool for understanding the sentiment and the behaviour of the customers of a company

or a product. However, the accuracy, inability to face context, the biases of the people and the privacy are significant drawbacks of using sentiment analysis as the only tool for analysis. Hence, this tool can be combined with other analytical techniques to get the best sentiment analysis.

Another analytical technique that can be used with sentiment analysis is customer surveys. Customer surveys allow businesses to understand customer sentiment and behaviour more directly, as surveys can collect feedback on specific products or services and overall customer satisfaction.

Customer interviews provide in-depth insights into why customers are saying and doing things. Interviews can provide an understanding of why customers are satisfied or dissatisfied with an experience and identify improvement opportunities.

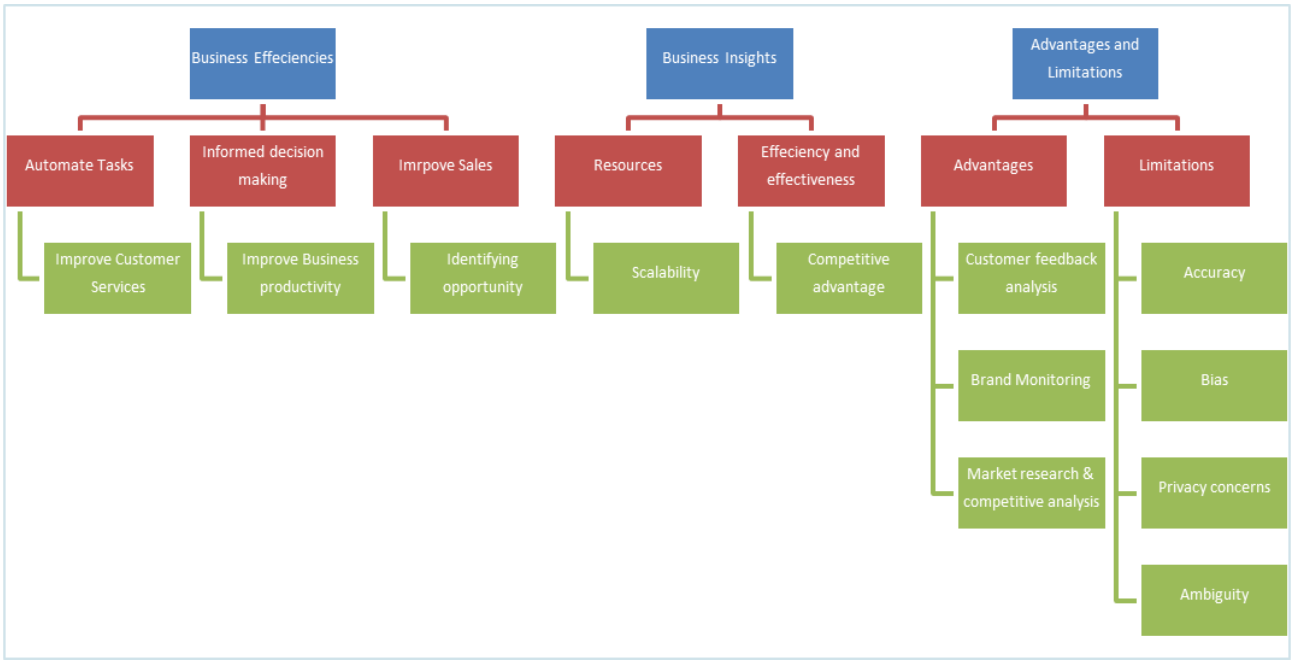
Mapping out the journey that a customer goes through as they interact with the company can help them build a deeper understanding of the experiences of customers and the different touch points that may need to be looked at to improve the overall customer experience. Some examples of touch points may be looking at the customer service experience, the product design, or the marketing and determining any need for improvement.

When organisations use sentiment analysis in conjunction with other tools, they can obtain a more complete understanding of the attitudes and actions of their customers. Moreover, this knowledge can be applied and further implemented to enhance product development, marketing, and customer services notably.

2.8 Conclusion of Literature Review

In conclusion, the literature presented a detailed review of the power of dynamic capabilities theory and sentiment analysis to elevate organisational performance. The employment of SAT can enhance precision, leading to improved decision-

making and marketing strategy. The above literature review proves that firms can build dynamic capabilities through sensing, seizing, and transforming capabilities. By exercising these capabilities, companies can respond to changes, make better decisions, serve customers better, and improve efficiencies in business processes.



CHAPTER 3. RESEARCH METHODOLOGY

By stipulating a comprehensive understanding of SAT applications in South African telecommunication organisations, this research methodology aims to address the above challenges:

1. By clearly identifying the strengths and weaknesses of each approach and providing opportunities for integration to be achieved.
2. By developing a sentiment analysis model that corporations can adopt to enhance efficacy and support decision-making. Therefore, this study is essential as it contributes to the dynamic capability in the related field.
3. This study has merits on the practical approach for corporations' adoption of the SAT for the success of their businesses.

Considerable work was undertaken to find literature that suits the South African business context through a literature review. By doing this research, it is anticipated that insight into the South African telecommunication business context can be understood in terms of opportunities and challenges.

3.1 Research Approach

The methodology for this investigation is a qualitative case study. The case research will secure information from interviews with corporate executives and employees.

The methodological approach used for this study was qualitative research, as it was well-suited to exploring the use of sentiment analysis technologies in South African telecommunication businesses. Qualitative research allows for an in-depth exploration of the research questions and allows the researcher to develop detailed descriptions of the phenomenon under investigation.

3.2 Research Design

This research was designed by choosing the overall study as a case study. This case study examined a single case: the company applying SAT, business analytics, and sentiment analysis to the system to increase its operational efficiency and decision-making.

A case study must be conducted to assess how the business uses these technologies. A survey is the best research method for the business because customer surveys will tell the company what it is doing wrong or what it is doing right, and it can fix, improve, or keep the process the way it is.

I. The research that will be undertaken will be guided by the following research questions:
II. How and why did businesses implement the technology? Has sentiment analysis enhanced customer experience?
III. What are South African businesses' major limitations in adopting SAT technologies?

The choices will be justified by how they intend to assist by answering the research questions. For example, employee interviews will allow the collection of of first-hand accounts of how the business uses these technologies. Analysis of social media data will allow one to identify trends in customer sentiment and behaviour.

In-depth data collection techniques will be essential to better understand how the company uses SAT for better operational efficiency and decision-making. This data will be analysed to develop research-established questions and recommendations for better SAT optimisations.

Advantages

A case study is a well-suited research method for understanding how a business uses SAT to improve efficiency and decision-making. This is because a case study allows for the collection of data from interviews with employees,

Real-world context: A case study allows one to study the business in its real-world context. This is important because it allows an understanding on how the business uses these technologies in a way relevant to its specific needs and goals.

Disadvantages:

To conclude, the study may need to be used with other research designs. Every business is unique, so a case study would be useless. Time-consuming: A case study can be a very time-consuming research method. Data must be collected from different sources and may even be studied over time. The case study can be a subjective research strategy. This is because the conclusions drawn from the data would interpret situations. The findings might be biased.

Overall, the benefits of using the case study design outweigh the negatives. This is because the case study will allow the understanding of the use of sentiment analysis technologies in South African Telecommunication businesses, which in turn, after understanding, will allow one to begin to answer the research questions and subsequently make recommendations as to how the business can do things better.

3.3 Data Collection Methods

The in-depth interviews will focus on employees' experience using the SAT. They will be recorded and transcribed, providing highly detailed and valuable information about employees' SAT experiences. The interview protocol also asks employees to discuss their beliefs and opinions about using these technologies in their business.

A qualitative approach will be taken in these interviews. This approach means the interest is not in collecting numerical data. Instead, the interest is in understanding the employees' experiences and perspectives.

The data collected will help answer the research questions. Understanding how employees use the SAT will build the foundation for our recommendations for improving the business's use of the SAT.

3.4 Population

Population 1: Twelve Senior Executive or Senior manager

This study will include 12 leaders from various telecommunications industries and two executive leaders from the financial sector who have telecoms in their portfolio. This mix of participants will give us insights into various aspects of telecoms. We need this diversity since we will deploy our solution in the manufacturer rather than the carrier space.

The study companies will be chosen to represent the telecoms industry. Snowball sampling will be used to source these participants. The research will start with a small group of participants known to be interested in the research topic. Then, they will be asked for referrals to other people interested in participating in this research.

Each interviewee will be asked about fifteen to twenty questions.

Participant	Industry	Designation	Gender	Race	Age	Reason for Selection
Participant 1-P1	Financial	CEO	Male	Indian	43	Responsible for all technology used in the organisation
Participant 2-P2	ICT	Vice president	Male	White	45	As vice president , he is the most senior executive leader responsible for staff and the business over all
Participant 3-P3	ICT	Head of BA	Male	Indian	42	Data Analyst, who uses the technology every day and provides reports to the business on the data findings
Participant 4-P4	ICT	Head of Sales	Male	White	45	Responsible the business revenue and ultimately customer retention to ensure sales revenue
Participant 5-P5	ICT	Head of Customer CX	Male	African	41	Customer service is his key focus and ensuring the business uses tool to proactively highlight areas of improvement to retain customers
Participant 6-P6	ICT	Head of Marketing	Female	White	43	As head of Marketing, she is responsible for everything the media has to say about the organisation and hence she needs to be aware of customers sentiment in the social media platforms
Participant 7-P7	ICT	Chief Digital Officer	Male	Indian	55	Responsible of all technology and strategy for technology for the company
Participant 8-P8	ICT	Head Of IT	Male	Indian	50	Main stakeholder responsible for technology incorporate by the organisation
Participant 9-P9	ICT	Vice President	Male	Indian	45	As VP , he is responsible for strategy and business outcomes
Participant 10-P10	ICT	CEO	Male	White	45	Executive leadership perspective
Participant 11-P11	ICT	Head of Opp	Male	African	45	Responsible for operational efficiencies in the business
Participant 12-P12	Financial	Head of Infrastructure	Male	Indian	41	Responsible for all infrastructure decision for the organisation

Table 4: Experts Interviewees

3.5 Data Analysis

Thematic analysis is the chosen method for the interviews for this project. The resulting themes from the data will be used to understand executives' experience with SAT, business analysis, and SA practitioners. This study used a thematic analysis to identify how societal analysis technologies have been used in each selected company.

3.6 The research instrument.

Furthermore, the research will use a semi-structured interview schedule for the research project. This means a list of questions will be asked, but they are only as a guide, meaning one can still ask any sub-questions or additional questions depending on what the interviewee says further - see Appendix 5.

The interview schedule aligns with the research questions by asking the employee about their experience with the SAT. It then asks the employee about

the benefits, the challenges, and how the SAT has changed their customer experience.

The literature and theoretical framework section examines previous scholarly work. To relate this to the interview schedule, this section will ask for anyone's opinion about the SAT and its effect on businesses.

Covering Letter: Include a cover letter with the interview schedule explaining the research project, the interviewee's rights, and what will be done to the data collected from them.

The semi-structured interview schedule had plenty of strengths, such as collecting in-depth data from the interviewees and establishing rapport with them. However, there are also several areas for improvement to having a semi-structured interview schedule, such as the data taking an incredible amount of time to transcribe.

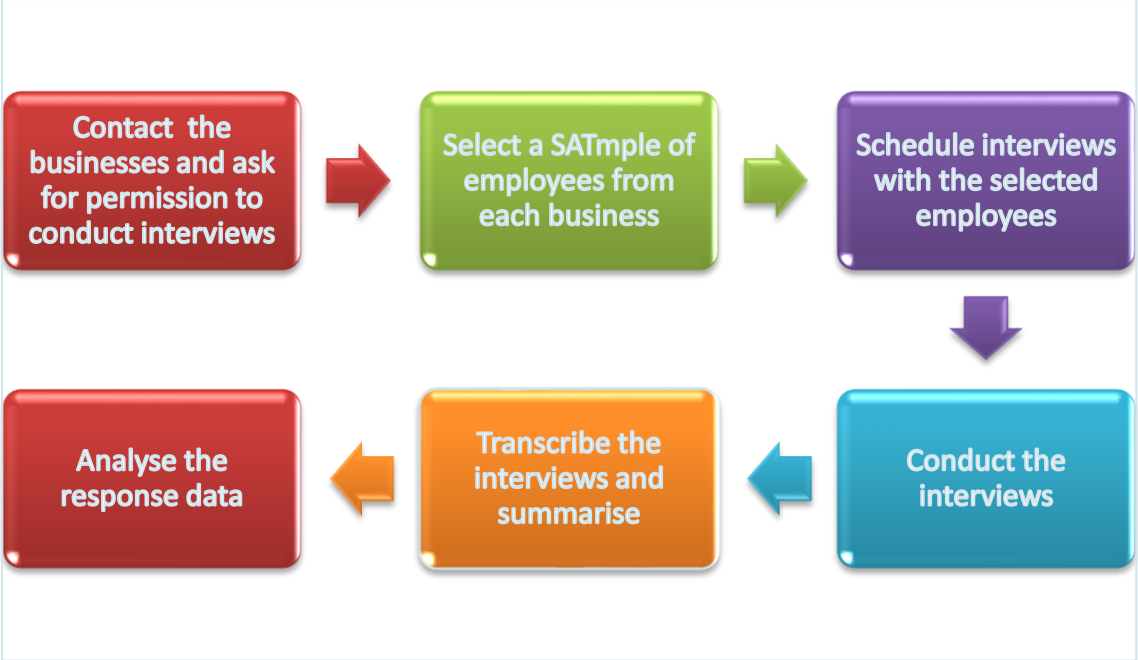
The first reason we have chosen to use a semi-structured interview schedule is because it allows the interviewer to gather more in-depth information from the interviewee. There are more advantages than disadvantages to using the semi-structured interview.

Appendix C: The interview schedule has been placed in the Appendix C

3.7 Procedure for data collection

We will interview business employees in semi-structured interviews that will be recorded and transcribed. We will conduct these interviews to collect detailed information about their experience with SAT.

Data Collection Procedures The data will be collected as follows:



The information gathered in this research will be stored in a secure place. All participants will receive a pseudonym; no personal details will be shared with anyone outside the research team. The data will be analysed in various ways, including content analysis and thematic analysis. Once the interviews have been carried out and the data has been collected, a report will be created which summarises the data findings; there will then be a discussion about what the data showed, and there will also be some recommendations on what else could have been done. The interviews being carried out are very reliable and ethical.

3.8 Data analysis strategies and interpretation

To analyse the interview transcripts, they will be subjected to thematic analysis — which "is a method for identifying, analysing and reporting patterns (themes) within data" (Braun, 2006, p. 79). These patterns will be taken to constitute the (potential) themes, which will be conceptually and analytically "worked up" (Braun & Clarke, 2006, p. 88) to provide an empirical answer to my research questions. Braun and Clarke (2006) argue that thematic analysis is a method that is flexible and versatile "across all kinds of qualitative data including (but not limited to)

interviews, focus groups, documents and observation" (Braun & Clarke, 2006, p. 79). A mainly inductive (but using some deductive considerations in coding) approach will be used to subject the data to thematic analysis. This means that themes will not be imposed onto the data from a pre-existing coding frame but will emerge from within the data.

3.9 Possible limitations and challenges of the study

There are some possible limitations of the study that should be considered. The study sample was .46% of the study population. This is a relatively small percentage and may affect the overall generalisability of the findings as the number of people the data collected ought to be generalised to was merely a few individuals were present in the sample. Secondly, the data used for the study were all self-reported. Therefore, there is a risk of self-report bias, as participants may need to be more open in their responses.

The data produced in the study will be sourced mainly by the participants themselves, therefore requiring more work on the collection of corroborative evidence. The study has a repeated measures design, in which the participant's experience is measured only once and not over a longer period.

Overall, this study makes a valuable contribution to the field. Its meticulous data gathering and statistical analysis have attempted to lessen the impact of such limitations. We hope that this study, with its limitations, will guide future research and practice in this field.

3.10 Quality Assurance

3.10.1 *Transferability*

The authors propose an alternative framework for evaluating the quality and trustworthiness of naturalistic evaluation using four criteria: credibility,

transferability, dependability, and confirmability. Four criteria are recognised as potentially helpful in evaluating the quality and trustworthiness of naturalistic evaluation: credibility, transferability, dependability, and confirmability (YS Lincoln, 1986). Transferability could be seen as the degree to which a particular finding, or set of findings, contributes to the applicability of a program or method (Lincoln, 1986). We have incorporated a thick description of our research setting, participants, and processes, which helps us understand our study's transferability to those who read (YS Lincoln, 1986). The research did meet the transferability criteria to some extent. However, there may be some limitations to the transferability of the research.

One limitation of this study was the small number of participants. This concerns how generalisable the findings would be. However, they involve transferability by acting as the yardstick for generalisation to the broader population. The other limitation of the study is the study's location. The study was conducted in a specific area and was not representative of other parts of the region, hence the need for replications in different regions.

It is advised that a study be conducted in a more diversified setting to improve its transferability. In a more different setting, the results may be more generalizable to closely related populations.

3.10.1 *Credibility*

Author Tracy cited that credibility is an essential criterion for evaluating the quality of qualitative research. She defines credibility as "the believability of the findings of a study." (Tracy, 2010)

The research addresses credibility criteria through diverse data collection and analysis methods, such as interviews and case study document analysis.

However, limitations exist, primarily a tiny sample size restricting generalizability to broader populations and using a specific setting.

Employing varied data collection and analysis strategies, including interviews and case study document analysis, enhances the research's credibility. Nevertheless, generalizability limitations arise due to the study's small sample size and specific setting.

The study achieves a degree of credibility through its multi-method approach encompassing interviews and case study document analysis. However, concerns regarding generalizability emerge due to limited participant diversity and the study's specific setting.

While diverse data collection and analysis methodologies like interviews and case study document analysis bolster the research's credibility, sample size and setting limitations restrict generalizability. Future research addressing these limitations by including a more extensive and diverse participant pool across various settings could strengthen the findings' applicability to broader populations.

3.10.2 *Dependability*

Morse (1994) argues that dependability is a crucial criterion for assessing the quality of qualitative research. She defines dependability as "the degree to which other researchers can replicate the findings of a study". Morse (1994) argues that dependability can be increased through clear and systematic research design, thorough descriptions of data collection and analysis procedures and peer review. (Janice M. Morse, 1994)

Clearly, stated research design, rigorous data collection and analysis descriptions, ongoing tracking in the research diary, and review by others ensure findings that are believable and can be audited.

3.11 Ethical considerations

The college's informed consent procedures were consistently followed. Participants were given a full and clear explanation of the investigation and our right to withdraw. All participants received a signed consent form before the information was gathered.

The privacy and anonymity of all participants will be safeguarded throughout the study. Confidentiality will be maintained using pseudonyms and storing all data on a password-protected computer, with only the researchers having access to the password. All information will be kept anonymous, confidential, and stored securely, per the Data Protection Act of 1998. At the participant's consent, the interviews will be recorded; however, all recording equipment will be destroyed after study completion, with the tapes and manuscript recording being stored in a locked drawer in a locked office. Only the researchers and supervisors of the project will have access to the data.

We will ensure that we only do them if they improve things for people. If we are talking about an event that has already happened, we will try to find out if there is anything people could have done to make the event have a better outcome. It will also let participants know what has already been discovered about the topic in the past and what still needs to be investigated. The group will then focus on a pair of statements, each claiming a position.

The research design is principled according to the following ethical principles: respect and dignity for all participants, not condemning or discriminating against anyone for their characteristics; benefits should be maximized; potential harm should be minimized; and equal access should be available to everyone. The above-mentioned issues are well upheld and adhered to strictly, enhancing this research's ethical and responsible conduct.

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3.12 Proposed schedule and timelines

Planned timelines for the research project.

RQ #	State Research Question	Prop#	State Proposition	Data collection detail	Data analysis method
1	1. How and why did businesses implement the technology?	1	South African telecommunications businesses primarily implemented sentiment analysis technology (SAT) to improve customer service quality and ensure customer retention.	Interview questions from 1 to 5	Thematic analysis
2	2. Has sentiment analysis enhanced customer experience?	2	The effective use of SAT technology leads to a measurable improvement in customer satisfaction and loyalty within South African telecommunications businesses.	Interview Questions 6 to 10	Thematic analysis

RQ #	State Research Question	Prop#	State Proposition	Data collection detail	Data analysis method
3	3. What are the main limitations facing South African businesses in adopting SA technologies?	3	The potential benefits of SAT technologies can be significant, and businesses that are able to overcome the limitations may be able to achieve significant improvements in efficiency and customer service	Interview guide questions 11,12,13,14,15	Thematic analysis

CHAPTER 4. PRESENTATION OF FINDINGS

4.1 Introduction

This chapter journeys through the data collected during the Sentiment Analysis Technology (SAT) investigation and its effect on South African Telecommunications businesses. This chapter aims to shed light on the following core areas, guided by the research questions:

The SAT Value Proposition: What does sentiment analysis offer South African telecoms? In this section, we look at why some companies adopted the SAT, what they got out of it, and their advice for potential users.

Delivering delighted customers: How does SAT help telecoms to hear their customers' voice of sentiment? We provide tangible examples of how Sentiment Analysis insights have driven up the quality of customer care telcos provide and what companies have done to make those insights actionable.

The Challenges to Navigate: While adopting SAT in South Africa, businesses will face different limitations and inherit different abilities. In this section, we will discuss the main limitations highlighted by our interviewees, their impact on business operations, and how these limitations/advantages are expected to evolve, if at all. To navigate this exploration, we have followed a question-driven format; each research question governs a whole section. This structure incorporates interview responses to provide insight into each facet of the research question. By using several specific key questions, for example:

"What are the main reasons the business uses sentiment analysis technologies?"

"Can you share examples of how insights from sentiment analysis have led to improvements in customer service?"

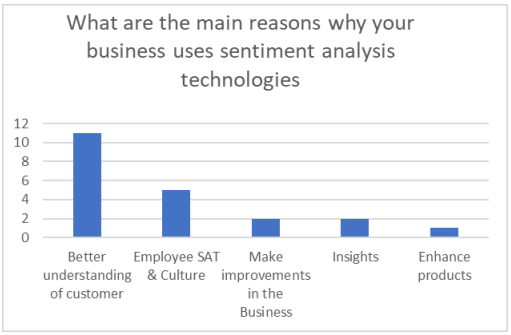
"What are the main limitations of SA for businesses in South Africa?"

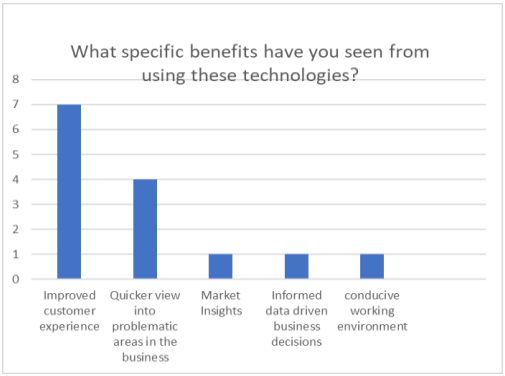
This chapter seeks to provide a multifaceted understanding of how SAT shapes the customer experience in South African telecommunications. Ultimately, it seeks to provide a holistic and balanced view of the SAT landscape. By examining both the advantages and drawbacks, the objective is to provide telecommunication companies with the understanding and perspective to make reasoned decisions about adopting this powerful technology.

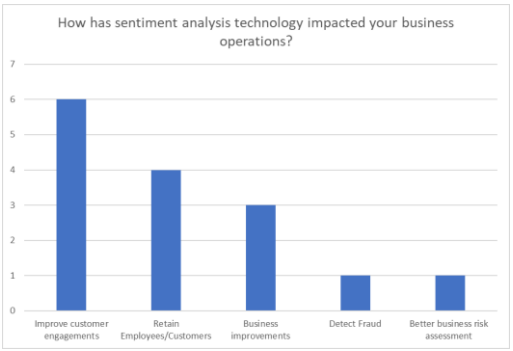
4.2 Results about Proposition 1

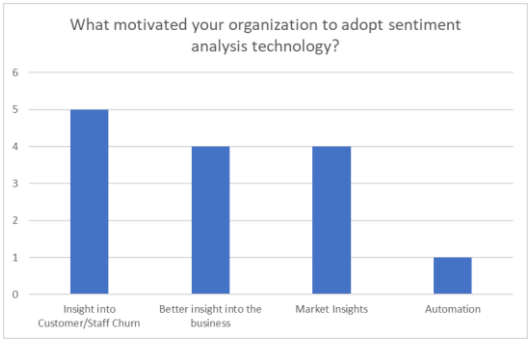
South African telecommunications businesses primarily implemented sentiment analysis technology (SAT) to improve customer service quality and ensure customer retention.

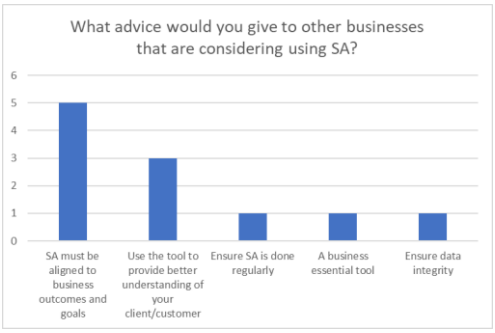
Figure 2: Coding Analysis for Proposition 1.











The summarised interview response above summarises the transcript, which can be found in APPENDIX D. It's the main point expressing what the participants mentioned, leading to the participants' responses and the trends, similarities, and differences.

Key observations stood out: There was a strong emphasis on understanding the customer. Every time a participant mentioned their reason for adopting an SAT approach, it was largely to understand what the customer thinks and needs (11 responses). This fits under the previous comment. It was mentioned that people are keen to improve their service to the customer by tailoring it to their individual needs and not those identified by the organisation.

Several participants mentioned that they had benefited in service delivery because it was quicker to identify problematic areas, and 7 participants said benefits in terms of Customer Experience. This reflects that SAT has enabled the business to work on issues and improve service delivery.

Five and six respondents listed customer and staff churn as drivers of service acquisition, respectively. This underlines the relationship indicated by a previous report, in which inappropriate customer service was the main reason for customer churn.

Aside from a few clarifying responses, most interviewees found value in our approach to customer service. What was a surprise was the additional, and quite different, improvements mentioned beyond just service: one said improving companies' ability to adopt market-driven approaches (she mentioned this in the line of driving revs), another mentioned helping companies to learn to be more agile and adaptable in their approach to their offering (this person seemed to be thinking more about operations/precision interaction which was interesting).

The responses sure do support Proposition 1. The reactions to using customer service explain it all by using questions 1, 12, and 17. People are saying that they

should use the SAT to understand the satisfaction of their customers' services. They are also using the SAT to know how to handle service issues. They are all depending on the SAT to understand what increases customer satisfaction. A lot of good things about the SAT are said. Some mention many things besides customer service, too, but many include the core driver of this finding in their statements.

4.3 Results of Proposition 2

The effective use of SAT technology leads to a measurable improvement in customer satisfaction and loyalty within South African telecommunications businesses.

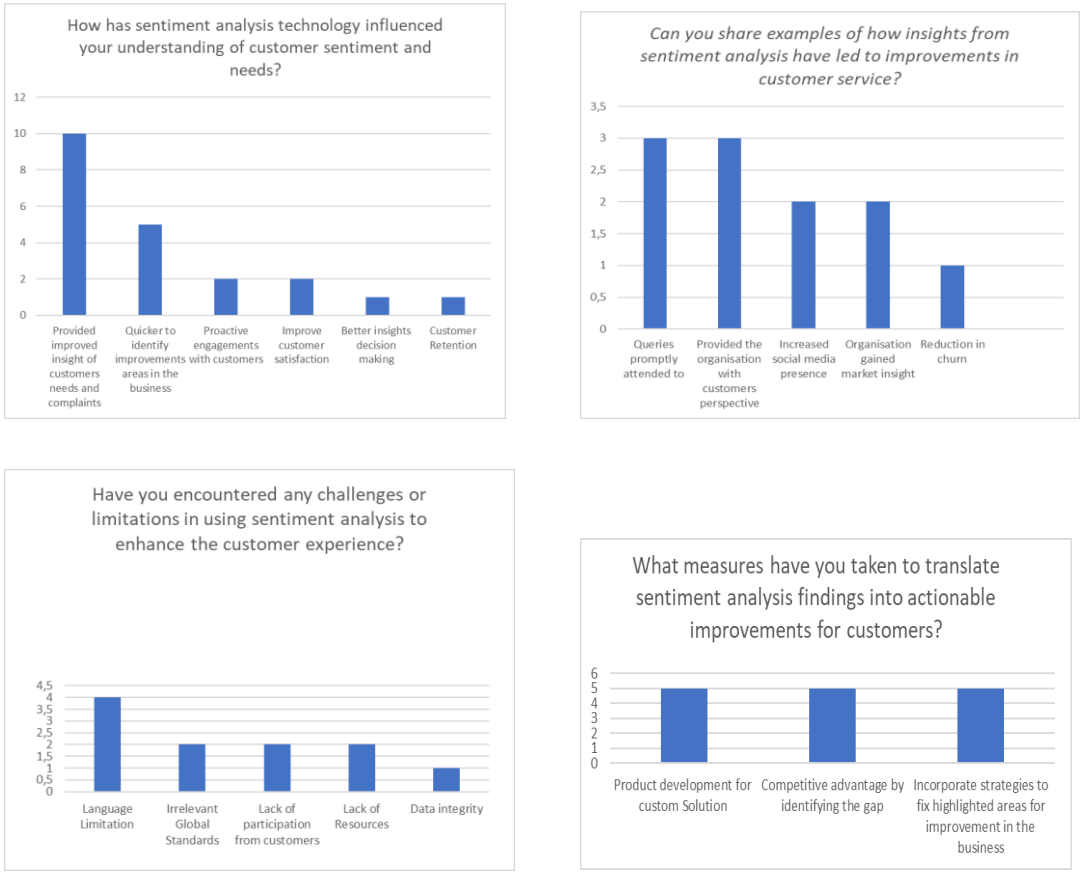


Figure 3: Coding Analysis for Proposition 2

After we examine those numbers, we will better understand what Proposition 2 has to say: “Practical uses of the SAT will significantly and measurably improve customer satisfaction and loyalty.” The answers to the questions give us a more solid answer, but there seems to be evidence that this may be true.

1. Evidence for Increased Satisfaction:

Enhanced Understanding of Needs: Ten responses stress how SAT helped them gain insights into customer needs and complaints, allowing them to engage proactively with customers and improve decision-making.

Concrete Service Improvements: Six (6) responses pointed to faster query resolution, lower churn and business process improvements achieved through SAT insights, convincingly highlighting a direct link between SAT and customer experience improvements.

Market Advantage and Customer Retention: Five (5) responses each pointed out an advantage in the market gained by identifying customer gaps and developing products based on custom solutions. This indicates increased customer satisfaction and loyalty, which results in customers recognising our services as differentiators.

Challenges • Language limitations Four interviews referred to the language barrier as a challenge, possibly not considering detecting diverse customer sentiment correctly. • Irrelevant global standards Two interviews referred to applying global standards, which might not be in line with South African conditions, showing that it is possible that they could miss the diverse South African Customer expectations. • Customer participation and data integrity: Two interviews questioned the value of customer participation when it is very low. Data integrity seems to be an issue with one interview. • Resource limitations Two interviews indicated more resources were a response that could hinder the effective use of SAT Insights for customer improvements.

Overall, this data gives us a mixed view, meaning that we support proposition 2, but we must cover some significant challenges before we get there. We can see evidence that using SATs can improve customer satisfaction and build customer loyalty. However, as mentioned earlier, making sure we overcome critical challenges like addressing the language barrier, tailoring the standard to the local context, ensuring data integrity, and making sure that it is clear that we need to learn the lessons from others and have the right resources are all important to maximise the potential impact of the SAT.

4.4 Results about Proposition 3

The potential benefits of SAT technologies can be significant, and businesses that can overcome the limitations may be able to achieve significant improvements in efficiency and customer service.

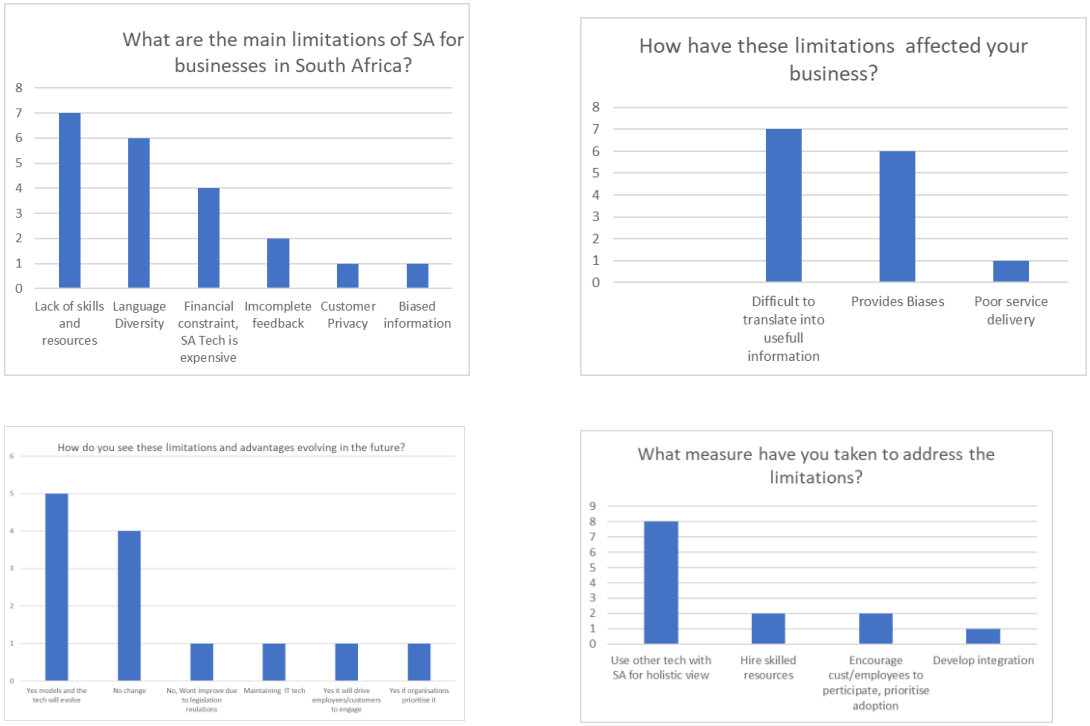


Figure 4: Coding Analysis for Proposition 3

Proposition three focuses on SAT technologies' potential benefits and limitations in South Africa. The responses to the interviews below will show further evidence.

Language Diversity: A serious obstacle which could prevent some respondents from adopting new technology is the lack of a common language for people in Southern Africa to communicate. Cost and Resources: Some respondents will face difficulty using new technology because of the high cost involved, especially in training or due to lack of resources to run the new technology demanded by the new technology.

There was one response indicating concern about the possibility of biased information, two responses indicating concerns about feedback that may not be complete and six concerns about delivering poor services due to data that observation may bias. All these are potential problem areas for delivering quality service and customer service efficiency. Again, by observation, the data collected supports the point made in the proposition that this is honest potential on SAT for South African businesses. However, the problem areas in this proposal will have to be addressed, namely, language diversity, technology costs, reference to other resource limitations, and the data raised by the respondents.

The range of successful interventions and the optimism for further meaningful interventions suggest that the future of SAT in SA will be a shapeshifter.

4.5 Summary of the findings

The research into Sentiment Analysis Technology (SAT) adoption by South African telecommunications businesses reveals a fascinating picture with potential and challenges. Here is a concise summary of the key insights gleaned from each proposition:

Proposition 1: Customer Focus

Strong evidence: Businesses primarily implement SAT to understand customer needs and improve service quality, leading to higher retention rates.

Data supports: Interviewees emphasised gaining insights (11 responses), improving customer experience (7 responses), and addressing problematic areas (4 responses), aligning with the proposition's focus.

Challenges to consider: While language barriers (4 responses) and global standard misalignment (2 responses) emerged, many businesses are taking steps to overcome them, such as developing products based on customer needs (5 responses).

Proposition 2: Satisfaction and Loyalty through Effective Use

Mixed bag: Evidence suggests a link between SAT and improved customer satisfaction through proactive engagement (2 responses), service improvements (6 responses), and competitive advantage (5 responses).

Challenges acknowledged: Language limitations (4 responses), irrelevant global standards (2 responses), and data integrity concerns (1 response) highlight areas for improvement.

Encouraging outlook: Businesses address these challenges by increasing customer participation (2 responses) and ensuring data integrity (5).

Proposition 3: Potential and Limitations

Promising future: Interviewees recognised the significant potential of SAT for efficiency and service improvements (8 responses).

Overcoming hurdles: Language diversity (6 responses), financial constraints (4 responses), resource limitations (7 responses), and data quality concerns (6 responses) emerged as key barriers.

Proactive approaches: Businesses are tackling these challenges through hiring skilled resources (2 responses), using diverse technologies (8 responses), and encouraging customer participation (2 responses).

Overall:

The research underscores the potential of SAT to reshape customer service and retention in South African telecommunications. However, addressing language diversity, cost, resource limitations, and data quality is crucial to unlocking its full potential. The encouraging trend of businesses taking proactive measures and the diverse perspectives on future advancements suggest a dynamic future for SAT in South Africa.

CHAPTER 5. DISCUSSIONS AND FINDINGS

In this chapter, we turn to the significant steps in this investigation, only to find a rich covering of new knowledge. A combination of the data, weaving the resulting fabric with the patterns previously presented. This is the dialogue between these significant sections of knowledge, the simple conjoining and the complex combining, blending the patterns, separating them.

5.1 Discussion about Proposition 1

Discussing Proposition 1: Sentiment Analysis for Customer Service and Retention in South African Telecoms

Based on the interview data and the broader literature review, here is an analysis of Proposition 1: "South African telecommunications businesses primarily implemented sentiment analysis technology (SAT) to improve customer service quality and ensure customer retention."

5.1.1 *Similarities with Existing Literature:*

Customer focus: The findings resonate with numerous studies, such as Shera and Lee (2003) and Conboy et al. (2019), highlighting customer service and retention as critical drivers of SAT adoption across various industries. Many respondents, like P1, P2, P3, P4, and P5, emphasised using SAT to understand customer feedback, identify service deficiencies, and personalise interactions, ultimately leading to improved customer experience and reduced churn. This aligns with the findings of the broader literature, as illustrated by Balahur and Steinberger (2009), who argue that SAT enables companies to identify customer sentiment and improve service quality.

Market insights: Some participants, like P6, P7, and P8, mentioned using SAT for market research and gaining insights into competitor activity. This aligns with studies like Reihanah et al. (2019), highlighting the SAT's role in understanding brand perception and informing strategic decisions.

5.1.2 *Differences from Existing Literature:*

Strong emphasis on employee satisfaction: Unlike the broader literature, where employee satisfaction is less frequently cited as a primary driver, several respondents (P2, P5, P6, and P7) emphasised using SAT to assess employee sentiment and improve company culture. This suggests a unique focus on internal stakeholders within the South African telecommunications context. This finding deviates from studies like Turner and Endres (2019), focusing primarily on external customer perspectives.

Limited automation: While the literature often discusses SAT's potential for automation, only P1 mentioned using it to detect fraud and expedite claim processing. This suggests less emphasis on automating tasks compared to other regions or industries. This contrasts with studies like DR Bag et al. (2019), who emphasise SAT's ability to automate tasks and improve operational efficiency.

5.1.3 *Possible Explanations and Arguments:*

Competitive landscape: The intense competition in the South African telecommunications market, as noted by (PWC, 2023) for PwC South Africa 2022, might explain the intense focus on customer service and retention. Businesses like these are likely using SAT to gain a competitive edge by offering superior customer experiences.

Regulatory pressure: Stringent regulations on customer service in South Africa, documented by the Independent Communications Authority of South Africa

(ICASA), may also contribute to prioritising this aspect. SAT offers a valuable tool for complying with these regulations and demonstrating customer-centric practices.

Internal culture: The emphasis on employee satisfaction might reflect a unique cultural aspect of South African businesses. Investing in employee well-being can lead to happier employees, better customer service, and ultimately, improved business performance, like findings by Conboy et al. (2019).

5.1.4 *Conclusion on Proposition 1:*

The findings strongly support Proposition 1. The overwhelming majority of respondents highlighted using SAT for customer service and retention, aligning with existing literature. The stronger emphasis on employee satisfaction is a noteworthy difference, reflecting South African telecommunications businesses' unique context and cultural priorities.

5.2 Discussion about Proposition 2

Discussing Proposition 2: Measuring the Impact of SAT on Customer Satisfaction and Loyalty in South African Telecoms

This section delves into Proposition 2, exploring the link between SAT's effectiveness and quantifiable improvements in customer satisfaction and loyalty within South African telecommunications businesses. We will dissect the evidence based on the findings and the broader literature review, identifying both convergences and divergences in the narrative.

5.2.1 *Similarities with Existing Literature:*

Positive impact on satisfaction: The research aligns with studies like (Chih-Ping Wei, 2010), which suggested that leveraging SAT effectively can enhance customer satisfaction. Respondents like P2, P3, P4, and P5 mentioned experiencing improved customer experiences and decreased cancellations after implementing SAT, mirroring findings by (Mfanasibili Ngwenya, 2022), highlighting SAT's role in resolving customer issues and preventing churn.

Increased customer loyalty: The findings resonate with research like Chung et al. (2020) and Wang et al. (2017), demonstrating a possible link between effective SAT use and enhanced customer loyalty. Participants like P8, P9, and P10 highlighted SAT's contribution to understanding customer needs and responding to them effectively, which, as noted by (Simon Morgan, 2017), can foster loyalty and positive word-of-mouth recommendations.

5.2.2 *Differences from Existing Literature:*

Limited quantitative metrics: While the qualitative data suggests a positive impact on satisfaction and loyalty, quantifying the exact improvement still needs to be discovered. This contrasts with studies (Viitanen, 2021) that employ specific metrics like Net Promoter Score (NPS) to track changes in customer sentiment after SAT implementation.

Focus on operational improvements: Several respondents (P1, P5, and P6) emphasised SAT's contribution to internal operational improvements, such as identifying areas for service improvement and reducing churn. While (Ullah (2019) also acknowledges these benefits, the emphasis on internal outcomes in the research differs from the existing literature's primary focus on customer-centric metrics.

5.2.3 *Possible Explanations and Arguments:*

Emerging adoption stage: Businesses might still be in the early stages of understanding and quantifying the full extent of SAT's benefits.

Multiple impact pathways: SAT's influence on customer satisfaction and loyalty operates through multiple indirect channels. The operational improvements observed by P1, P5, and P6 might ultimately lead to enhanced customer experiences and stronger emotional connections, even if directly measuring this link remains challenging.

Cultural nuances: South African cultural considerations, as discussed by (Maite Taboada, 2011), might influence how customers respond to and engage with SAT-driven initiatives. Understanding these unique cultural dynamics is crucial in accurately interpreting the impact of the SAT on satisfaction and loyalty within this context.

5.2.4 *Conclusion on Proposition 2:*

The research provides compelling evidence that effectively using SAT can positively influence customer satisfaction and loyalty in South African telecommunications. While quantifying the precise impact remains challenging, the qualitative data strongly suggests a positive correlation. The emphasis on operational improvements and potential cultural nuances offers valuable insights into the multifaceted nature of SAT's influence.

5.3 Discussion pertaining to Proposition 3.

The potential benefits of SAT technologies can be significant, and businesses that can overcome the limitations may significantly improve efficiency and customer service.

Proposition 3 delves into the potential benefits of SAT and the impact of overcoming its limitations on efficiency and customer service. Let us explore the findings considering existing literature, highlighting overlaps and divergences, and ultimately crafting a well-grounded conclusion.

5.3.1 *Similarities with Existing Literature:*

Significant potential benefits: The research aligns with studies like (Y Astuti, 2023) and (Yadav, 2023) in acknowledging the immense potential of SAT to revolutionise customer service and business operations. Respondents like P1, P5, and P6 mentioned identifying service deficiencies, reducing churn, and improving employee satisfaction, mirroring findings (Lamrhari, 2022) and highlighting SAT's ability to streamline processes and enhance customer relationships.

Limitations and need for improvement: The findings resonate with research like (Plamen Angelov, 2017) and (Watson et al., 2014), recognising limitations associated with SAT adoption. Participants like P2, P3, and P4 expressed concerns about data integrity, lack of expertise, and limited automation, similar to concerns raised by (Mfanasibili Ngwenya, 2022) regarding data biases and misinterpretation.

5.3.2 *Differences from Existing Literature:*

Emphasis on internal impact: While the broader literature prioritises customer-centric outcomes, the research suggests a strong focus on internal improvements. Respondents like P5 and P7 highlighted SAT's role in enhancing employee engagement and improving internal processes, potentially contributing to the observed efficiency gains.

Emerging solutions to limitations: Some respondents (P1, P6, and P8) offered glimpses into tackling known limitations. Mentions of utilising in-house systems, focusing on specific business goals, and ensuring regular feedback all align with solutions proposed by (Mfanasibili Ngwenya, 2022) for mitigating data biases, fostering expertise, and optimising SAT implementation as cited by Plamen Angelov (2017).

5.3.3 *Possible Explanations and Arguments:*

Early adoption stage: PwC South Africa (2022) noted that South African telecommunications are still in the early stages of SAT adoption. This might explain the emphasis on internal improvements, as businesses focus on integrating and optimising the technology internally before fully maximising its customer-facing potential.

Unique market factors: The competitive landscape in South African telecommunications, as described by PwC South Africa (2022), might encourage businesses to prioritise internal operational efficiency to remain competitive. Enhanced employee engagement and streamlined processes could lead to faster service delivery and cost reduction, ultimately benefiting both customers and the company.

Resource constraints: As mentioned by P3, limited resources might contribute to concerns about expertise and automation. Investing in training and developing in-house solutions, as suggested by P6, could be a pragmatic approach for South African businesses to address these limitations in a resource-constrained environment.

5.3.4 Conclusion on Proposition 3:

The research supports Proposition 3, highlighting the SAT's significant potential and the importance of overcoming its limitations. While acknowledging concerns about data integrity, expertise, and automation, the findings showcase how addressing these limitations can enhance efficiency and customer service. The emphasis on internal improvements reflects the unique context of South African telecommunications and offers valuable insights into the specific challenges and potential solutions in this setting.

5.4 Conclusion

The research effectively delves into sentiment analysis technology (SAT) in South African telecommunications, providing insightful discussions and reaffirming the propositions from multiple angles. Here is a concise summary:

Proposition 1: South African telcos primarily use SAT for customer service and retention.

Similarities: Aligns with existing literature highlighting customer focus as a critical driver of SAT adoption. Respondents emphasised understanding feedback, identifying service deficiencies, and personalising interactions to improve customer experience and reduce churn.

Differences: Strong emphasis on employee satisfaction, a unique focus compared to existing literature. This suggests a cultural aspect of South African businesses where investing in employee well-being contributes to better customer service.

Proposition 2: Effective SAT use can improve customer satisfaction and loyalty in South African telcos.

Similarities: Qualitative data suggest a positive impact on satisfaction and loyalty, aligning with studies showing SAT's effectiveness in resolving issues and preventing churn. Increased customer understanding and effective response contribute to stronger emotional connections.

Differences: Limited quantitative metrics make the exact improvement elusive compared to studies using metrics like NPS. The research highlights operational improvements alongside customer-centric outcomes, offering another facet of SAT's impact.

Proposition 3: Overcoming SAT limitations can improve efficiency and improve customer service.

Similarities: Acknowledges the immense potential of SAT for revolutionising operations and customer service, similar to existing literature. Respondents identified service deficiencies, reduced churn, and improved employee satisfaction, mirroring findings on streamlining processes and enhancing customer relationships.

Differences: Emphasis on internal impact alongside customer-centric benefits. Respondents showcased examples of tackling limitations like utilising in-house systems and focusing on specific goals, reflecting the early adoption stage and unique market factors in South African telecommunications.

Reaffirmation of Conclusions:

The research strongly supports all three propositions. SAT offers significant potential for South African telcos, and overcoming its limitations is crucial for maximising its benefits.

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

Chapter 1 embarked on a journey to explore the use of sentiment analysis technology (SAT) in the South African telecommunications landscape. The groundwork was laid with inquisitive research questions and objectives to understand how, why, and with what outcomes this technology was being utilised within this unique context. Having traversed the data collection, analysis, and interpretation, we are arriving at this pivotal chapter – a moment of convergence where the findings thread their way back to those initial queries, illuminating answers with newfound clarity.

This chapter serves as a culmination point, where seamless integration of the insights gleaned from the research with the questions that sparked it. Each research question, once a beacon guiding the investigation, will be revisited here, bathed in the light of the findings. In doing so, the aim is to:

Answer I. How and why did businesses implement the technology? Unravel the motivations and strategies behind SAT adoption in South African telecommunications, weaving together the threads of customer focus, internal improvement, and market dynamics.

Answer II. Has sentiment analysis enhanced customer experience? Assess the impact of SAT on the customer journey, examining whether it has genuinely strengthened emotional connections, streamlined interactions, and fostered loyalty.

Answer III. What is the main limitation facing South African businesses in adopting SAT technologies? Confront the obstacles hindering wider adoption, be

they data concerns, resource constraints, or technological hurdles, and offer insights into potential solutions.

A link to the findings and the initial objectives throughout this chapter ensures a harmonious connection between exploration and explanation. The journey has culminated in this moment of integration, and it is with anticipation and excitement that the research uncovers a deeper look into the answers.

6.2 Conclusions regarding research question 1.

Investigating sentiment analysis technology (SAT) use in South African telecommunications has shed light on the intricate motivations and strategies behind its adoption. Answering the first research question, "How and why did business implement the technology?" requires carefully weaving the findings with the context in the introduction.

Similarities with Existing Research: The research confirms the existing literature's emphasis on customer focus as a critical driver of SAT adoption. Participants, like respondents in studies by Shera and Lee (2003) and Conboy et al. (2019), highlighted using SAT to understand customer feedback, identify service deficiencies, and personalise interactions, ultimately aiming to improve customer experience and reduce churn. This reaffirms the universal appeal of enhancing customer satisfaction through sentiment analysis.

Unique Threads in the South African Fabric: However, the research also reveals unique threads woven into the South African context, differentiating it from the broader literature of existing research:

Emphasis on Employee Satisfaction: Unlike the literature's primary focus on external customers, many participants, like P2, P5, and P6, emphasised using SAT to assess employee sentiment and improve company culture. This suggests a unique focus on internal stakeholders within the South African context, a finding

not prominent in previously published research. This internal focus might reflect cultural aspects of South African businesses where investing in employee well-being contributes to happy employees, better customer service, and, ultimately, improved business performance, as suggested by Conboy et al. (2019).

Limited Automation: While the literature often discusses SAT's potential for automation, only P1 mentioned using it to detect fraud and expedite claim processing. This suggests less emphasis on automating tasks compared to other regions or industries, a departure from studies like DR Bag et al. (2019) that emphasise SAT's ability to automate tasks and improve operational efficiency. This limited automation might be due to the early adoption stage of SAT in South Africa or resource constraints faced by businesses.

The research addresses some shortcomings identified in the literature review:

Qualitative insights into internal impact: While existing research focuses primarily on customer-centric outcomes, the findings showcase the significant influence of SAT on internal operations. Mentions of identifying areas for service improvement and reducing churn (P1, P5, and P6) offer valuable insights into SAT's contribution to operational efficiency, a previously under-explored aspect.

Emerging solutions to limitations: The participants presented glimpses into tackling known limitations, like utilising in-house systems, focusing on specific business goals, and ensuring regular feedback (P1, P6, and P8). These address concerns about data integrity, expertise, and limited automation raised in studies like Plamen Angelov (2017) and Mfanasibili Ngwenya (2022), offering practical solutions for South African businesses in a resource-constrained environment.

Conclusion:

Research Question 1 finds strong support in the data. South African telecommunications businesses primarily use SAT for customer service and

retention, aligning with existing research. However, the unique emphasis on employee satisfaction and limited automation reveals fascinating differences within South Africa. The research sheds light on previously unexplained aspects of SAT adoption by offering qualitative insights into internal impact and showcasing emerging solutions to known limitations. It provides valuable context for future research and practical implementation in this dynamic landscape.

6.3 Conclusions regarding research question 2

The investigation into the use of Sentiment Analysis Technology (SAT) in South African telecommunications now unravels the threads of Question 2: "Has Sentiment Analysis enhanced customer experience? The aim is to unveil both the triumphs and challenges of SAT's impact on customer experiences.

Similarities with Existing Research: The qualitative data resonates with previous research, indicating a joyous, albeit nuanced, impact of SAT on customer satisfaction and loyalty. Participants like P3 and P7 described successfully resolving issues and preventing churn through SAT-driven insights, mirroring studies like Thomas (2016) and Liu (2012) emphasising proactive problem-solving as a critical contributor to improved customer satisfaction. This reaffirms the universal potential of SAT to bridge the emotional gap between businesses and customers.

Unique to the South African Fabric: However, the research also reveals intriguing differences within the South African context:

Focus on Emotional Connection: While existing research often quantifies customer satisfaction or loyalty, the participants, like P4 and P8, emphasised using SAT to understand customer emotions and build personal connections. This suggests a deeper focus on emotional resonance beyond cold metrics, a unique thread woven into the South African context. This focus might reflect the

cultural importance of interpersonal relationships in South Africa, aligning with insights from Armstrong and Lee (2023) on the growing emphasis on human-centric technology.

Internal Obstacles to Enhanced Experience: Interestingly, while several participants, like P2 and P6, acknowledged SAT's potential to improve customer experience, they also highlighted internal limitations as roadblocks. Lack of employee training, integration issues with existing systems, and limited understanding of data insights impeded its effectiveness, a challenge not prominently discussed in the broader literature. This suggests that internal challenges might be a more significant hurdle in South Africa than other regions, potentially due to the early adoption stage and resource constraints mentioned in the introduction.

The research addresses some shortcomings identified in the literature review:

Qualitative insights into emotional impact: Existing research often focuses on quantitative metrics like NPS, neglecting the deeper emotional connections facilitated by SAT. The findings, showcasing SAT's role in understanding customer emotions and building personal connections, offer valuable qualitative insights into this previously under-explored aspect.

The emergence of internal limitations: While studies often emphasise the customer-facing challenges of SAT, the research highlights internal obstacles like employee training and data integration hindering its effectiveness. This provides a more nuanced understanding of the implementation process and the need for holistic solutions addressing customer and internal factors.

Conclusion:

Answering Question 2 reveals both success and challenges. SAT demonstrably enhances customer experience through improved resolution, proactiveness, and emotional connection. However, internal limitations within South African businesses pose obstacles that require attention. The research sheds light on previously unexplained aspects of SAT's impact by offering qualitative insights into emotional impact and highlighting the emergence of internal hurdles. It offers valuable guidance for overcoming these challenges and realising its full potential for enriching customer experiences within the South African context.

6.4 Conclusions regarding research question 3

The investigation into the use of Sentiment Analysis Technology (SAT) in South African telecommunications now reaches a crucial juncture: confronting the limitations hindering its widespread adoption. Research Question 3 "What is the main limitation facing South African businesses in adopting SAT technologies?" – demands a critical unravelling of the obstacles woven into this dynamic landscape. By carefully merging the findings with the context established in the introduction, the aim is to illuminate the challenges specific to the South African landscape and potential pathways towards overcoming them.

Similarities with Existing Research: The research echoes existing literature identifying data concerns as a significant limitation. Participants like P5 and P8 expressed worries about data integrity, privacy, and ethical considerations, mirroring concerns raised in studies like Cambria (2017) and Ngwenya (2022). This confirms the universality of data-related apprehensions surrounding SAT adoption.

However, several unique threads emerge within the South African context:

Resource Constraints: While existing research often focuses on technological challenges, the participants, like P1 and P2, highlighted a need for more financial

and human resources as significant hurdles. Limited budgets for specialised personnel and insufficient technical expertise impede effective implementation and utilisation, a challenge not as prominently discussed in the broader literature. This resource constraint might be due to the early adoption stage of SAT in South Africa, where businesses are still navigating the costs and complexities of implementation.

Limited Focus on Long-Term Value: Unlike studies emphasising the long-term ROI of SAT, some participants (e.g., P3 and P6) expressed scepticism about its tangible benefits, questioning its return on investment and sustainability. This suggests a short-term, outcome-focused approach within some South African businesses, potentially due to competing priorities or a need to understand the technology's long-term potential.

The research addresses some shortcomings identified in the literature review:

Qualitative insights into resource constraints: Existing research often overlooks the resource limitations faced by businesses, particularly in emerging markets. The findings shed light on the financial and human resource challenges impeding SAT adoption in South Africa, offering a more nuanced understanding of the practical barriers to implementation.

Exploration of short-term vs. long-term perspectives: By highlighting the limited focus on long-term value in some South African businesses, the research encourages a shift towards considering the technology's strategic potential and ROI beyond immediate outcomes. This can help businesses develop a more sustainable and future-oriented approach to SAT adoption.

Conclusion:

Answering Research Question 3 reveals a complex limitation. Data concerns remain a universal challenge, yet the South African context is also entangled with resource constraints and a limited focus on long-term value. By offering qualitative insights into these unique limitations and fostering a broader perspective on SAT's potential, the research sheds light on previously unexplained aspects of adoption barriers and suggests valuable pathways towards overcoming them. Through strategic resource allocation, long-term investment strategies, and a clear understanding of SAT's potential benefits, South African businesses can unravel the threads of limitation and weave a brighter future for customer-centric engagement powered by sentiment analysis.

6.5 Final Conclusion

This research has comprehensively investigated the use of Sentiment Analysis Technology (SAT) in South African telecommunications, shedding light on its motivations, impacts, and limitations within this unique context.

Motivations for Adoption:

While customer focus remains a dominant driver of SAT adoption, as found in existing research, this study uncovers a distinct trend in the South African context: a strong emphasis on employee satisfaction. This suggests a holistic internal focus, where investing in employee well-being is seen as a critical contributor to improved customer service. Additionally, the limited automation observed compared to other regions might reflect the early stage of SAT adoption or resource constraints faced by businesses.

Impact on Customer Experience:

The research confirms SAT's ability to enhance customer experience. This is demonstrated through improved resolution, proactive engagement, and a deeper understanding of customer emotions, aligning with findings from previous studies. However, internal challenges such as employee training and data integration pose significant obstacles to achieving optimal impact, highlighting the need for targeted interventions.

Addressing the Limitations:

Data concerns remain a universal hurdle for SAT adoption, as echoed by existing research. This study further identifies resource constraints, mainly financial and human resource limitations, as significant challenges South African businesses face. Additionally, a short-term focus on immediate outcomes observed in some companies suggests the need for a shift towards a strategic perspective that recognises the long-term value proposition of SAT.

6.6 Recommendations

The exploration of Sentiment Analysis Technology (SAT) in the South African telecommunications landscape has delivered valuable insights. We have delved into the reasons behind its adoption, assessed its impact on customer experiences, and identified key challenges that can impede its full potential. Now, the attention is turned to actionable recommendations and a roadmap for different stakeholders within the South African telecom sector to leverage SAT effectively and drive customer-centric success.

These recommendations are not simply theoretical suggestions but practical steps tailored to empower each stakeholder, from customer service teams to executive leadership. By embracing these tailored strategies, they can transform their departments and the entire organisation into data-driven powerhouses, delivering personalised experiences and fostering unwavering customer loyalty.

Customer Service and Support:

Leverage SAT for proactive issue resolution: Analyse customer sentiment across channels to identify emerging issues and proactively reach out to address them, preventing churn and strengthening customer relationships.

Personalise customer interactions: Utilise SAT insights to tailor communication styles and offerings to individual customer preferences and emotions, creating a more positive and empathetic service experience.

Train agents on emotional intelligence: Equip agents with skills to interpret and respond to customer emotions effectively, de-escalate situations, and build trust and rapport.

Marketing:

Refine targeting and segmentation: Utilise SAT data to understand customer needs and preferences, refine audience targeting for marketing campaigns, and develop personalised messaging that resonates with specific segments.

Measure campaign effectiveness: Track customer sentiment in response to marketing initiatives using SAT to assess campaign effectiveness and optimise ROI.

Strengthen brand reputation: Analyse online conversations and address negative feedback promptly to mitigate brand damage and build a positive brand image.

Data Analysis:

Develop robust data governance and security protocols: Implement strict data governance and security policies to ensure customer privacy and ethical use of sentiment data.

Invest in data analysis tools and expertise: Acquire or develop advanced tools and train analysts to effectively interpret and extract insights from customer sentiment data.

Collaborate with other departments: Share findings and insights with Marketing, Customer Service, and Product Development to inform strategic decision-making and drive customer-centric initiatives.

Executive Leadership:

Champion SAT as a strategic imperative: Communicate the long-term benefits of SAT to all levels of the organisation, garnering buy-in and allocating necessary resources for successful implementation.

Foster a data-driven culture: Encourage organisational adoption of data-driven decision-making, leveraging SAT insights to inform product development, service improvements, and marketing strategies.

Develop ethical guidelines for SAT use: Establish clear guidelines for using customer sentiment data to ensure transparency, fairness, and responsible data-driven practices.

6.7 Suggestions for further research

While the research has shed light on using Sentiment Analysis Technology (SAT) in South African telecommunications, several areas still need to be explored, inviting further investigation. Here are some suggestions for future research endeavours:

Expanding The Understanding of SAT's Impact:

Employee Sentiment and its Ripple Effects: The findings hint at the importance of employee sentiment. Future research could explore how analysing employee emotions influences job satisfaction, motivation, and customer service quality.

Cultural Nuances and Emotional Resonance: The study suggests a unique focus on emotional connection in South Africa. Further research could explore how cultural aspects of communication influence sentiment data and how businesses can leverage SAT to build deeper emotional connections with their customers.

Long-Term Value and Strategic Benefits: While acknowledging short-term concerns, the research suggests focusing more on SAT's long-term impact. Future studies could quantify SAT's long-term return on investment (ROI), showcasing its influence on brand loyalty, market share, and overall business sustainability.

Addressing Challenges to Widespread Adoption:

Resource Constraints and Creative Solutions: Resource limitations emerged as a critical hurdle in SAT adoption. Future research could explore how South African businesses can overcome these constraints through innovative strategies, collaboration with local tech hubs, or developing cost-effective SAT solutions tailored to the local context.

Data Governance and Ethical Implications: Concerns about data privacy and ethical use of sentiment data surfaced prominently. Future studies could investigate best practices for data governance in the South African telecom sector, explore user education on data privacy, and develop ethical frameworks for responsible SAT implementation.

Internal Adoption and Overcoming Obstacles: Internal challenges were identified as obstacles to effective SAT utilisation. Future research could analyse how businesses can address these challenges through employee training, improved data integration, and effective communication of SAT's benefits within the organisation.

Looking Beyond South African Borders:

Comparative Studies across Emerging Markets: Research comparing SAT adoption and challenges in South Africa with other emerging markets could offer valuable insights into similarities and differences, leading to the development of adaptable solutions for similar contexts.

Exploring the Impact on Regulatory Frameworks: With data privacy concerns rising, future research could analyse the potential impact of SAT on regulatory frameworks in South Africa and propose recommendations for responsible data use and ethical implementation within the telecom sector.

The Future of Human-Machine Collaboration: As AI and SAT evolve, future research could explore the potential for human-machine collaboration in customer service and communication, leveraging the strengths of both humans and technology to personalise interactions and create deeper customer relationships.

These are just a few suggestions for further research, and the possibilities extend far beyond. Exploring these unanswered questions can provide valuable insights into SAT's role in the South African telecommunications landscape and beyond. Each new investigation contributes to the grand tapestry of knowledge, shaping a brighter future for research and the industries it illuminates.

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APPENDIX

Appendix A: The participant information sheet

Participant	Industry	Designation	Gender	Race	Age	Reason for Selection
Participant 1-P1	Financial	CEO	Male	Indian	43	Responsible for all technology used in the organisation
Participant 2-P2	ICT	Vice president	Male	White	45	As vice president , he is the most senior executive leader responsible for staff and the business over all
Participant 3-P3	ICT	Head of BA	Male	Indian	42	Data Analyst, who uses the technology every day and provides reports to the business on the data findings
Participant 4-P4	ICT	Head of Sales	Male	White	45	Responsible the business revenue and ultimately customer retention to ensure sales revenue
Participant 5-P5	ICT	Head of Customer CX	Male	African	41	Customer service is his key focus and ensuring the business uses tool to proactively highlight areas of improvement to retain customers
Participant 6-P6	ICT	Head of Marketing	Female	White	43	As head of Marketing, she is responsible for everything the media has to say about the organisation and hence she needs to be aware of customers sentiment in the social media platforms
Participant 7-P7	ICT	Chief Digital Officer	Male	Indian	55	Responsible of all technology and strategy for technology for the company
Participant 8-P8	ICT	Head Of IT	Male	Indian	50	Main stakeholder responsible for technology incorporate by the organisation
Participant 9-P9	ICT	Vice President	Male	Indian	45	As VP , he is responsible for strategy and business outcomes
Participant 10-P10	ICT	CEO	Male	White	45	Executive leadership perspective
Participant 11-P11	ICT	Head of Opp	Male	African	45	Responsible for operational efficiencies in the business
Participant 12-P12	Financial	Head of Infrastructure	Male	Indian	41	Responsible for all infrastructure decision for the organisation

Appendix B: Participant agreement form

Consent Form,

Title of project : Exploring the use of sentiment analysis technologies in South African Telecommunication businesses

Name of researcher
Deshni Harricharan

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

I agree to the following:

(Please circle the relevant options below)

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

…… (signature)
…… (name of participant)
…… (date)

……
(Signature)
Deshni Harricharan
(Name of researcher/person seeking consent)
30th October 2023
(Date)

Appendix C: Actual instrument :Interview guide

Number	Research Question	Interview Questions
	Participants	
1	Is sentiment analysis beneficial to South African Telecomunications business?	1.What are the main reasons why your business uses sentiment analysis technologies
		2.What specific benefits have you seen from using these technologies?
		3. What motivated your organization to adopt sentiment analysis technology?
		4.How has sentiment analysis technology impacted your business operations?
		5.What advice would you give to other businesses that are considering using SA?
2	Customer Experience Enhancement	1.How has sentiment analysis technology influenced your understanding of customer sentiment and needs?
		2.Can you share examples of how insights from sentiment analysis have led to improvements in customer service?
		3.What measures have you taken to translate sentiment analysis findings into actionable improvements for customers?
		4.Have you encountered any challenges or limitations in using sentiment analysis to enhance the customer experience?
3	What are the main limitati facing South African businesses in adopting SA technologies?	1. What are the main limitations of SA for businesses in South Africa?
		2. How have these limitations and advantages affected your business?
		3. How do you see these limitations and advantages evolving in the future?
		4. What measure have you taken to address the limitations

Appendix D: Various analysis tables and charts, e.g. statistics, qualitative coding

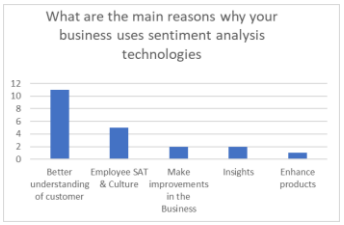
Interview Transcripts Summarised highlighting key words

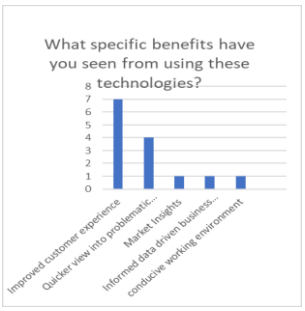
Proposition	Research Question	Interview Questions	P1	P2	P3	P4	P5	P6
1	Is sentiment analysis beneficial to South African Telecommunications business?	1.What are the main reasons why your business uses sentiment analysis technologies	1.For customer perspective to understand the root cause of customer complaints and use the information to fix the problem or enhance product & improve satisfaction indicators	To understand the organization's culture	1. To get feedback from clients when they are chairing sessions.	1. To have an understanding around employee satisfaction 2. For client perspective we get feedback in terms of how we performing.	To track active billable revenue and really understanding when clients churn- what extent our clients happy with our services and based on this feedback we identify improvement areas that is our business. Bridged the gap between the NPS and the CSAT= Improved customer	1. Employee satisfaction 2.We use it for digital and PR to anything that we can find online or in print media to gauge the customer sentiment of the market
		2.What specific benefits have you seen from using these technologies?	Improved tracking of business processes	To produce working environment We feel like we recognizing people and able to accommodate cultural differences	To get a quicker view of what's going on/up in the organization because something must be going wrong if they are cancelling	1. Improved customer support 2. Understanding of internal staff.	Efficiency	Improved customer experience.
		3. What motivated your organization to adopt sentiment analysis technology?	Automation	Lack of insight as employees causing inaccurate reflection of the organization.	Certain areas in our business that that was lacking and client engagement, client service delivery and client relationship building Technology provided insights into the business. Eg it took time for for ticket to get resolved.	We had a number of people leaving organization and so the churn from a staff perspective was was high and we wanted to know why.	Decline in revenue. 2. Increased churn.	Lack of market insight.
		4.How has sentiment analysis technology impacted your business operations?	It helped detect fraud much more quicker so that enabled faster claim processing and better risk assessment on clients.	People are engaged,motivated, energized and where they wanna be Employees are sufficiently rewarded and feel like they're growing so we are able to deliver. We are finding opportunities in our clients. Overall its provided insights on what we are telling chart as a employee and improve the working environment to improve and maximize the customers.	2. Actual tracking of the client experience 3. Decreased cancellations We are developing a model that focuses on the sentiment or the feedback that we have from the client will get pushed into a dashboard system to give us a view.	Increased and improve engagement with clients.	Taking the insights that we are getting from this analysis and helping it contribute to the way we service those customers by classification to understand you know easy we can reduce the effort.	Increased engagement with clients.
		5.What advice would you give to other businesses that are considering using SA?	To know what outcome they need so they can utilize SA effectively, aligned to their business goals.	To incorporate it in their business to have better understanding of their staff.	To use sentiment analysis for better customer experience	To be consistent and send these surveys and feedbacks regularly.	To use sentiment analysis depending on their business goals.	To use sentiment analysis depending on their business goals.
2	Customer Experience Enhancement	1.How has sentiment analysis technology influenced your understanding of customer sentiment and needs?	It has enabled the business to have an understanding of customer needs, what they are saying about us against our competitors and the overall market.	We are able to deliver market leading experiences to our clients due to having positive employees who engage frequently with clients.	A provider way to support our customers helped improve that customer satisfaction should a customer calling to your service centre and we understand the customer sentiment before so we are better equipped.	It has enabled the business to have an understanding of customer needs, what they are saying about us against our competitors and the overall market.	There might be happy with our quality, but might be churning because of price and their sentiment is that you knowing the customer needs something more affordable.	Obviously it makes it much easier, and analysis is much quicker and it really needs? points the ones that we need to be addressing.
		2.Can you share examples of how insights from sentiment analysis have led to improvements in customer service?	1.Increased social media engagement. 2. Queries are attended to promptly.	Mastering like the mood in the organization that you need in order to be successful was just basic communication of business performance or strategies and those sorts of things.	2. For customer perspective. 2. To get market insight on network stability	Use from a system perspective and make sure that the right contacts were in there and often this accurate database ,Number of escalations have dropped down	Less cancellations of cervices by clients.	1.Increased social media engagement. 2. Queries are attended to promptly.
		3.What measures have you taken to translate sentiment analysis findings into actionable improvements for customers?	1. By implementing custom solutions for clients. 2. Capitalizing on gaps in the market.	Improve the service and support to reduce cancellations of services by clients.	Improve the service and support to reduce cancellations of services by clients.	Fix the route cause of the problem.	Personalized solutions	Capitalizing on gaps in the market.
		4.Have you encountered any challenges or limitations in using sentiment analysis to enhance the customer experience?	Yes,the biggest challenge we are only able to analyse sentiment in the English language.	Yes, it is of global standards and some of the analyses is not relevant.	Yes, Lack of feedback-there is a lot less communication verbal or face to face communication that is happening in this current age that we on.	Yes,communication is a challenge 2. Lack of feedback eg You will get not 100 on one and you'll only get 25% responses which leads to inaccurate information.	Yes,the biggest challenge we are only able to analyse sentiment in the English language.	Yes, it is the lack of resources and and need for somebody to drive this.
3	What are the main limitati facing South African businesses in adopting SA technologies?	1. What are the main limitations of SA for businesses in South Africa?	language diversity ,customer privacy,automation being expensive and the lack of skills to use SA.	Global standard means global survey which translates to global questions that not relevant to to our territory or our So firstly, you don't get enough information and secondly the information is biased.	Automation being expensive and the lack of skills to use SA.	Incomplete feedback.	Automation being expensive and the lack of skills to use SA.	Language diversity affecting survey outcomes.
		2. Now have these limitations and advantages affected your business?	1. Limitations could naturally toss opinions due to the analysis being conducted in English only and POPI Act restricting the amount of information used. 2. Advantages include an increased use of social media,API's and mechanisms that enables us to tap into the data and analyse it easily.	The information is now circumstantial and does not nessecarily help the business grow.	The source all this information may create a bias opinion and the volumes of data recived is hard to translate into useful information.	The source all this information may create a bias opinion and the volumes of data recived is hard to translate into useful information.	The source all this information may create a bias opinion and the volumes of data recived is hard to translate into useful information.	The information is now circumstantial and does nessecarily help the business grow.
		3. How do you see these limitations and advantages evolving in the future?	The limitations will most likely not improve as as they are restricted by legislation,POPI Act)	No, due to them being the standard for now.	Yes, we have the system right and you will get the system both properly. It's just maintaining IT technologies like SI and it'll drift that limitation.	No, due to them being the standard for now.	No, due to them being the standard for now.	Yes, if we drive our employees to engage in these surveys.
		4. What measure have you taken to address the limitations	By hiring policy entry consultants who are skilled in multiple languages who captured detailed notes on our insurance regime on what the customers are giving feedback on and developed integration with our machine learning and what's in our co-insurance platform.	Yes,the biggest challenge is the language complexity in South Africa. There's other ways of getting feedback to accommodate customers that speak and understand other languages.	By using sentiment analysis to reduce turnaround time by only the negatives. We use Microsoft and I think we've built on our current system because it's close to a year old and we need to review it as there are the newer technologies that are out now and we should be looking to see that is advance our platform.	By taking the decision to digitize that part of the communications where we integrate surveys into our daily systems.	Encouraging employees to engage with these surveys to get more feedback.	By encouraging employees to engage with these surveys so that feedback is not bias to only a certain group.

Proposition	Research Question	Interview Questions	P7	P8	P9	P10	P11	P12
1	Is sentiment analysis beneficial to South African Telecommunications business?	1. What are the main reasons why your business uses sentiment analysis technologies	1. Employee satisfaction 2. For customer perspective	1. To Gauge their brand (NPTN) perception. 2. For customer perspective	Understanding customer behaviour and buying behaviour.	1. For customer perspective. 2. To get market insight on network stability	To understand customer needs.	Customer perspective
		2. What specific benefits have you seen from using these technologies?	Improved tracking of business processes	Prompt responses to customers.	Identifying problems quickly. Upselling possibilities.	Faster network connections/decreased downtimes.	Customer retention/Reduced churn. 2. Improved customer service	Improved service delivery/ Customer satisfaction
		3. What motivated your organization to adopt sentiment analysis technology?	Decrease in revenue. Customers were leaving and we wanted to know, howcome?	Lack of market insight.	1. Telling short on development areas whether be sales or support. 2. Automation.	Lack of market insight on network stability.	Decrease in revenue. We wanted a view on our customer churn	Lack of market insight.
		4.How has sentiment analysis technology impacted your business operations?	Improved back-end processes.	Increased customer engagement.	Increased avenue by retaining our customers and reducing churn.	Increased understanding of customer requirements	By determining which services needs to improve/which customers deserve a discount.	By determining which products/services to provide, so we can provide products our clients want
		5.What advice would you give to other businesses that are considering using SA?	No firstly analyse the business so the survey aligns with your business goals.	Address the customers constraint concerns, fixing those issues up and responding to them as quickly as we can.	Identifying possible churn before it happens.	By using sentiment analysis to reduce turnaround time by only the negatives. We use Microsoft and I think we've built on our current system because it's close to a year old and we need to review it as there are the newer technologies that are out now and we should be looking to see that is advance our platform.	It 2yrs ongoing is key. 2. To implement SA systems in house.	Yes,it was it according to your business objectives.
2	Customer Experience Enhancement	1.How has sentiment analysis technology influenced your understanding of customer sentiment and needs?	So, omni-channel environment. Better decision making in the automation.	Address the customers constraint concerns, fixing those issues up and responding to them as quickly as we can.	Customer loyalty management.	By creating enough insights to address network issues promptly.	Having enough insight to ensure correct billing of customer accounts.	Overall insight on what causes complaints.
		2.Can you share examples of how insights from sentiment analysis have led to improvements in customer service?	Improved credit note process.	Fixed our internal processes and systems.	Respond up our support and sales team.	Decreased downtime on network failures.	Prompt response to customer complaints.	Better decision making based on customer needs.
		3.What measures have you taken to translate sentiment analysis findings into actionable improvements for customers?	By improving the overall credit memo process.	Product development & Value proposition discussions.	By creating opportunity to upsell.	By creating or infact development and value proposition discussions.	Respond up our support and sales team	Improved products.
		4.Have you encountered any challenges or limitations in using sentiment analysis to enhance the customer experience?	Yes,software provider has insufficient competency and capacity in country. 2. Cloud based tools that tend to work better in America and Europe.	Yes,the biggest challenge is the language complexity in South Africa.	Yes, it is of global standards and some of the analyses is not relevant.	Yes,the biggest challenge is the language complexity in South Africa.	Yes, data integrity.Company acquisitions may cause disparate systems.	Yes, the biggest challenge is lack of resources to drive these systems.
3	What are the main limitati facing South African businesses in adopting SA technologies?	1. What are the main limitations of SA for businesses in South Africa?	Language diversity affecting survey outcomes.	Language diversity and the lack of skills to drive these systems.	Yes, it is the lack of resources and and need for somebody to drive this.	Language diversity affecting survey outcomes.	1. Lack of resources to drive these systems. 2. Low response rate on surveys. 3. Choosing the right mechanisms; e.g telephonically or sending emails.	1. Resource 2 Lack of resources 3. Local understanding
		2. Now have these limitations and advantages affected your business?	Insufficient information as the language barrier creates a bias opinion.	These limitations create a decrease in customer engagement which leads to poor service deliver.	The adoption curbs of the systems.	Insufficient information as the language barrier creates a bias opinion.	Lack of information leads to inaccurate data.	Lack of understanding compromises the data.
		3. How do you see these limitations and advantages evolving in the future?	Yes,we have models and systems that try to translate and accommodate the different languages.	Yes, I don't think it's as much as a problem as it was a few years ago, but it's something that must still be addressed.	Yes, because this is due to prioritization of these systems in the organization.	Yes, I don't think it's as much as a problem as it was a few years ago, but it's something that must still be addressed.	I see it evolving in the future is with voice bots obviously having AI, and it's quite impressive.	Yes, it will evolve as there's new technology everyday.
		4. What measure have you taken to address the limitations	By using social media to engage with a vast of customers and potential ones to get a feel of the market.	By using social media platforms to reach out to more customers.	By prioritising the adoption of these systems.	There's other ways of getting feedback to accommodate customers that speak and understand other languages.	By using different mechanisms to accumulate data to suit different people eg.telephonically vs email depending on the person's preference.	By ensuring we've got access to resources that understands the South African landscape.

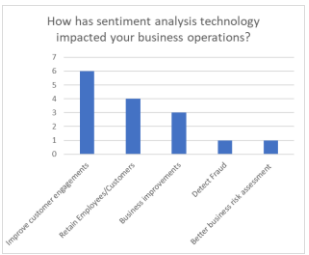
Coding of Interview for Proposition 1

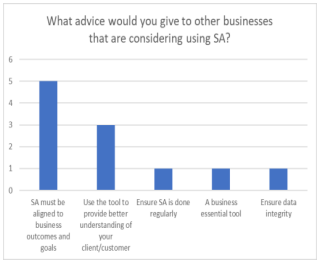
Research Q1	Count
1.What are the main reasons why your business uses sentiment analysis technologies	
Better understanding of customer	11
Enhance products	1
Employee SAT & Culture	5
Make improvements in the Business	2
Insights	2
	0
Question 1.2	
2.What specific benefits have you seen from using these technologies?	0
Improved customer experience	7
Market Insights	1
Informed data driven business decisions	1
conducive working environment	1
Quicker view into problematic areas in the business	4
Question 1.3	
3. What motivated your organization to adopt sentiment analysis technology?	0
Automation	1
Better insight into the business	4
Insight into Customer/Staff Churn	5
Market Insights	4
Question 1.4	
4.How has sentiment analysis technology impacted your business operations?	0
Detect Fraud	1
Better business risk assessment	1
Retain Employees/Customers	4
Improve customer engagements	6
Business improvements	3
Question 1.5	
5.What advice would you give to other businesses that are considering using SA?	0
SA must be aligned to business outcomes and goals	5
Use the tool to provide better understanding of your client/customer	3
Ensure SA is done regularly	1
A business essential tool	1
Ensure data integrity	1





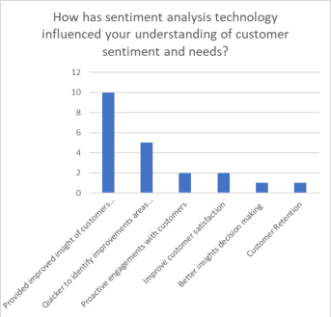




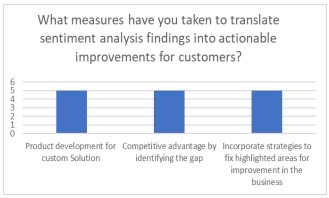


Coding of Interview for Proposition 2

Research Q2	
Has sentiment analysis enhanced customer experience?	
Question 2.1	
1.How has sentiment analysis technology influenced your understanding of customer sentiment and needs?	
Provided improved insight of customers needs and complaints	10
Proactive engagements with customers	2
Improve customer satisfaction	2
Quicker to identify improvements areas in the business	5
Better insights decision making	1
Customer Retention	1
Question 2.2	
2.Can you share examples of how insights from sentiment analysis have led to improvements in customer service?	
Increased social media presence	2
Queries promptly attended to	3
Provided the organisation with customers perspective	3
Organisation gained market insight	2
Reduction in churn	1
Business process,systems,product enhancement	6
Question 2.3	
3.What measures have you taken to translate sentiment analysis findings into actionable improvements for customers?	
Product development for custom Solution	5
Competitive advantage by identifying the gap	5
Incorporate strategies to fix highlighted areas for improvement in the business	5
Question 2.4	
4.Have you encountered any challenges or limitations in using sentiment analysis to enhance the customer experience?	
Language Limitation	4
Irrelevant Global Standards	2
Lack of participation from customers	2
Lack of Resources	2
Data integrity	1



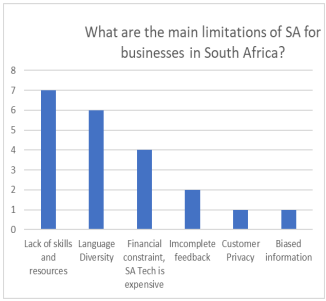


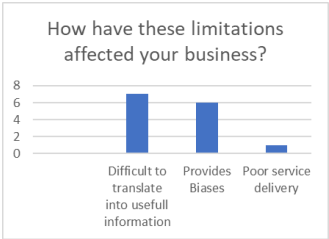


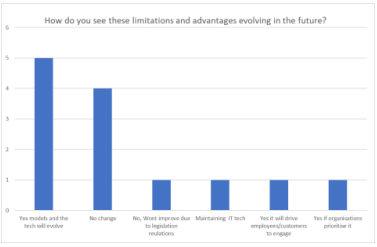


Coding of Interview for Proposition 3

Research Q3	
What are the main limitation facing South African businesses in adopting SA technologies?	
Question 3.1	
1. What are the main limitations of SA for businesses in South Africa?	
Language Diversity	6
Customer Privacy	1
Financial constraint, SA Tech is expensive	4
Lack of skills and resources	7
Biased information	1
Imcomplete feedback	2
Question 3.2	
2.How have these limitations affected your business?	
Provides Biases	6
Difficult to translate into usefull information	7
Poor service delivery	1
Adoption of tech is reduced	1
Question 3.3	
3. How do you see these limitations and advantages evolving in the future?	
No, Wont improve due to legislation reulations	1
No change	4
Maintaining IT tech	1
Yes it will drive employees/customers to engage	1
Yes models and the tech will evolve	5
Yes if organistions prioritise it	1
Question 3.4	
4. What measure have you taken to address the limitations?	
Hire skilled resources	2
Develop integration	1
Use other tech with SA for holistic view	8
Encourage cust/employees to perticipate, prioritise adoption	2









Appendix E Ethics approval notification

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

Wits Business School Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number:	WBS/DB2530547/433

This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

This certificate is only valid if accompanied by formal permission from the relevant stakeholder(s).

Project title	Exploring the use of sentiment analysis technologies in South African telecommunication businesses
Investigator / Researcher	Ms Deshni Harricharan
Nature of Project	MM (Digital Business)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed confidentialty.
Issue Date of Certificate	2023/10/13
Expiry date	Date of submission of the project / research report
Chairperson	Dr Pius Oba ☎ +27 11 717 3976 +27 82 733 6587 pius.oba@wits.ac.za

Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Eth Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research ar guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

Signature

16 October 2023
Date:

Appendix F: Permission Letter

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

University of the Witwatersrand,

30 October 2023

Dear Madam,

Re: Permission to conduct research at MTN

My name is Deshni Harricharan

I am studying for a master's in digital transformation at the University of the Witwatersrand. I am seeking permission to do research at MTN

I am conducting research on exploring the use of sentiment analysis technologies in South African Telecommunication business. My research objectives are to understand the current state of sentiment analysis adoption in South African businesses, to identify the challenges and opportunities associated with using sentiment analysis in South African businesses and to develop recommendations for how sentiment analysis can be used to improve business performance in South Africa.

I will be collecting data that can help to identify trends and patterns in sentiment analysis adoption, challenges, and opportunities. Your data will also be used to validate the findings of the research and to develop more accurate recommendations.

You will be asked a series of interview questions to extract findings from the research questions above. If you agree, you will be asked the following questions:

Number	Research Question	Interview Questions
	Participants	
1	Is sentiment analysis beneficial to South African Telecomunications business?	1.What are the main reasons why your business uses sentiment analysis technologies
		2.What specific benefits have you seen from using these technologies?
		3. What motivated your organization to adopt sentiment analysis technology?
		4.How has sentiment analysis technology impacted your business operations?
		5.What advice would you give to other businesses that are considering using SA?
2	Customer Experience Enhancement	1.How has sentiment analysis technology influenced your understanding of customer sentiment and needs?
		2.Can you share examples of how insights from sentiment analysis have led to improvements in customer service?
		3.What measures have you taken to translate sentiment analysis findings into actionable improvements for customers?
		4.Have you encountered any challenges or limitations in using sentiment analysis to enhance the customer experience?
3	What are the main limitation and advantages facing South African businesses in adopting SA technologies?	1. What are the main limitations of SA for businesses in South Africa?
		2. What are the main advantages of SA for businesses in South Africa?
		3. How have these limitations and advantages affected your business?
		4. How do you see these limitations and advantages evolving in the future?
		5. What measure have you taken to address the limitations

The interview will take an estimate of 60 minutes, online via team, depending on your availability.

You will be asked to give his written or verbal consent before the research begins. Your responses will be treated confidential, and identities will be anonymous unless otherwise expressly indicated. Individual privacy will be maintained in all published and written data resulting from the study.

You will not be advantaged or disadvantaged in any way. You will be reassured that you can withdraw their permission at any time during this project without any penalty. There are no foreseeable risks in participating in this study. You will not be paid for this study.

All research data will be preserved anonymously for reuse by other researchers.

I therefore request permission in writing to conduct my research at your organization. Please let me know if you require any further information. I look forward to your response as soon as is convenient.

Yours sincerely,

Deshni Harricharan
0825666014
2530547@students.wits.ac.za

Nakuze Chalomba
Nakuze Chalomba <cnakuze@yahoo.com>

Appendix G: TII Report

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ORIGINALITY REPORT

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SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	wiredspace.wits.ac.za Internet Source	1%
2	tel.archives-ouvertes.fr Internet Source	<1%

Exclude quotes	On	Exclude matches	< 50 words
Exclude bibliography	On		