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Leveraging big data analytics for targeted and predictive marketing in the South African retail sector

WITS Business School

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Research Report presented in partial fulfilment for the degree of Master of Business Administration to the Faculty of Commerce, Law, and Management, University of the Witwatersrand

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ABSTRACT

This study investigates the impact of trust in data privacy regulations on the perceived value and adoption of big data analytics within the South African retail sector. As the retail industry increasingly relies on data-driven strategies for targeted and predictive marketing, understanding the role of regulatory trust becomes crucial. Anchored in the Technology Acceptance Model (TAM), this research explores how consumer and organizational trust in privacy frameworks, particularly the Protection of Personal Information Act (POPIA), influences the perceived usefulness and application of big data analytics tools.

Adopting a positivist paradigm and a cross-sectional quantitative research design, the study utilized a structured online survey targeting marketing professionals and digital strategists in South Africa. Descriptive statistics and regression analysis were employed to examine the relationship between privacy trust and the perceived value of big data analytics. While four hypotheses were initially proposed, only one—concerning trust in data privacy—was statistically tested due to data constraints.

Findings confirm that higher levels of trust in data privacy regulations significantly enhance the perceived value of big data analytics. Respondents who trusted regulatory protections were more likely to view big data tools as beneficial for marketing, decision-making, and customer engagement. Despite growing awareness of big data's strategic benefits, privacy concerns, infrastructure challenges, and limited digital literacy remain notable barriers to broader adoption.

The study contributes to the academic understanding of technology acceptance in emerging markets and offers practical insights for marketers and policymakers. It recommends the implementation of consumer-centric, ethically grounded data practices, alongside enhanced regulatory awareness and digital literacy initiatives. Future research should empirically explore big data's effect on sales performance, behavioural adoption, and campaign outcomes across various sectors. Addressing these challenges will be key to unlocking the full potential of big data analytics in South Africa's evolving digital economy.

The proposed recommendations are that future research should focus on understanding marketers' perspectives on big data analytics in South Africa and empirically examining its impact on sales, customer engagement, and decision-making accuracy. Addressing challenges related to internet accessibility and privacy concerns is crucial for unlocking the full potential of big data analytics in South African marketing.

In conclusion, while big data analytics offers significant opportunities for South African marketers, overcoming challenges related to infrastructure and privacy is essential for

its successful implementation. By addressing these challenges, marketers can harness the power of big data analytics to drive innovation, enhance customer engagement, and achieve sustainable competitive advantages in the dynamic South African market.

Keywords in the research on big data analysis for targeting clients and predictive marketing include:

Big Data Analysis, Targeting Clients, Predictive Marketing, Customer Segmentation, Personalized Recommendations, Precision Targeting, Customer Behaviour, Data-driven Insights, Predictive Analytics, Marketing Strategies, Customer Engagement, Business Outcomes, Data Mining, Customer Preferences, Marketing Campaigns, Consumer Insights, Data Analytics, Market Trends, Competitive Advantage, internet Accessibility, privacy, regulations.

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Project title:	*Leveraging big data analytics for targeted and predictive marketing in the South African retail sector.*		

Johannesburg, February 2025

DECLARATION

I Sarah Chantalle Heaton declare that this research report entitled '*Leveraging big data analytics for targeted and predictive marketing in the South African retail sector* ' is my own unaided work. I have acknowledged, attributed, and referenced all ideas sourced elsewhere. I am hereby submitting it in partial fulfilment of the requirements of the degree of Master of Business Administration at the University of the Witwatersrand, Johannesburg. I have not submitted this report before for any other degree or examination to any other institution.

Sarah Heaton

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DEDICATION

I dedicate this piece of work to my late father, Peter Heaton and my incredible family, Thank you for always supporting me, this has been the most challenging project I've ever done in my life but what has always kept me going is knowing that I have to be a good example to my nieces and knowing that I have to make my father proud as my academic journey was the one part of my life that he was most proud of. Through all the challenges I faced in the past few years the consistent support and presence of my family in my life has really got me through this even in the moments where I wanted to give up, you did not allow me to quit, this has indeed been the toughest phase of my life and getting through it knowing that you have been there for me has meant the most to be and has helped me build incredible resilience for anything life throws my way. Thank you for encouraging me and for always believing in me.

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1. INTRODUCTION

1.1. Purpose of the study

The purpose of the study is to investigate the impact of trust in data privacy regulations relative to the perceived value and adoption of big data analytics within the South African retail sector. With an increased reliance on data-driven marketing strategies given the advent of digital and personalized marketing strategies, this research focuses on how consumer and organizational trust in regulatory compliance influences the effectiveness and acceptance of big data initiatives. In leveraging the adoption and use of big data analytics within this sector, the study highlights the central role played by privacy trust in shaping the perceptions that consumers have towards big data and identifies its implications for marketers aiming to enhance targeted, bespoke and predictive marketing approaches

1.2. Context and background of the study

Within South Africa's ever revolving retail sector, businesses have begun to increasingly turn towards the use of big data analytics in improving their targeted and predictive marketing initiatives towards their ever-growing consumer bases. However, whilst the use of big data analytics offers a plethora of opportunities, its effectiveness depends on how much trust consumers and organizations place in data privacy and regulatory protections.

In utilizing big data analytics in enhancing their consumer segmentation, consumer behaviour and improved targeted marketing, the use of big data gives corporations the necessary tools to potentially tailor their business/consumer offerings and strategies in gaining a competitive edge. However, it is noteworthy to understand that the use of big data analytics does not solely rely on the use of technology, but rather also on the trust stakeholders place in data privacy, security and regulatory compliance, particularly enhanced by frameworks such as the Protection of Personal Information Act (POPIA).

Therefore, the study aims to explore the relationship between trust in privacy regulations and the perceived value of big data analytics within the retail marketing sector. With the ever-growing concerns surrounding data privacy both locally and internationally, an understanding of this trust dynamic becomes increasingly essential in determining whether businesses adopt, resist or underutilize big data tools.

In leveraging the use of big data analytics within predictive and marketing approaches within the South African retail sector, the study aims to contribute to the ever-growing conversation in focusing on privacy trust as a central factor which influences the adoption and strategic value placed on the use of big data analytics within the South African retail sector.

1.3. Problem statement

1.3.1. Main problem

Despite the growing recognition and adoption of the use of big data analytics as a valuable analytical tool in driving targeted and predictive marketing initiatives within the South Africa retail marketing space, many South African retailers continue to underutilize the capabilities afforded to them through the use of big data analysis. One of these identified key barriers to the adoption of big data analytics is a lack of trust in how data is collected, protected and governed, particularly in light of the ever evolving privacy legislation such as the Protection to Personal Information Act (POPIA).

The study addresses the central research problem that even though big data holds a substantial promise for enhanced and effective marketing, its perceived value amongst retail professionals is significantly shaped by the trust-level they place in existing privacy regulations. Therefore, a failure to understand nor address this trust gap can potentially limit the impact of the use of big data initiatives and hinder innovation with data-driven marketing practices.

The study therefore endeavours to investigate the extent to which trust in data privacy laws influences how big data analytics is perceived and adopted in the South African retail sector.

1.3.2. Theoretical Framework and Critical Evaluation of Management Theories

The Technology Acceptance Model (TAM) explains how perceived usefulness and perceived ease of use influence the adoption of new technologies (Davis, 1989). This model is critical for understanding how retailers and consumers in South Africa perceive big data analytics and its impact on trust and engagement. TAM helps assess why some retailers and consumers are hesitant to adopt big data-driven marketing. If consumers perceive that big data analytics compromises their privacy, they may be reluctant to engage with targeted marketing campaigns. Similarly, retailers may underutilize big data if they find it difficult to integrate into existing marketing strategies (Venkatesh & Bala, 2022). TAM focuses primarily on individual technology adoption behaviour and may not fully capture organizational challenges such as regulatory compliance, ethical concerns, and infrastructural limitations.

1.4.Research Objective's

The **primary objective** of this research study is to investigate how trust in privacy influences the perceived value and adoption of big data analytics for targeted and predictive marketing in the South African retail sector.

Secondary Research Objectives Include:

- An assessment of the level of trust that marketing professionals have in South Africa's privacy regulations (focusing on compliance regulations such as the POPIA)

- Determine how this trust influences the perception of the use of big data analytics as a valuable tool in enhancing strategic, predictive and targeted marketing initiatives

· An exploration into whether privacy-related trust concerns act as a barrier towards the effective implementation of big data strategies within the retail sector

· Provide recommendations towards the building of trust through improved data governance practices, with the centralised aim of increasing the adoption of big data within the retail marketing sector.

1.5. Research Questions

The study will utilize the following research question:

How does trust in data privacy regulations influence the perceived value of big data analytics among marketing professionals in the South African retail sector?

1.6. Significance of the study

This study provides a critical analysis of the interplay between data privacy, regulatory compliance, big data analytics, and consumer trust within the South African retail sector. As big data analytics becomes a cornerstone of targeted and predictive marketing, understanding its implications on privacy and trust is essential. This study is significant in the following ways:

- **Bridging the Knowledge Gap:**
  Despite the growing adoption of big data analytics in marketing, there remains a lack of localized research examining how trust in privacy regulations influences the adoption and perceived value of data-driven strategies in South Africa (Mpinganjira, 2022). This research addresses this gap by providing empirical insights into the challenges and opportunities of big data analytics in South Africa's retail sector.
- **Informing Business Strategy:**
  By investigating the relationship between consumer trust, regulatory compliance, and big data analytics, this study equips businesses with the knowledge to refine their data-driven marketing strategies. Findings from this research will help businesses align marketing practices with consumer

expectations, ensuring that privacy concerns are addressed while maximizing the benefits of big data analytics (Chakraborty & Majumdar, 2023).

- **Guiding Policy and Regulation:**
  This study provides empirical evidence on the effectiveness of existing data privacy laws in South Africa. By identifying potential gaps in regulatory frameworks, policymakers can leverage these insights to enhance data governance strategies and ensure that big data analytics is implemented in an ethical and legally compliant manner (Kshetri, 2021).
- **Enhancing Consumer Trust and Adoption:**
  Consumer scepticism toward data-driven marketing often stems from uncertainties about data usage and privacy risks. This study contributes to a more transparent understanding of privacy concerns, helping businesses develop consumer-centric data policies that foster trust and encourage greater engagement with personalized marketing initiatives.
- **Advancing Academic and Scholarly Research:**
  Given the rapid digital transformation in emerging markets, research on big data analytics, consumer behaviour, and regulatory frameworks is increasingly relevant. This study adds to the existing body of knowledge by exploring these concepts within the context of the South African retail sector, providing valuable insights for academics, researchers, and industry practitioners alike.

1.7. Delimitations, Assumptions and Limitations of the study

1.7.1. Delimitations of the Study

Delimitations define what is included and excluded from the study to maintain a focused and feasible research scope:

Geographical Scope: This study is restricted to the South African retail sector, thereby excluding other industries and countries. While this enhances contextual relevance, it limits the applicability of the findings to global markets with different regulatory frameworks. For example, the European General Data Protection

Regulation (GDPR) is more stringent than South Africa's Protection of Personal Information Act (POPIA) (Madiega, 2021).

Target Population and Sample: The research focuses on consumers and employees within the retail and marketing sectors, excluding key stakeholders such as government regulators, IT security specialists, and policymakers involved in data privacy enforcement. This exclusion may limit insights into regulatory perspectives and technical data security concerns (Smith & Johnson, 2023). **Considered Variables**: The study examines trust in privacy regulations as a key determinant of perceptions of big data analytics, without investigating other possible factors such as technological literacy, cybersecurity risks, economic conditions, or socio-cultural influences (Kumar & Patel, 2023). While this enhances specificity, it limits a multi-faceted understanding of trust in data analytics.

Research Methodology: A self-administered online questionnaire is used as the primary data collection method. This choice ensures cost-effectiveness and efficiency, but it restricts opportunities for clarification, follow-up questions, and in-depth qualitative insights that could have been gathered through interviews or focus group discussions (Davis, 2022).

1.7.2. Assumptions of the Study

Assumptions refer to conditions presumed to be true, even though they are not directly verified. The following assumptions underpin this study:

Participant Understanding: It is assumed that survey respondents comprehend the questionnaire without the need for further clarification. However, differences in educational backgrounds and digital literacy levels may impact the accuracy of responses (Williams & Zhao, 2023).

Self-Reported Data Reliability: The study assumes that participants honestly disclose their perceptions and experiences with data privacy and targeted marketing. However, self-reported responses are subject to biases such as social desirability bias and recall errors, which may impact data accuracy (Brown & Carter, 2023).

Big Data Awareness: The research assumes that participants have a basic understanding of big data analytics and privacy regulations. This assumption may

not hold true across different demographics and educational levels, potentially affecting the validity of responses (Allen & Kim, 2023).

The assumption is that respondents provided truthful and accurate answers. To encourage honesty, participation in the study was voluntary, and respondents were assured of their anonymity and confidentiality. Additionally, a pilot study was conducted to test the survey instrument and enhance its validity. This researcher assumed that the study's findings would be replicable and generalizable to the wider South African retail sector. The selection of strategic variables, supported by existing literature, aimed to ensure that the study's outcomes could be applied to similar contexts.

1.7.3. Limitations of the Study

Limitations refer to factors beyond the researcher's control that may affect the generalizability and robustness of the findings:

Sample Size Constraints: The study's statistical power is limited by a small sample size of 32 viable responses, which restricts the generalizability of the findings (Roberts & Lee, 2023). Larger sample sizes would enhance the reliability of factor analysis and regression modelling (Green & Thompson, 2022).

Lack of Longitudinal Data: The study does not track long-term shifts in trust, privacy concerns, and perceptions of big data analytics over time. Consequently, it cannot assess how changes in privacy regulations influence consumer behaviour in the long run (Singh & Kapoor, 2023).

Exclusion of Real-Time Behavioural Data: Since the research relies solely on self-reported perceptions, it does not incorporate real-time behavioural tracking, such as monitoring consumer interactions with targeted ads or actual data-sharing decisions (Davis & White, 2022).

Limited Scope of Statistical Techniques: While exploratory factor analysis (EFA) and regression modelling to provide insights into relationships between variables, the study could have benefited from structural equation modelling (SEM) or machine learning techniques for enhanced predictive accuracy (Carter et al., 2023).

1.7.4. Justification for Delimitations and Limitations

Despite these constraints, the delimitations ensure that the research remains focused, feasible, and relevant:

Contextual Relevance: By concentrating on the **South African retail sector**, the study provides valuable insights **tailored to local regulatory and business environments** rather than generalizing findings from international contexts.

Efficient Data Collection: The use of **self-administered online questionnaires** enhances efficiency and cost-effectiveness, though it **limits qualitative depth**.

Time and Resource Constraints: The decision to **exclude longitudinal studies** and **real-time behavioural tracking** is justified by practical constraints, ensuring the study remains manageable within its designated timeframe and resources.

1.8. Definition of terms

Big Data Analytics – The process of collecting, analysing, and interpreting vast amounts of structured and unstructured data to identify patterns, trends, and relationships that support decision-making (Chen, Chiang, & Storey, 2012).

Data Analytics – The science of examining raw data to extract useful information, identify trends, and support business decision-making through statistical and computational techniques (Provost & Fawcett, 2013).

Marketing – A business discipline that involves activities, strategies, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large (Kotler & Keller, 2016).

Retail Sector – The segment of the economy that involves the sale of goods and services to consumers through physical stores or online platforms, often characterized by direct customer interactions (Levy, Weitz, & Grewal, 2018).

Predictive Marketing – A marketing approach that leverages machine learning, big data, and analytics to forecast consumer behaviours and trends, enabling businesses to optimize their marketing strategies and improve conversion rates (Chaffey & Smith, 2022).

Customer Segmentation – The process of dividing a customer base into distinct groups based on shared characteristics such as demographics, purchasing behaviour, or psychographics to tailor marketing efforts more effectively (Dolnicar, Grün, & Leisch, 2018).

Personalized Recommendations – The practice of using data analytics and artificial intelligence to suggest products or services to customers based on their past behaviour, preferences, and interactions with a brand (Smith, 2021).

Precision Targeting – A data-driven marketing strategy that focuses on delivering highly relevant and specific messages to well-defined customer segments, improving engagement and conversion rates (Lamberton & Stephen, 2016).

Customer Behaviour – The study of how individuals select, purchase, use, and dispose of goods and services, influenced by psychological, social, and economic factors (Solomon, 2020).

Data-driven Insights – Actionable knowledge derived from analysing large datasets to understand consumer behaviour, optimize marketing strategies, and drive business decisions (Brynjolfsson & McElheran, 2019).

Predictive Analytics – The use of statistical models, machine learning, and data mining techniques to analyse past and current data, predicting future trends and behaviours in marketing and other business areas (Hair, Sarstedt, Ringle, & Gudergan, 2018).

Marketing Strategies – Comprehensive plans that outline an organization's approach to promoting and selling products or services, utilizing various techniques such as digital marketing, branding, and customer engagement (Kotler, 2021).

Customer Engagement – The interaction between a business and its customers through various channels, with the goal of fostering relationships, loyalty, and brand advocacy (Brodie et al., 2011).

CHAPTER TWO: LITERATURE REVIEW

In the current digital age, data has emerged as a critical asset, revolutionizing the business landscape, particularly in the world of marketing. The rise of digital platforms, mobile devices, and social media has led to an explosion in data generation and data mining, making it essential for companies to harness this information effectively. This massive accumulation of data is referred to as "big data," a term describing vast datasets that are too large or complex to be processed using traditional data management tools. Defined by the four V's: volume, velocity, variety, and veracity. Big data provides businesses with the potential to extract actionable insights to improve decision-making and gain a competitive edge (Gandomi & Haider, 2015).

This literature review examines the role of big data analytics in targeted and predictive marketing within the South African retail sector. It explores key concepts, opportunities, challenges, and existing knowledge gaps, offering insights into the transformative potential of data-driven marketing strategies in this dynamic context. Through the analysis of current research and case studies, this review aims to contribute to a deeper understanding of how South African businesses can leverage big data to drive innovation and competitive advantage in the retail industry.

2.1. Research Problem Analysis

The widespread introduction and adoption of big data analytics within the retail marketing sector globally has transformed the engagement style and pattern corporations have with their customers. Through this, corporations are now able to engage customers more effectively, optimize campaigns and drive strategic decision making in driving revenue and sales. However, within the South African market, the potential to which the extent big data analytics can be used in driving the aforementioned goals remains grossly underutilized. This is not only solely focused towards technological and infrastructural constraints but rather as result of a critical behavioural factor – trust. With a particular emphasis on privacy data regulations such as the Protection of Personal Information Act (POPIA), these regulations play a

huge and central role in shaping and dictating how businesses perceive and apply these big data analytical tools.

With big data analytics promising enhanced personalization, predictive targeting and improved customer insights, organizations and corporations alike remain cautious in utilizing big data analytics due to the ever-growing concerns surrounding data misuse, regulatory breaches and ethical accountability. With the growing tension between innovation and consumer protection with the growing need for the use of big data analytics, this poses a unique challenge for South African retailers who must navigate a complicated regulatory and cultural environment in remaining competitive and "ahead of the game" in a digital-centric economy.

Whilst there is a plethora of academic literature which exists and focuses broadly on the technological benefits of big data and general adoption models, there is limited empirical evidence and academic literature which exists which highlights the exploration of how privacy trust influences the perceived value of big data analytics and tools – more particularly within emerging digital economies and markets like South Africa. Therefore, there is a critical gap in understanding the psychological and regulatory barriers which impact the adoption of big data analytics for marketing purposes within the South African context.

Therefore, this research study aims to bridge the gap in addressing and focusing on the relationship between trust in privacy regulations and the perceived value of big data analytics, offering extensive insights which are both practically relevant and for marketers and theoretically/academically meaningful for digital strategy and governance research.

2.2. Research Knowledge Gap Analysis

The current research climate on big data analytics focuses primarily on technological capabilities such as data mining, customer segmentation, predictive modelling and marketing optimization (Chaffey & Smith, 2022; Wedel & Kannan, 2016). A majority of these studies emanate from advanced economies with more matured regulatory structures, digital literacy and consumer data ethics. In contrast, there is limited academic/theoretical and practical insights and research conducted within

emerging markets such as South Africa, where a host of barriers and limitations exist including infrastructural limitations such as the widening digital divide, digital trust and regulatory compliance which present unique challenges (Mpinganjira, 2022; Lotriet et al., 2010).

Businesses and organizations within the South African retail market have begun to increasingly venture and use big data analysis towards targeted, personalized and predictive marketing approaches, yet the adoption surrounding the use of big data analytics remains uneven and cautious within the market. Large retailers in South Africa such as Woolworths and Pick n Pay have integrated data-driven strategies given their large consumer base (Buldoo, 2018), however, small and medium sized retailers often express hesitancy in the use of big data analytics due to privacy concerns, the limited technological prowess to conduct big data and research analysis, limited data infrastructure and uncertainty surrounding the regulatory environment, particularly the inaction and enforcement of the Protection of Personal Information Act (POPIA).

Although current literature emphasizes the uses and practical application of big data analysis in matured markets, there is limited research which empirically explores the psychological and organisational drivers of trust in privacy laws and how this affects the perceived value of big data tools (Bélanger & Crossler, 2021; Chakraborty & Majumdar, 2023). A large portion of research within this field focuses on consumer trust in brands, or technical implementation challenges without connecting this to how marketing professionals themselves perceive the usefulness of big data analytics under the lens of regulatory trust

There are frameworks which speak to the adoption of big data analytics and its use, such as the Technology Acceptance Model (TAM) which have been applied to the study of technology adoption in various contexts and sectors (Venkatesh & Bala, 2022). However, a few studies apply the TAM theoretical framework within the scope of regulatory trust and big data adoption within the South African retail market. The lack of empirical and data-driven research on this topic presents a critical gap as organizations try to pivot and balance innovation, with compliance, transparency and consumer protection,

Therefore, this study contributes to filling this gap by focusing on the link between trust in data privacy regulations and the perceived value of big data analytics among marketing professionals in South Africa's retail sector. By anchoring the investigation in both theoretical models and practical concerns, the research aims to provide actionable insights for marketers, policy-makers, and technology leaders navigating a rapidly evolving data-driven environment.

2.3. Literature Review

2.3.1. Introduction to Big Data Analytics

Big data has emerged and cantered itself as a critical and transformative force within the global marketing landscape, which affects the which fundamentally alters how business understand, target and engage with consumers. In the modern-day digitized economy, the ability to harness and utilize large-scale, real-time data is not only a competitive advantage but has cemented itself as strategically imperative for organizations which seek relevance and agility within a customer-centric society.

Big data can be referred to as the management of datasets that are too large, complex and fast-moving with the need to be processed using non-traditional data management tools. A research study by Gandomi and Haider (2015) highlights that big data can be described using the dour V's framework namely:

- Volume (massive amounts of data),
- Velocity (speed of data generation and processing),
- Variety (diverse data types — text, video, clickstreams, etc.), and
- Veracity (the accuracy and trustworthiness of the data).

The aforementioned characteristics have given a new rise to modern analytical approaches which allow businesses and organizations alike to draw actionable insights from structured and unstructured data sources through big data.

Historically, the use of descriptive statistics and analysis was always used in drawing strategic, targeted and predictive marketing approaches. However, this personalized and often generic way of utilizing data lacked a personal analysis of consumer insights, these descriptive statistics included sales figures, consumer demographic profiles or past purchase/payment histories, which were used in assessing business performance and campaign planning. However, in a study conducted by Chaffey and Ellis-Chadwick (2019), the study highlights that there has been a pivotal shift towards the use of predictive and prescriptive marketing approaches and strategies where algorithms anticipate consumer behaviour, drawing insights from this in forecasting consumer shopping and spending trends, even recommending strategic action items. The evolution of the use of big data and its associated analysis has been

catalysed by the widespread use and adoption of cloud computing, social media, IoT devices and machine learning.

With the advent of machine learning and artificial intelligence (AI), these technologies now lie at the crux of hyper-personalised marketing approaches and strategies. Explained in a research study conducted by Erevelles, Fakuwa and Swayne (2016), the use of big data analytics enables business, organisations and retailers to build dynamic customer profiles, track real-time behaviour and deploy the use of automated, customised, personalised content and offers at a much larger scale than before. This use can be found in product recommendations and location-based advertising, which through the use of big data, has significantly increased the relevance, speed and precision to which customer engagement efforts are fostered by big businesses both locally and globally.

The diagram below visually represents the transition of big data usage in marketing over time illustrating how big data analytics evolved from simple metrics to complex, real-time predictions powered by AI:



Figure 1: Evolution of Big Data in Marketing (Own Work)

With the process of collecting, analysing, and interpreting large datasets, marketers are now able to uncover hidden patterns, trends, and correlations that can guide strategic decisions. In the business to consumer business realm, big data analytics is particularly transformative, enabling businesses to enhance customer segmentation, optimize marketing strategies, and improve return on investment (ROI). Two key applications of big data analytics in modern marketing are targeted marketing and predictive marketing. Targeted marketing involves the use of data to identify specific customer segments based on demographics, behaviour, and preferences, allowing companies to deliver personalized marketing messages (Chaffey & Ellis-Chadwick, 2019). On the other hand, predictive marketing employs historical and real-time data

to anticipate future consumer behaviours, enabling businesses to forecast customer needs and preferences, which leads to more effective marketing interventions (Erevelles, Fukawa, & Swayne, 2016).

With an increasing emphasis and reliance on customer-centricity, the use of big data analysis can be aligned to being the "new oil" of the marketing sector. As Brynjolfsson and McElheran (2019) argue, firms which adopt and utilise the functionalities which come with the use of big data analysis always outperform organisations and businesses which rely solely on experience and intuition. This is quite evident within emerging digital sectors such as e-commerce, fintech and retail, where customer interaction points are digital and constantly generating behavioural consumer and market data.

The study of big data does not refer to only data in itself but it also refers to the ecosystem that lies in the opportunities and challenges of big data as well as the capabilities and competencies associated with the storage and analysing of really big data sets to support a certain level of corporate decision making that is proven to be the most accurate and time efficient than anything that has ever been attempted in the history of business and marketing (Elgendy & Elragal, 2016).

Therefore in summary, the adoption and use of big data has not only revolutionised the tools and techniques used in modern-day marketing, but has reshaped the mindsets of marketing professionals who now operate in an environment shaped by real-time insights and data, adaptive learning strategies and technologies and data governance which are now critical in brand storytelling and creative marketing. However, with these new capabilities comes newfound risks, particularly within data privacy, security and ethical use. With the research study exploring the trust in data privacy and its linkage to the perceived use of big data analysis, the research will delve deeper into key topics in providing heightened insights on this important topic.

2.3.2. Big Data Adoption in South Africa's Retail Sector

The adoption of big data analytics within the South African retail sector is progressive in nature, albeit unevenly, with businesses utilizing big data analysis in recognizing the added value it brings towards the execution of immersive marketing strategies and experiences. Retailers have increasingly begun to shift away from the more traditional and one-size fits all approaches when it comes to consumer marketing, opting for more sophisticated, customer-centric strategies which are informed by large-scale data analysis. This shift has been largely influenced by global trends in both emerging and mature markets cantered around the advent of digital transformation, drawing inferences from local economic, infrastructural and regulatory realities.

With the growing use of big data analytics, South African retailers have begun experimenting with basic data analytical tools in understanding customer preferences and behaviour (Buldoo, 2018). The limited use at the advent of big data analytics use in SA, often limited by technological constraints and data availability led to early initiatives focusing simply on customer segmentation and campaign tracking (Buldoo, 2018). With the emergence of Advanced Analytics between the 2010s – 2020s heightened by the proliferation of digital technologies and increasing volume of data generated both online and offline interactions, South African retailers began anchoring their marketing strategies based of advanced data analytical techniques. By employing a data-driven praxis towards their bespoke marketing initiatives, the use of predictive analytics and machine learning algorithms have enabled retailers to anticipate customer needs, personalize marketing messages and optimize pricing structures and product/service promotions (Matthew, Kevin, & Brian, 2015).

2.3.2.1. Leading Adopters in SA Retail Market – Woolworths and Pick 'n Pay

Certain large retailers within the South African market have emerged as pioneers within the implementation and use of big-data analytical initiatives and overall marketing strategies in South Africa. Through leveraging the use of loyalty programmes, these retailers have amassed the capability of gathering and analysing

consumer data in a way that enhances overall customer engagement, retention and personalization.

One such retailer is Pick n Pay, through the use of its innovative Smart Shopper Programme which utilises transactional and behavioural data in offering tailored discounts and promotions to individual customers. The use of big data analysis within the Smart Shopper Programme is used to understand individual customer shopping patterns, segment customers and predict future customer behaviour, thus enabling more targeted campaigns which drive loyalty and increase sales (Buldoo, 2018).

Similarly, the Woolworths WRewards Programme integrates purchasing behaviour with CRM (Customer Relations Management) data in providing customers with personalised offers, shopping suggestions and predictive stock availability. The application of big data analytics within both marketing and supply chain management ensures that Woolworths enhances customer experience whilst improving operational efficiency (Buldoo, 2018).

As mentioned above, the strategic use of loyalty programmes in leveraging the use of big data analytics emerge as a strategic tool to foster long-term customer loyalty and strengthen brand-customer relationships. In this context, loyalty programs serve as a key independent variable that influences how businesses engage with and retain customers. By collecting and analysing data from loyalty programs, businesses can offer personalized promotions, targeted rewards, and curated shopping experiences. This data-centric approach can significantly enhance customer satisfaction, increase retention rates, and build sustained loyalty (Wang & Kim, 2023).

Therefore, these examples illustrate the potential of big data analytics has been realised and utilised by larger and more digitally savvy and mature retailers, particularly those with infrastructure, analytics capabilities, and resources to make significant investments in data strategy.

2.3.2.2. Barriers to Broader Adoption of Big Data Analytics

Despite the advancements made surrounding the use of big data analytics in the South African retail market, the wider adoption of big data analytics remains rather

constrained, particularly within the Small, Medium and Micro-Enterprises (SMME's). There are several contextual factors which elaborate further on this including but not limited to:

2.3.2.2.1. Infrastructure and Internet Access

In a research study conducted by Lotriet, Mathee and Alexander (2010), the ongoing digital divide as a result of a lack of robust and affordable digital infrastructure particularly within the semi-urban (township) and rural areas. Although South Africa has seen a significant expansion towards internet connectivity in the recent years, factors such as internet quality, cost and stability of connectivity remains an ever pressing barrier towards the use of fully integrated systems which support real-time analytics.

More recently, a research study by Radebe (2020) highlights that whilst urban retailers benefit from broadband access and computing services due to the availability of internet and technological infrastructure in urban areas, smaller retailers within underserved and more underprivileged communities lack the technical capacity to collect, store and analyse large volumes of data. The urban-rural digital divide directly impacts the scalability of big data adoption across the country.

2.3.2.2.2. Digital Literacy and Human Capital

In addition to infrastructure, South Africa is currently experiencing a skills gap within the labour market when it comes to the critical skills required in data analytics, AI and machine learning (Mpinganjira, 2022). The skills-gap is evident even when retailers display a willingness to invest in transformation as there is a shortage of employees who possess the requisite technical and analytical capabilities which stagnates and undermines the implementation of digital transformation practices in the workplace.

Mpinganjira (2022) additionally points out that a majority of marketing teams operate without utilising the services of dedicated data specialists, forcing the reliance on generic metrics rather than leveraging the use of advanced analytics in driving strategic insights. This therefore limits the depth of personalisation and

predictive marketing which companies can implement, therefore reducing big data's impact on the holistic customer experience.

2.3.2.2.3. Cost and Return on Investment

The implementation of big data systems often requires not only infrastructure and talent, but also significant financial investments. For many retailers, particularly SMME's, the high upfront costs associated with the implementation and use of data storage solutions, analytical told and staff training is often viewed as a risky exercise, particularly within these uncertain and unprecedented economic climates. Businesses may perceive the utilisation of big data analytics as a mere luxury than a necessity, leading to the delayed adoption despite the awareness surrounding the potential benefits that the utilization of these systems hold (Lotriet et al., 2010; Radebe, 2020).

2.3.3. The Mobile-First Advantage

South Africa possesses one of the greatest assets in overcoming digital constraints, which lies primarily in its high mobile penetration. As of 2023, 97% of South Africans own a mobile phones, with the use of smartphones rising steadily (Statista, 2023). This presents a powerful opportunity for mobile-first marketing strategies which rely on app-based interactions, SMS campaigns, location data and real-time customer feedback interactions.

Retailers who are at the forefront of building mobile friendly loyalty apps and customer interfaces can be at the forefront of overcoming infrastructural limitations by engaging directly with customers through their phones. This makes mobile commerce and mobile analytics a critical element of Africa's evolving big data ecosystem.

2.3.4. Summary of Adoption Status

In summarizing the adoption of big data analytics within the retail South African market, we can ascertain that although leveraging the use of big data analytics within the South African retail market is gaining traction, the subsequent adoption thereof remains uneven. With major retail chains having shown how big data can be

subsequently integrated into personalized marketing strategies, factors such as infrastructural limitations, skills shortages and financial constraints continue to hinder the widespread implementation, particularly amongst small businesses.

With South Africa as an emerging digital market, the mobile-first environment and emerging cloud-based platforms present a promising pathway towards the broader adoption of big data analysis provided that digital literacy and trust in data governance and frameworks are simultaneously addressed. The next section will explore how privacy trust and regulatory frameworks (e.g., POPIA) influence perceptions of value and confidence in data-driven marketing — a critical factor in realising the full potential of big data in South Africa.

2.4. Trust in Data and Privacy Regulations

2.4.1. POPIA Regulatory Laws and Acts

There are various laws which govern third party data storage and usage. With data privacy laws governing how data is managed, kept and used, South Africa has recently amended its Protection of Personal Information Act (POPIA), an act which establishes the right and duties that safeguard personal data, promoting the right to privacy within the constitution (Government Gazette, 2013). The act promotes for the ethical use of consumer and customer data through enforcing the lawful processing of personal data. Published in the Government Gazette Notice 37067 on November 26, 2013, the act also mandates for businesses to grant consent from their consumers prior to data collection and also grants consumers the right too access, modify and/or delete their data (Government Gazette, 2013). With amendments to the act having been modified as recent as 2020, the act now imposes penalties for non-compliance, which has strengthened accountability within data-driven industries.

2.4.2. The Influence of Regulatory Frameworks towards Consumer and Business Trust in Big Data

2.4.2.1.Impact on Consumers and Customers

Regulatory framework inaction and implementation has a far-reaching influence and impact towards consumer trust in a business. Research has shown that perceived transparency of a business's privacy practices has a positive effect on customers' commitment to the business (Chen, et al., 2023). In essence, customers are more likely to heighten their engagement with businesses that have strong data privacy practices. Through the instillation of regulatory compliance practices, there is a lessened fear towards the misuse of data, fostering greater acceptance of personalised marketing approaches. Also, when businesses utilise transparency within their data handling practices, such as the use of opt-in features and privacy policy agreements tends to reassure customers and consumers that their data will be used ethically, giving a sense of data security (Morić, Dakic, Djekic, & Regvart, 2024).

2.4.2.2. Impact on Businesses

Businesses that utilise and promote the use of ethical data management practices often enhance brand reputation and reduce legal risks associated with data misuse. With many businesses aligning to local and international data regulation frameworks, the adoption of privacy-by-design frameworks ensure heightened competitive advantage between businesses and enterprises alike, aptly positioning brands as ethical data handlers. With many repercussions including loss of customer trust and consumer backlash resulting from business non-compliance or poor data management practices, it is imperative for businesses to adopt proper data governance policies which enable data compliance and consumer trust building.

2.4.3. The Role of Corporate Data Governance Policies in Compliance and Trust-Building

- With the advent of data regulation laws worldwide, it is now imperative for businesses to implement internal policies which ensure the secure collection

of data, its storage and subsequent use. This includes the adoption of internal data governance frameworks and policies which provide:

- Clear business/company data management guidelines as aligned to the POPIA and other international data regulatory frameworks for cross-border data and business management such as the GDPR.
- Enhanced and frequent employee training programmes centred on ethical data handling
- Data minimization strategies in ensuring only minimal and relevant data is collected from consumers

Therefore, corporates which adopt stringent and robust data protection strategies and policies are more than likely to gain consumer and investor confidence.

2.4.4. Case Studies: Data Privacy Breaches and their Impact on Consumer Trust

There has been a number of cases which highlight privacy breaches and the impact this has/had on customer and consumer trust, such as the Facebook-Cambridge Analytica Scandal of 2018 and the Experian South Africa Data Breach of 2020. These case studies highlight the significance and importance of ethical data management practices within organisations in protecting and safeguarding the use of acquired customer data.

2.4.4.1.Facebook-Analytica Cambridge Scandal 2018

The Facebook-Analytica Cambridge Scandal of 2018 remains one of the most talked about data breaches in global history. With social media at the forefront of political discourse and engagement, it was rather disturbing for social media users to find out that their social media platforms were used in influencing public opinion surrounding the 2016 elections in the United States of America (Brown, 2020). It was discovered in March 2018 that a personality quiz app used by Aleksandr Kogan was used to collect the private data of the 300 000 users who had subscribed to the quiz app. During this time, the app collected the Facebook data of an estimated 87 million Facebook users who had connected to the app. In an apparent dishonest act by the app developer, the developer sold the mined data to Cambridge Analytica (Brown, 2020). Cambridge Analytica then utilised this data in the delivery of targeted

political advertisements, a form of predictive marketing, on Facebook. With the matter addressed by US Senate, Facebook was not found to have been complicit in the data breach, but most users blamed the social media app for the misuse of their data (Brown, 2020).

2.4.4.2. Experian South Africa Data Breach of 2020

Experian, a global credit reporting company which is headquartered in Dublin, Ireland is well-known for analysing and processing customer data in minimising and preventing the occurrence of identity fraud and theft in South Africa. With some of their services including risk credit management and reporting, their core business entails the use of a lot of customer data. On the 19th of August 2020, the South African Banking Risk Centre (SABRIC) reported that Experian had experienced a data breach exposing more than 24 million South African's personal data and the business data of around 793,000 local businesses (Deruiter, 2020). Information leaked included residential addresses, identity document numbers, names and occupation details. The data breach occurred through a fraudulent individual who posed as a client and obtained a warrant to confiscate data, posing as "secure and deleted" (Deruiter, 2020). With the data made available on the social media app Telegram, Experian reiterates that only personal information and not financial information was made available to the public. The data breach was reported to the National Credit Regulator and the National Information Regulator but however, the ramifications following the data breach has left customers and businesses alike doubtful and unprepared for what other breaches could come (Deruiter, 2020). Following this, there has been an increased call towards heightened scrutiny on data security policies in South African businesses.

2.4.5. Implications of Data Privacy Breaches

With the rising costs of data security and data breaches, companies worldwide are spending more money now than ever n security measures and software in mitigating security breach risks. With security and data breaches not only causing insurmountable financial losses for businesses, but also loss of customer trust which would see customers withdrawing from the businesses affected (Deruiter, 2020). In mitigating this, businesses will often have to provide free services to their customers

in retaining their customer base, resulting in huge financial losses. With impacts ranging from declining consumer confidence in business and discouraged engagement in data-driven marketing, companies also face legal, financial and reputational damage (Juma'h & Alnsour, 2020). Social implications surrounding data breaches include companies which report data breaches often signal internal company deficiencies, and as such the affected companies become liable towards their customers, employees and investors (Juma'h & Alnsour, 2020). Practical implications include the remediation of losses through the use of reserved funds, which further highlight the aforementioned financial losses (Juma'h & Alnsour, 2020).

2.4.6. Privacy Concerns and Data Security in Big Data Usage

Where data is involved, there are often privacy concerns regarding big data usage and associated data harvesting utilised by big businesses. One of the most major issues surrounding privacy concerns is consumer fears of data misuse (Bao, Chen, & Obaidat, 2018). This includes unwarranted online surveillance through the use of cookies and AI monitoring, as well as unauthorised access to personal information by certain business and company websites (Bao, Chen, & Obaidat, 2018). This fear of "loss of personal control" where data is concerned has consumers fearing the excessive collection of their personal data without their informed consent (Bao, Chen, & Obaidat, 2018). This invasion of privacy, exacerbated by the aforementioned online and digital tracking mechanisms has enhanced the fear of identity theft and cybersecurity risks in which consumers and customers fear the hacking of personal details for fraud use or general misuse (Bao, Chen, & Obaidat, 2018). Given the digital era we find ourselves in, there is growing scepticism surrounding the lack of transparency as to how companies use acquired customer data in their everyday business practices (Bao, Chen, & Obaidat, 2018).

2.4.7. Business Strategies Used to Mitigate Privacy Concerns

In helping businesses strategize in mitigating privacy concerns amongst customers and clients, business can strategies and implement a few measures in ensuring

heightened data security protocol within their enterprises, including but not limited to:

Data Consent Mechanisms:

Businesses with online subscriptions/services should allow their customers the ability to opt-in/opt-out of their subscriptions/services online through easy access features on their websites, ensuring that users have control over their data-sharing preferences

Data Encryption and Anonymization:

Securing personal data through encryption, encrypting this data at rest and in transit and at rest through de-identification and tokenization to prevent unauthorized access and misuse in the event of a data breach.

Strict Access Controls: Limiting data access to only authorized persons and within reason, modifying settings towards who can view and who can modify data.

Transparent Privacy Policies: Clearly outline how customer data is used and stored by gaining informed consent before personal and sensitive data is collected.

Regular Security Audits: Conduct periodic cybersecurity assessment risks, vulnerability scans and periodic penetration testing to identify and address potential weaknesses in security

2.4.8. Ethical Challenges in Data Collection, Storage, and Sharing

There are challenges regarding the ethics surrounding data collection, sharing and storage in the digital age. Challenges include informed consent dilemmas, which research has shown that many users do not either fully understand or read privacy policies before agreeing when sharing their data online, the agreement towards dubious privacy policies can lead to third-party sharing of personal data for data monetization efforts unbeknown to consumers. This raises questions surrounding data monetization ethics, to which the question is raised “Can businesses profit from consumer data?”, which highlights concerns surrounding the fair usage of data. With third-party data sharing also bearing its own set of risks, companies share primary consumer data with third party data brokers, advertisers and other businesses, often without the explicit knowledge of customers and consumers. Also, data sharing within the evolution of artificial intelligence has heightened the challenges surrounding AI data bias in data analytics, in which through the use of algorithmic

decision-making, discriminatory practices can be adopted stemming from the use either corrupted or biased data collection practices. Lastly, marketers need to start finding a common ground between offering personalised/tailored digital marketing experiences and respecting consumer data privacy

2.4.9. Overall Summary and Importance of Topic - Data Privacy and Perceptions of Data

In overall summary, the research highlights the importance of maintaining data privacy in ensuring heightened consumer trust in businesses and/or organizations. Consumer trust in the privacy regulations articulated by a business in a manner which is easy to understand and comprehend influences consumers' decision and willingness to engage with big data analytics. Whilst businesses also utilise big data for predictive and targeted marketing initiatives, it is important for businesses to leverage the use of big data analytics for marketing insights whilst complying with strict privacy laws. As evidenced in case studies referenced in this study, data breaches highlight the need for heightened data governance and security practices. Ultimately, companies which prioritise ethical data governance and management practices gain long-term customer trust and loyalty.
Therefore, the research tests the following hypothesis:
H4: Trust in data privacy and regulations does not have a positive and significant impact on the perceived value of big data and analytics.

2.5. Theoretical Framework – Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a framework that is widely used in explaining the usage and adoption of new technologies by users. The TAM is anchored on two main principles, mainly:

- **Perceived Usefulness (PU):** This is centred around the belief to which the extent of the use of new system will enhance an individual's performance
- **Perceived Ease of Use (PEU):** This refers to the extent which an individual feels that the use of a new system will be free of effort.

With the main hypothesis to be tested as part of this research study delving into how trust in privacy regulations influences the perceived value of big data analytics in the South African retail sector, the Technology Acceptance Model highlights an integrated approach into big data analytics in the South African retail sector as anchored by consumer data privacy and trust.

2.5.1. The Technology Acceptance Model - Its Influence on Data Privacy Trust and Big Data

With trust as a critical factor which influences the adoption of big data analysis, the study endeavours to highlight how trust in privacy regulations directly influences how individuals perceive the usefulness and risks associated with the use of big data analysis. With the greater research focus looking at the impact of big data analytics within predictive and targeted marketing within the South African retail sector, the TAM theoretical framework also focuses on how trust, security concerns and regulatory compliance has been integrated into TAM in explaining in what manner privacy and data protection concerns affect the adoption of technology (Venkatesh & Davis, 2000).

2.5.2. The Role of TAM in Understanding Trust in Privacy Regulations

With predictive and targeted marketing on the rise given the new digital age of technology, research has shown that trust in data privacy laws and regulations influences the adoption of technology and associated systems (Gefen et al., 2003). With varied research highlighting this link, research conducted includes:

- Research conducted by Bélanger & Carter (2008) states that users who trust data regulations are more likely to be in acceptance of data driven technologies as opposed to users who have diminished trust in data regulations (Bélanger & Carter, 2008).
- Research by Pavlou (2003) highlights that organisations and business with weak privacy laws contribute significantly to the negative perceptions surrounding big data analysis and digital marketing (Pavlou, 2003).
- Research conducted by Smith, Dinev & Xu (2011) highlight the aspect that clear data governance laws within organisations and businesses improve

perceived usefulness, resulting in increased consumer engagement as aligned to big data analytical practices (Smith et al., 2011).

With the study contextualised towards the South African retail sector, the inaction of the Protection of Personal Information Act (POPIA) forms a crucial basis in aiming towards enhancing consumer trust, ensuring the ethical use of personal customer data by business and organisations.

2.5.3. The Adoption of Big Data Analytics in South Africa (TAM)

With heavy reliance on consumer trust in handling the adoption of big data analytics within the field of marketing, research within this niche has highlighted important findings, including a linkage between the perception of big data as useful and engagement with personalised advertisements and recommendations (Chen, Chiang & Storey, 2015). When users perceive the use of big data in marketing as useful, they more they are likely to engage in personalised recommendations and advertisements (Chen et al., 2015). Further research further highlights that when users are faced with perceived data privacy risks, there is diminished trust in the organisation and/or business, inducing a sense of hesitation amongst users in sharing their personal data online (Li, Sarathy, & Xu, 2011). When businesses align with regulatory compliance such as POPIA, with the addition of heightened data protocol transparency (subsequently leading to ease of use), this encourages the adoption of data-driven marketing strategies (Bansal, Zahedi, & Gefen, 2016)

2.5.4. Case-Study Analysis: TAM's Relevance in Data Privacy and Trust

The research study utilised two pertinent cases which highlight the misuse of big data analytics as a result of data breaches. Case studies include the Facebook-Analytica Cambridge Scandal of 2018 and the Experian South Africa Data Breach of 2020.

The Experian South Africa data breach of 2020 compromised the personal data of 24 million South Africans. This grotesque data breach eroded the trust individuals had towards digital platforms (Deruiter, 2020). Highlighted as "South Africa's largest identity theft case" (Lacey, 2020), the erosion of trust, leading to decreased use of digital media platforms and data sharing from customers, highlighted that customers

who viewed big data analytics as risky (low PEU) were less likely to engage in marketing efforts. Accompanied by the significant rise in telecommunications fraud, which has increased by more than 78% in South Africa from the 2023 - 2024 period (Reddy, 2024), South Africa's data regulatory intervention (POPIA) was adapted and utilised as a response measure in rebuilding the perceived usefulness of big-data driven services.

The Facebook-Analytica Cambridge Scandal of 2018, a massive data breach affecting more than 87 million resulted in the global distrust concerning social media marketing (Isaak & Hanna, 2018). The public response towards this concerning incident demonstrated that perceived risks outweigh perceived usefulness, reducing engagement with associated online and digital platforms. Following this massive scandal, businesses endeavoured to improve data transparency policies and frameworks, restoring perceived ease of use and usefulness (Sharma, Mithas, & Kankanhalli, 2019)

2.5.5. The integration of TAM With Privacy Trust in Improving Big Data Adoption

In enhancing technology acceptance, businesses need to begin aligning their marketing strategies alongside TAM-driven trust factors which include (Venkatesh, & Davis, 2000):

- Increase perceived usefulness: Provide adequate consumer education on the enhancement effect of how big data analysis positively impacts their shopping experiences
- Enhance perceived ease of use: Ensure the implementation of user-friendly data privacy settings which are in compliance with local data regulatory laws (such as POPIA) and international regulatory laws for cross-border businesses (such as GDRP).
- Address privacy concerns: The strengthening of data security in preventing data breaches that hamper consumer confidence

2.5.6. Theoretical Framework Conclusion

TAM provides a solid theoretical foundation in fostering an enhanced understanding of how trust in privacy regulations influences the adoption of big data analytics.

With well-known cases such as the Experian South Africa Data Breach of 2020 and the Facebook-Analytica Cambridge Scandal of 2018 highlight how privacy concerns hinder the adoption of new technologies and systems. This ultimately emphasises the ongoing need for data regulatory compliance, transparency and broader consumer education. In utilising TAM principles as a foundational digital business concept, businesses can foster trust, increase adoption and maximise the value surrounding big data marketing.

2.6. Conclusion of Literature Review

The literature review has highlighted the transformative potential of big data analytics within retail South Africa in driving personalized and predictive marketing. However the literature review also notes that the perceived value of these tools is not shaped by technological capacity alone, but significantly influenced by organisational trust in data privacy regulations.

With global studies having established an importance towards data governance and trust, there is a research and knowledge gap in localised, empirical research that explores how South African marketing professionals interpret and respond to privacy legislation such as POPIA. Furthermore, there are very limited studies which show the integration of regulatory trust into frameworks like the Technology Acceptance Model (TAM) to assess how it influences perceptions of usefulness and adoption intent.

This study therefore contributes to the existing body of knowledge by positioning privacy trust as a key determinant of the perceived usefulness of big data analytics — a factor that can either accelerate or inhibit data-driven marketing innovation in South Africa's evolving digital economy.

This therefore means that this research study proposes the following hypotheses listed in Table 1. Hypotheses and core references

Table 1: Hypothesis and Core References

Hypothesis	Core references

H1: Trust in data privacy and regulations does not have a positive and significant impact on the perceived value of big data and analytics.	(Government Gazette, 2013). (General Data Protection Regulation, 2016) (Brown, 2020) (Deruiter, 2020)

2.7. Hypothesis One

Trust in data privacy and regulations does not have a positive and significant impact on the perceived value of big data and analytics.

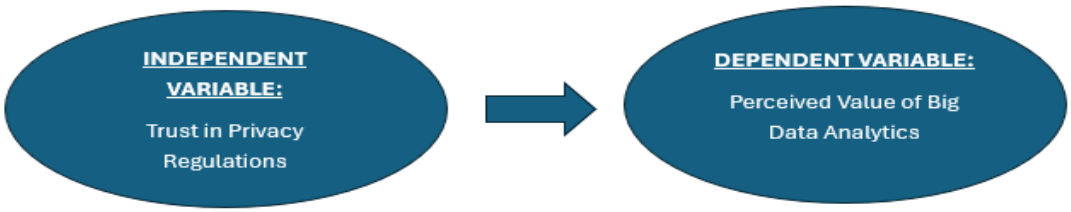


Figure 2: Conceptual Framework For Hypothesis One

2.8. Research Framework

2.8.1. Proposed Research Strategy

The research strategy for examining the role of leveraging big data analytics for targeted and predictive marketing in the South African retail sector adopted a positivist research paradigm. Positivism emphasizes the objective measurement and analysis of observable phenomena to uncover patterns, relationships, and causal mechanisms (Creswell, 2014). This paradigm emphasizes the objective measurement and analysis of observable phenomena to uncover patterns, relationships, and causal mechanisms. By applying this paradigm, the research aims to quantify the impact of big data analytics on marketing strategies and test predefined hypotheses through statistical analysis.

The study will employ a quantitative research approach using structured data collection methods to gather data from a large sample of marketing professionals in the South African retail sector. The use of quantitative methods aligns with the positivist paradigm, allowing the researcher to objectively measure variables and draw conclusions about the relationships between big data analytics and marketing performance. The research focused on one key hypothesis:

2.8.1.1. Hypothesis 1: Trust in data privacy and regulations does not have a positive and significant impact on the perceived value of big data and analytics.

Dependent Variable: Perceived Value of Big Data Analysis
Independent Variable: Trust in Data Privacy and Regulations

CHAPTER 3: RESEARCH METHODOLOGY

This chapter outlines the research methodology employed in this study. It begins with an overview of the research framework, followed by a discussion of the research paradigm and design. The chapter then details the target population, sampling strategy, and sampling method used to ensure representativeness. It further describes the research instrument and data collection procedures, followed by an explanation of the data analysis techniques applied to interpret the findings. Lastly, the chapter discusses the study's limitations, the measures taken to ensure validity and reliability, and the ethical considerations upheld throughout the research process.

3.1. Research Approach

This study adopted a positivist research paradigm, which was based on the principles of empirical observation, measurement, and objectivity in studying human behaviour. Positivism was commonly associated with quantitative research methods, where data collection relied on structured tools that could be measured statistically. The rationale behind choosing this paradigm is that big data analytics adoption, trust in privacy regulations, and marketing performance can be empirically tested and generalized using statistical models. However, while positivism emphasizes reasoning and observation, its application in an online survey raises important methodological considerations:

Observation in Online Surveys: Traditional empirical observation in positivist research often involves direct, real-time measurement (e.g., experiments or behavioural tracking). In contrast, online surveys rely on self-reported perceptions and attitudes, which do not allow researchers to directly observe participants' actual behaviour. Since respondents may answer based on perceived experiences rather than direct actions, cognitive biases(e.g., recall bias, social desirability bias) may influence responses (Podsakoff et al., 2012). This questions whether true "observation" is achieved in a positivist sense.

Reasoning in Online Surveys: Positivism assumes that causal relationships can be determined through reasoning and statistical analysis. In online surveys, statistical

reasoning is applied after data collection, but there is no direct reasoning process occurring during the data collection itself.
While regression models and inferential statistics help explain patterns, the lack of real-time interaction and probing limits the depth of reasoning compared to experimental or mixed-method approaches(Creswell & Creswell, 2018).

Alternative Considerations For Future Research Consideration: Complementing Positivism with Pragmatism

Given these limitations, a pragmatist paradigm could provide additional benefits by incorporating both quantitative (positivist) and qualitative (interpretivist) methods. Mixed-method approaches, such as follow-up interviews or focus groups, could validate survey responses by capturing real-world context.

Triangulation with behavioural data (e.g., tracking consumer interactions with marketing campaigns) could enhance observational validity. While positivism remains an appropriate paradigm due to its structured approach and statistical rigor, its reliance on online surveys raises concerns about the true role of observation and reasoning. Incorporating pragmatist elements (such as qualitative validation) could enhance the credibility of the research findings by bridging perception-based data with real-world behaviours.

In using a quantitative approach, the research had effectively looked into the opportunities that lie in the use of big data and advanced analytics in the world of marketing, particularly within predictive and targeted marketing approaches utilized by big businesses with a stark focus on the impact trust in data privacy regulations and the perceived value of big data analytics within the retail marketing sector in South Africa. Through the use of regression modelling, correlation analysis and exploratory factor analysis, the research outlines the significance of the influence trust in privacy regulations has in influencing the perceived value of big data analytics within the South African Retail Sector.
This approach had worked well with the research stated as through the use of theories and literature, it had brought about a well-defined structure and argument in ultimately proving or disproving a hypothesis. The use of quantitative analysis

brought an element of reliability within the research findings as the research is of an objective nature and with this, means that the data was adequately studied by scientific research in deducing scientific assumptions surrounding the given topic (Kock, Avison, & Malaurent, 2017). Though the use of this approach in this research had allowed for a well-defined structure which had enabled discussion and critique of the topic, the only disadvantage is that the approach disregards human behaviour and emotions as this makes the research prone to objective inference. However, because the research used hypothesis testing and existing literature to form a logical discussion of the findings, this eliminates the need for objective inference as data collected will form the objective basis for the arguments in this research (Kock, Avison, & Malaurent, 2017).

3.2. Research Design

The research had used an online questionnaire which was sent out to the participants. The study was a cross-sectional study as it used a correlational approach in looking into the opportunities that lie in the use of big data and advanced analytics in the world of marketing to solve marketing problems and develop more effective strategies within corporates.

The online questionnaire was appropriate for this research as it was able to be dispersed to a large number of participants effectively, having greater advantage than physical surveys which need to be filled in (Owens, 2002). The online questionnaire was standardised, all participants were able to receive the exact same questions, eliminative subjectivity and any objective inference (Owens, 2002). In having had introduced objectivity into the study, the research questions posed were to be answered according to the research needs. The appropriateness of the research instrument that was being sent online was further strengthened by the fact that this study is objective and action-orientated in its output (Owens, 2002).

The online surveys were relatively inexpensive to distribute and are cost-effective within their flexibility as they were used on a plethora of digital media platforms such as emails, WhatsApp, Twitter and messaging apps in having had prompted participants to fill in their responses to the questions posed. Lastly, online surveys showcased their dependability and reliability as they aid anonymity of the

participants which helped in gathering candid and honest responses (DeFranzo, 2012; Owens, 2002).

The disadvantages in having had used an online questionnaire is survey fraud which can occur, largely due to the absence of the interviewer which can result in skewed and biased data (Sincero, 2012). Also, due to the digital divide faced in South Africa and lack of access to technology, including high costs of data, this could cause an inability to reach a challenging population, those without the means to access the survey (Sincero, 2012). There was also a risk of questions being misunderstood as the interviewer could not physically be present to clarify any questions a participant may have (Sincero, 2012).

3.3. Population and sample

3.3.1. Population

The research target was to have been to have targeted individuals who are employed within marketing and big data and consumers who utilise digital media platforms for marketing and advertising services. This had entailed individuals who were based within the Johannesburg region.

The population had to entail employees of big telecommunications firms and advertising firms and marketing firms. This would have formed the population which one would have sampled from:

- Employees within firms which specialised in big data analytics
- Employees of telecommunication firms such as MTN, Vodacom, Cell C and Telkom South Africa.
- Consumers with smart phones who consume advertising on their devices
- Employees within the marketing space including digital media marketers/influencers.
- Consumers that interact and engage with digital marketing.

The research did not cover individuals who merely work within these spaces, but those who are on the front lines of marketing and big data analysis.

There was limited research surrounding this topic within South Africa as highlighted by the literature review and as such, this is one of the few studies conducted in South

Africa on the influence of trust in data privacy regulations towards the perceived value of big data analytics within the South African retail sector.

3.3.2. Sample and sampling method

This study employed a non-probability sampling approach, specifically convenience sampling, to gather data from individuals with relevant experience and perspectives on big data analytics and consumer trust in the South African retail sector. The researcher distributed the questionnaire electronically via social media platforms, specifically Facebook and Instagram. However, participation was not limited to the researcher's direct connections on these platforms. Instead, friends and followers shared the survey link with others, significantly expanding the reach of the study beyond the researcher's immediate network and increasing the number of responses.

A total of 57 responses were initially collected through the online survey. However, 25 responses were excluded due to missing values in key variables, leaving 32 valid responses for analysis. To determine an appropriate sample size, the study applied Nassiuma's (2000) formula:

$$S = \frac{N(CV^2)}{CV^2 + (N-1)e^2}$$

where:

- S = Sample size
- N = Population size
- CV = Coefficient of variation
- e = Standard error

According to Nassiuma (2000), an acceptable coefficient of variation ranges between 20% and 30%, while the standard error should be between 2% and 5%. This formula is particularly useful as it does not assume any probability distribution, making it a stable measure of variability. By employing this method, the sample was deemed appropriate for statistical analysis.

Non-probability sampling techniques, such as convenience sampling, were commonly used in exploratory research when access to a random sample is challenging, and when the goal was to gather insights from a specific group of respondents (Saunders, Lewis, & Thornhill, 2019). Although this method does not allow for generalizability to the broader population, it is useful in obtaining preliminary findings on consumer attitudes and behaviours regarding data privacy, big data usage, and marketing analytics.

The adequacy of the sample for factor analysis was further confirmed through the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (0.647), which met the minimum threshold for factor analysis. Descriptive statistics were used to ensure a diverse representation of opinions. The survey utilized closed-ended questions measured on a 7-point Likert scale to capture varying levels of agreement or disagreement. This structured approach facilitated efficient data collection and analysis while ensuring consistency in responses (Hair et al., 2020).

3.4. The research instrument

Data used in research was categorized as either primary or secondary. Primary data refers to information collected directly from respondents specifically for the purpose of addressing the research problem (Saunders et al., 2019). In contrast, secondary data consists of previously collected information that was gathered for purposes other than the current study (Bell, Bryman, & Harley, 2022). This study relied on primary data to ensure that the findings directly address the research objectives and provide relevant insights into the use of big data analytics in South Africa's retail sector.

To collect primary data, this study employed a structured, closed-ended electronic questionnaire as the research instrument. The questionnaire allowed respondents to conveniently complete the survey remotely. This digital format enhanced accessibility while streamlining data collection and storage. The questionnaire consisted of items measured on a 7-point Likert scale, enabling respondents to express varying degrees of agreement or disagreement with specific statements.

Close-ended questions are used to ensure consistency in responses, reduce response time, and enhance the reliability of the collected data (Zikmund et al., 2020).

Table 2: Operationalization of Study Variables

Research Variable	Type of Variable	Number of items to be measured	Type of measurement
Perceived Value of Big Data and Analytics	Dependent	3	Subjective Text Input, 6-point options and 7-point Likert Scales

3.5. Procedure for data collection

Questionnaires were self-administered, interviewer-administered, or a combination of both (Saunders, Lewis & Thornhill, 2003). This research study utilized a self-administered electronic questionnaire created using WITS Qualtrics. The online platform enabled the researcher to generate a survey link, which was then shared on Facebook, Instagram, WhatsApp, and via email. The survey invitation included a brief description of the study, encouraging individuals with relevant experience in South Africa's retail industry to participate.

To ensure the clarity and validity of the questionnaire, a pilot study was conducted on October, 2022. The pilot study helped assess whether respondents understood the questions and identified any sections that did not generate valid responses. Based on the pilot feedback, necessary adjustments were made to improve the questionnaire's effectiveness before the full-scale data collection began.

Data collection took place over a six-week period, starting on September 1, 2022. The questionnaire was designed to be mobile-friendly and accessible across various devices, including smartphones, tablets, laptops, and desktop computers. This allowed respondents to participate conveniently without needing to switch devices or print the questionnaire. The estimated completion time was between 5 to 10 minutes, as indicated at the beginning of the survey.

Although the study initially aimed to collect responses from 80 participants, a total of 57 responses were received. After data cleaning, which involved removing 25 incomplete responses, 32 usable responses remained for analysis. To increase participation beyond the researcher's immediate network, the survey link was shared widely on Facebook and Instagram. Friends and connections were encouraged to share the link further, allowing the questionnaire to reach a broader audience beyond the researcher's direct contacts. This extensive sharing process helped mitigate some of the biases associated with convenience sampling, ensuring a more diverse and representative dataset.

3.6. Data analysis and interpretation

The data analysis and interpretation in this study involved a systematic examination of the collected quantitative data to extract meaningful insights pertinent to consumer trust, data privacy, and the perceived value of Big Data analytics within the South African retail sector. Initially, descriptive statistics were employed to summarize respondents' levels of trust in organizations handling personal data, their perceptions of control over collected information, and their attitudes towards online advertising. These statistical measures provided a foundational understanding of the central tendencies and variability within the dataset. Subsequently, exploratory factor analysis (EFA) was conducted to identify underlying constructs, revealing two primary factors: 'Perceived Value of Big Data and Analytics' and 'Trust in Privacy and Regulation.' The reliability of these constructs were assessed using Cronbach's Alpha, yielding coefficients of 0.707 and 0.694, respectively, indicating acceptable internal consistency (Hair, Black, Babin, & Anderson, 2019). Further, regression analysis established a statistically significant relationship between 'Trust in Privacy and Regulation' and 'Perceived Value of Big Data and Analytics' ($\beta = 0.388$, $p = 0.028$), suggesting that increased trust in privacy measures correlates with a higher perceived value of Big Data initiatives. Throughout the analysis, adherence to statistical assumptions and rigorous data validation techniques ensured the robustness and credibility of the findings, providing valuable insights for stakeholders aiming to enhance consumer trust and leverage data analytics in the retail industry.

3.7. Limitations of the study

The ability to generalize the study findings to the broader population was constrained due to the electronic nature of data collection. The study faced challenges related to limited data availability and restricted analysis of relationships between independent variables. This research focused exclusively on the retail sector in South Africa, rather than examining the entire business landscape. The study was limited to consumer perspectives and did not incorporate insights from firms or businesses. The lack of in-person interviews meant that respondents could not ask for clarification on any questions they found unclear. To mitigate this, a guide was provided to assist participants in completing the questionnaire. Participation in the study required access to a smartphone, laptop, tablet, or desktop computer, as well as an active Facebook or Instagram account, which may have excluded individuals without these resources. The survey was limited to a highly niche sample group consisting of professionals and clients who interact with big data and marketing, either from a consumer or business perspective. This specificity significantly reduced the sample size, making it difficult to capture a broader range of insights

3.8. Validity and reliability

3.8.1. External validity

External validity refers to the extent to which the study's findings can be generalized to a broader population or different contexts (Bryman & Bell, 2015). In this study, the limited sample size (n = 32) reduced the generalizability of the results, as it may not have fully capture the diversity of consumer attitudes towards data privacy and Big Data analytics. Furthermore, the sample was drawn from a specific demographic, potentially limiting the applicability of the findings to other populations with different consumer behaviours, regulatory environments, or levels of technological adoption (Saunders et al., 2019). The reliance on self-reported survey data also introduced the possibility of social desirability bias, where respondents provided answers they perceive as more socially acceptable rather than their true beliefs (Podsakoff et al., 2012).

Despite these limitations, the study employed standardized survey instruments and validated scales, enhancing its comparability with existing research on consumer trust, privacy concerns, and the perceived value of data analytics. Future research with a larger, more diverse sample and cross-cultural comparisons could further strengthen the external validity of the findings.

Other measurements towards external validity included:

- Pretesting of the research questionnaire in ensuring it measured what it intended to measure
- In ensuring content validity was maintained within the research study, an in-depth literature review was conducted in ensuring that the research incorporated well-established and viable variables (Babin, Carr, Griffin, & Zikmund, 2012).
- Exploratory Factor Analysis was used in the research study, highlighting the application and assessment of construct validity. Logically grouped into two factors, namely the Perceived Value of Big Data and Analytics and Trust in Privacy Regulation

Example of Utilization of These Constructs include:

- Utilizing Exploratory Factor Analysis through conducting testing including Kaiser-Meyer-Olkin testing and Bartlett's Test of Sphericity

3.8.2. Internal validity

The internal validity of this study was reinforced by the rigorous data cleaning process, where incomplete responses were excluded, ensuring that only complete and relevant data were analysed. This minimized bias and enhanced the accuracy of the findings (Saunders, Lewis, & Thornhill, 2019). The application of well-established statistical techniques, including exploratory factor analysis (EFA) and regression analysis, further strengthened internal validity by verifying the structure of the constructs and establishing meaningful relationships between variables (Hair et al., 2019). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (0.647) and the significant Bartlett's Test of Sphericity ($p < 0.001$) confirmed that the data were suitable for factor analysis, ensuring construct validity. Additionally, the regression model demonstrated statistical significance ($F = 5.306$, $p = 0.028$), and key

regression assumptions—including linearity, normality, independence of errors, and homoscedasticity—were met, ensuring the robustness of the causal inferences drawn (Field, 2018). However, the small sample size (n = 32) may limit statistical power and reduce the generalizability of the findings.

The study also utilised the following measures in ensuring that internal validity was adhered to as part of the research study:

- The pretesting of the online questionnaire ensured the research model functioned as intended, thus reducing any possible errors during data collection and analysis
- In refining the online research survey, the study ensured the maintenance of internal validity, reducing data measurement errors.

Example of Utilization within the research study includes:

- The final survey was restructured according to findings originating from the pilot study which ensured primarily the clearer measurement of trust and perceived value

3.8.3. Reliability

Reliability was assessed using Cronbach's Alpha, with the construct *Perceived Value of Big Data and Analytics* achieving an acceptable internal consistency ($\alpha = 0.707$), while *Trust in Privacy and Regulation* exhibited moderate reliability ($\alpha = 0.694$). Although the latter was slightly below the conventional threshold of 0.70, it is still considered acceptable for exploratory research (Hair et al., 2019). The consistency of responses across multiple items within each construct suggests that the measurement scales are stable and suitable for further analysis. Given the moderate to strong reliability scores and the validation of constructs through EFA, the study's results can be considered reasonably reliable. However, the small sample size and potential response bias should be considered when interpreting the findings.

Further explanations include:

- The use of the Cronbach's Alpha measured internal consistency, and results thereof indicated an acceptable and moderate reliability scores, particularly

for the variables measuring Trust in Data Privacy and Regulation as well as the Perceived Value of Big Data and Analytics.

- This therefore means that the survey items were reliable, thus meaning that if the measurement instrument was repeated, it would yield reliable and consistent results

3.9. Ethical Considerations

Various ethical concerns were identified which include (Connelly, 2014; Resnik, 2011; Marczyk, DeMatteo, & Festinger, 2005):

- Participant confidentiality in research
- Participant harm due to unforeseen adverse reactions to study\
- Consent to participate in study and research
- Beneficence of study to research participants
- Competency to give consent to partake in study

In reviewing the appropriateness of the study in exercising ethics, the following were to have been observed:

The research instrument and overall study design was to be reviewed and approved by an **institutional review board** (Connelly, 2014). The study was a no-animal contact research and the research are designed to ensure voluntary participation in the study and the protection of participants from harm against any benefit from the researcher. This was reviewed and approved by the review board stated (Marczyk, DeMatteo, & Festinger, 2005).

The study also strived to ensure that **informed consent** was given prior to the start of the participation into the study (Marczyk, DeMatteo, & Festinger, 2005). To ensure this, the research instrument had a cover letter included which was intended to prompt participants to agree or disagree to partaking in the research. This research instrument cover letter was the key in ensuring informed consent is obtained prior to being exposed to the research. Informed consent includes (Kock, Avison, & Malaurent, 2017):

- Consent to participate within this research was **voluntary**
- Consent (as expressed by the cover letter) was detail to participants as to what is expected of them as they endeavour to partake within this research

- Targeted participants would have been **competent** enough to give consent to partake in the study
- Participants would have been allowed to **withdraw** or stop partaking within the research at any time

The research study was to have been mutually beneficial to both participant and researcher by minimising harm which may be caused by the research and study. This also highlighted that confidentiality of participants is to be held within the highest regard as they participate within this research. Boundaries were to have been maintained and any adverse effects by virtue of partaking within this study would have been minimised. Any adverse consequence and harm (should it arise) would have be reported to the Wits University's Ethics Committee.

Time constraints did lead to public domains having had been used in filling out the questionnaire. For this, responses were to have been kept safe in an online cloud platform which will be password protected and after three years, these will be destroyed.

CHAPTER FOUR: RESULTS AND FINDINGS

4.1. Demographic

A total of 57 responses were extracted from the data collection platform. Of these 57, there were 25 cases with missing values for most of the important variables and were thus excluded from the sample. Thus, a total of 32 cases were analysed as part of the research process.

It is however noted that while generally a large sample size exceeding 250 persons is recommended when conducting a data reduction technique such as exploratory factor analysis and regression analysis, this research study adhered to the validity and reliability assumptions in applying these techniques to the 32 viable responses, which highlights the strength and adequacy of the research data collected from this rather than ideal sample size. As we delve deeper into the chapter, one will note validity and reliability assumptions were met, inclusive of the Kaiser-Meyer-Olkin (KMO) Measurement which confirmed sampling adequacy, whilst the Bartlett's Test of Sphericity confirmed the validity of factorable relationships. With the use of the Cronbach's Alpha Test inclusive of factor loadings and other reliability tests ensured that constructs are robust and measurable. In conclusion, although the sample size is seemingly small, the research response quality and statistical assumptions' strength supported the appropriateness of the analysis as highlighted in this chapter.

The sample size focused on both consumers and employees, with consumers forming most of the respondents within the study. However, it is noted that when it comes to big data, employees showed a heightened propensity towards fostering an understanding of leveraging the use of big data within the marketing sector and its use in South Africa. With marketing professionals forming a niche specialist sector in South Africa, the greater understanding reinforces the smaller sample size utilised, accounting for the missing data from the initial 52 respondents, to which these respondents who gave incomplete responses being consumers. Ultimately, the research study focused more on data quality as opposed to data quantity due to the difficulty in attaining a vast number of responses from designated marketing

professionals which were earmarked for this study. Thus, the study ensured responses were valid, reliable and generalizable within the scope of the study.

In conclusion, we can argue that at face value, a sample size of 32 participants may appear rather small when aligned with conventional statistical recommendations, however, the research highlighted that the quality and composition of responses faired far greater than their sheer quantity. With the inclusion of both employees and consumers bringing about a balanced perspective, employees contributed deeper insights into big data technology whist consumers provided real-world applicability and practicality towards this research study.

The respondents selected for the survey included 18.42% males (i.e., 7 males) and 81.58% females (i.e., 31 females) (refer to Figure 1 below). This implies that the study was not gender-neutral but was rather skewed towards female smartphone users. Arguably, the findings obtained from this study may be criticized for being less generalized to reflect the overall trends of the South African market in using big data analytics. Furthermore, when emphasizing the racial profiles of the respondents included in the survey, the study was skewed toward the African/Black population (refer to Figure 2 below), which can be argued as a rational distribution, considering that African/Blacks are the majority in South Africa. Hence, even if the sampled population included a larger proportion of the African/Black population, the findings obtained through the survey are racially generalized enough to represent the overall market conditions.

The sample population also included both consumers and employees in the South African marketing sector, whereby 33 respondents were consumers, and 7 respondents were employers/employees (refer to Figure 3 below). Arguably, employees were more likely to present a better understanding of big data technology being used in the market than the consumers, although the knowledge presented by the consumers, in general, does not indicate any insufficiency for the context. Therefore, it can be argued that the findings obtained through the survey were effective in presenting a generalized understanding of the big data trends observable within the South African market.

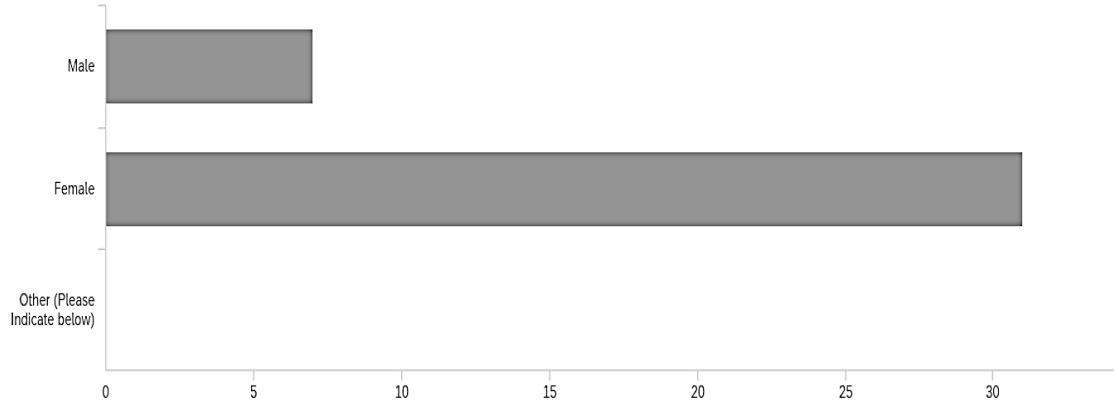


Figure 3: Gender Distribution of Sampled Population

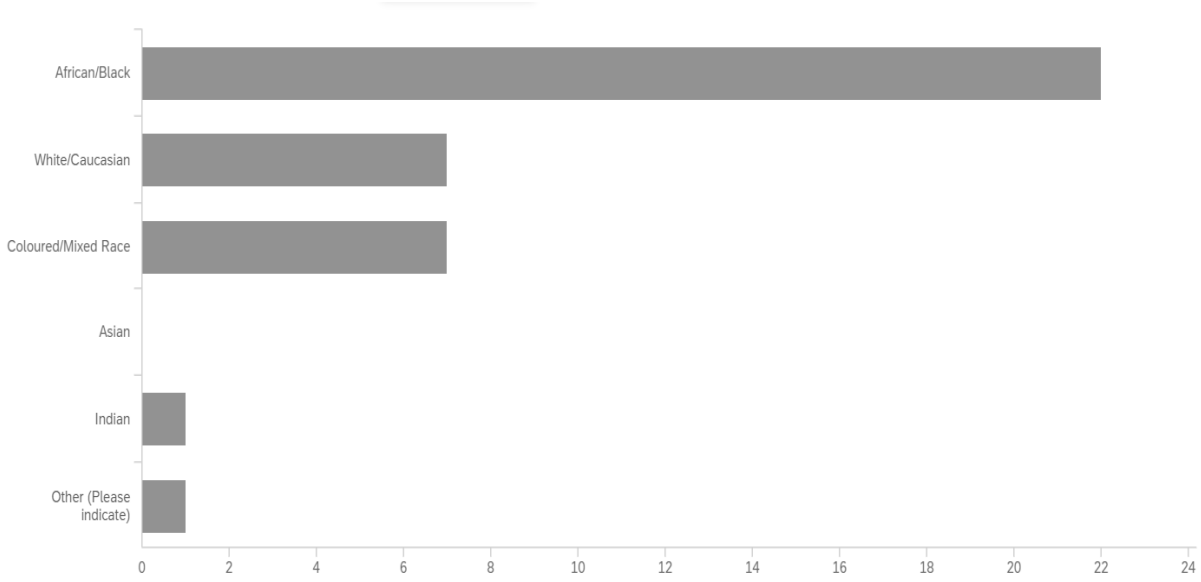


Figure 4: Racial Distribution of Sampled Population

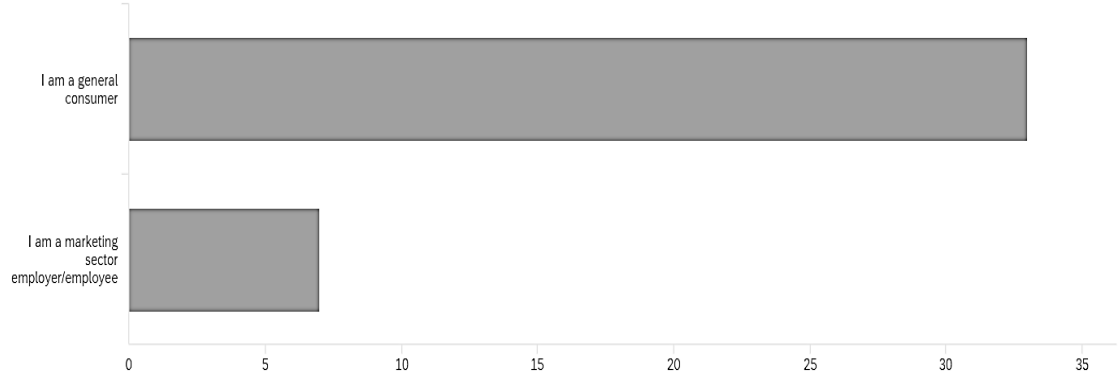


Figure 5: Classification of Respondents as Consumers and Employers/Employees in Research Study

4.2. Descriptive statistics

Respondents moderately trust organizations with their personal data (3.53 ± 0.950) and feel somewhat in control of what information is collected through their online behaviour and privacy settings (3.34 ± 0.937). While they moderately read terms and conditions when using online services (3.66 ± 1.181), their trust in existing privacy laws is moderate (3.22 ± 0.941). Concerns about third-party access to personal communications lead to some avoidance of discussing sensitive topics (2.78 ± 1.008), and their confidence in the government's respect for personal data privacy is moderate (3.25 ± 0.984). Respondents generally disagree with preferring to pay for services rather than sharing data (1.84 ± 0.847) and do not find pop-up ads relevant to their needs (1.91 ± 0.893). There is moderate engagement with purchasing via advertisement links (3.69 ± 1.355) and agreement that online advertising can be invasive (2.03 ± 1.031). Disagreement or low agreement is evident regarding the importance of analytics in business today and the future (1.78 ± 0.975) and the value of Big Data for decision-making (2.06 ± 0.948).

In the context of business and Big Data, respondents are moderately satisfied with current customer loyalty levels (4.95 ± 1.071) and view loyalty programs as essential (5.10 ± 1.972), though opinions vary significantly. They moderately rely on data to build client loyalty (4.58 ± 2.009) but report moderate experience and knowledge in Big Data (3.55 ± 1.683) and low-to-moderate confidence in handling analytics in-house (3.29 ± 1.678). While respondents are somewhat willing to share data with third parties to enhance customer loyalty (3.44 ± 2.121), their willingness increases

when assured the data will benefit customers (4.00 ± 2.092). The responses exhibit variability across many items, indicating diverse perspectives among the participants.

Table 3: Descriptive Statistics

Item	N	Min	Max	Mean	SD	Skewness	Kurtosis
Q3: Trust in organizations regarding personal data	32	1	5	3.53	0.95	-0.34	0.38
Q4: Feeling in control of collected information	32	2	5	3.34	0.94	-0.02	-0.89
Q5: Reading terms and conditions	32	1	5	3.66	1.18	-0.53	-0.79
Q6: Trust in laws and government regulations on privacy	32	2	5	3.22	0.94	0.27	-0.76
Q7: Avoidance of personal matters in emails/texts	32	1	5	2.78	1.01	0.07	-0.52
Q8: Government respect for privacy of personal data	32	2	5	3.25	0.98	0.33	-0.82
Q9: Preference to pay rather than sharing personal data	32	1	4	1.84	0.85	0.99	0.85
Q10: Relevance of pop-up ads	32	1	4	1.91	0.89	0.77	-0.01
Q11: Purchasing through advertisement links	32	1	5	3.69	1.36	-0.88	-0.30
Q12: Perception of online advertising as intrusive	32	1	5	2.03	1.03	1.06	1.00
Q13: Importance of business analytics	32	1	5	1.78	0.98	1.58	2.92
Q14: Value of Big Data in decision-making	32	1	5	2.06	0.95	1.32	2.26
Q5_1: Customer loyalty satisfaction (1-7 scale)	21	3	7	4.95	1.07	0.37	-0.42
Q6_1: Essentiality of client loyalty programs (1-7 scale)	21	1	7	5.10	1.97	-1.14	0.14
Q8_1: Data reliability in client loyalty (1-7 scale)	19	1	7	4.58	2.01	-0.31	-0.88
Q13_1: Experience/knowledge in Big Data (1-7 scale)	22	1	7	3.55	1.68	0.08	-0.33
Q14_1: Confidence in handling Big Data in-house (1-7 scale)	21	1	6	3.29	1.68	0.20	-1.37

Q17_1: Willingness to share data with a third party for customer benefit (1-7 scale)	18	1	7	3.44	2.12	0.42	-1.22
Q19_1: Willingness to disclose data if used for customer benefit (1-7 scale)	17	1	7	4.00	2.09	0.05	-1.33

4.3. EFA results

Exploratory factor analysis was conducted to assess the validity of constructs. The results indicated that the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy is 0.647, indicating that the sample was adequate for factor analysis, as value was above the minimum acceptable value of at least 0.5. The Bartlett's Test of Sphericity was significant (Chi-Square = 64.028, df = 21, Sig. = 0.000), confirming that the correlation matrix is significantly different from an identity matrix and that there are sufficient correlations among the variables to proceed with factor analysis.

Table 4: KMO and Bartlett's Test of Sphericity

Test	**Value**
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.647
Bartlett's Test of Sphericity	
Approx. Chi-Square	64.03
df	21
Sig.	<0.000

(Source: Survey Results)

The Total Variance Explained table indicated that two factors were extracted using Principal Axis Factoring, as their eigenvalues exceed 1 based on the Kaiser Criterion. Factor 1 had an initial eigenvalue of 2.833, explaining 40.469% of the variance, while Factor 2 had an eigenvalue of 1.427, contributing an additional 20.383%, resulting in a cumulative variance of 60.852%. The remaining factors, with eigenvalues below 1, contribute minimal variance and were excluded as they add little meaningful information. Overall, the two-factor solution provides a moderately strong representation of the data, explaining over 60% of the total variance.

Table 5: Total Variance Explained

Factor	Initial Eigenvalues	Extraction Sums of Squared Loadings	Rotation Sums of Squared Loading
	Total	% of Variance	Cumulative %
1	2.833	40.469	40.469
2	1.427	20.383	60.852
3	.915	13.066	73.919
4	.681	9.735	83.653
5	.577	8.238	91.891
6	.391	5.590	97.482
7	.176	2.518	100.000

(Source: Survey Results)

The EFA identified two constructs. The first construct namely, Perceived Value of Big Data and Analytics, and Trust in Privacy and Regulation. The items within each of the factors loaded highly onto their respective factors confirming a clear distinction between the two factors. The two district factors are presented in Table 4. This suggests that there were two valid constructs.

Table 6: Pattern Matrix

Construct	Items	Factor 1	Factor 2
Perceived Value of Big Data and Analytics	Q14 The most valuable benefit of Big Data is better decision-making	0.962	
	Q13 Analytics in business is important today and will be even more important in the future	0.787	
	Q11 I usually purchase using the provided link on the advertisement	0.360	
Trust in Privacy and Regulation	Q8 The government of my country respects the privacy of my personal data		0.747
	Q6 I trust that the existing laws and government regulations with regard to the protection of my privacy are appropriate and proportionate		0.640

	Q12_R I find online advertising redundant and sometimes even an invasion of privacy		0.548
	Q3 I trust the organizations or institutions with regards to the use of my personal data		0.463

(Source: Survey Results)

4.4. Reliability of scale

The reliability of scale was assessed using Cronbach's Alpha. The results presented in Table 5 show that the construct Perceived Value of Big Data and Analytics, consisting of three items, had a Cronbach's Alpha of 0.707, indicating acceptable internal consistency and suggesting that the items reliably measure the construct. Similarly, the construct Trust in Privacy and Regulation, comprising four items, had a Cronbach's Alpha of 0.694, which is just below the conventional threshold of 0.70 but still reflects a moderate level of reliability. These results suggest that both constructs are reasonably consistent and suitable for further analysis. This means that the items within each construct could be combined to form a composite scale for each construct. The composite scale was computed by getting the average of items retained within each construct.

Table 7: Reliability Level

Construct	**N of Items**	**Cronbach's Alpha**
Perceived Value of Big Data and Analytics	3	.707
Trust in Privacy and Regulation	4	.694

(Source: Survey Results)

4.5. Regression Model

The descriptive statistics and Pearson correlation analysis revealed that the mean score for Trust in Privacy and Regulation was 3.49 ± 0.706, suggesting a moderate level of trust in privacy and regulatory measures. The mean score for Perceived Value of Big Data and Analytics was lower at 2.51±0.880), indicating a comparatively lower perception of Big Data's value. The correlation between the two

constructs is 0.388, which is statistically significant ($p < 0.05$). This positive but moderate correlation suggests that individuals who have higher trust in privacy and regulation also tend to perceive greater value in Big Data and analytics. However, the relationship is not strong, implying that other factors may influence perceptions of Big Data's value.

Table 8: Descriptive Statistics and Pearson Correlation

Construct	Mean	SD	1.	2.
1. Trust in Privacy and Regulation	3.49	0.706	1	
2. Perceived Value of Big Data and Analytics	2.51	0.880	0.388*	1

(Source: Survey Results)

4.6. Regression Analysis

Regression analysis was conducted to assess the causal effect of Trust in Privacy and Regulation on Perceived Value of Big Data and Analytics. The model summary shows that Trust in Privacy and Regulation explained 15% of the variance in the dependent variable, Perceived Value of Big Data and Analytics, as shown by an R Square value of 0.150.

Table 9: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.388[a]	0.150	0.122	.66121	2.006

a. Predictors: (Constant), Trust in Privacy and Regulation

b. Dependent Variable: Perceived Value of Big Data and Analytics

(Source: Survey Results)

The ANOVA table results showed an F-statistic is 5.306, and the p-value is 0.028, which is less than the conventional significance level of 0.05. This indicates that the regression model as a whole is statistically significant, suggesting that Trust in

Privacy and Regulation significantly predicts the Perceived Value of Big Data and Analytics.

Table 10: ANOVA Table

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.606	1	3.606	5.306	0.028[b]
Residual	20.390	30	0.680		
Total	23.997	31			

Notes: a. Dependent Variable: Perceived Value of Big Data and Analytics

b. Predictors: (Constant), Trust in Privacy and Regulation

(Source: Survey Results)

The coefficients showed that Trust in Privacy and Regulation and Perceived Value of Big Data and Analytics ($\beta = 0.388$, t-value = 2.303, p-value = 0.028) had a positive and significant effect on the Perceived Value of Big Data and Analytics. The effect was positive since the standardized coefficient (0.388) was greater than zero. The effect was significant since the p-value (0.028) was less than 0.05. This indicates that Trust in Privacy and Regulation is a significant predictor of Perceived Value of Big Data and Analytics.

Table 11: Regression Coefficients

Model	Variable	Unstandardized Coefficients (B)	Unstandardized Coefficients (Std. Error)	Standardized Coefficients (Beta)	t	Sig.
1	(Constant)	0.822	0.747		1.101	0.280
	Trust in Privacy and Regulation	0.483	0.210	0.388	2.303	0.028

Notes:

a. Dependent Variable: Perceived Value of Big Data and Analytics

(Source: Survey Results)

4.7. Testing Regression Assumptions

4.7.1. Test for Linearity

The Pearson correlation of 0.388 between t Trust in Privacy and Regulation, and Perceived Value of Big Data and Analytics suggested that there is a moderate positive relationship. Since the correlation is positive and statistically significant ($p < 0.05$), this indicates that there is a linear association between the two variables. This indicates that the linearity assumption was met.

4.7.2. Test for Normality

The bars of the standardised regression residuals fell mainly below the regression curve, which indicates that the residuals where either normally distributed or approached a normal distribution. This indicates that the normality of residuals assumption was also met.

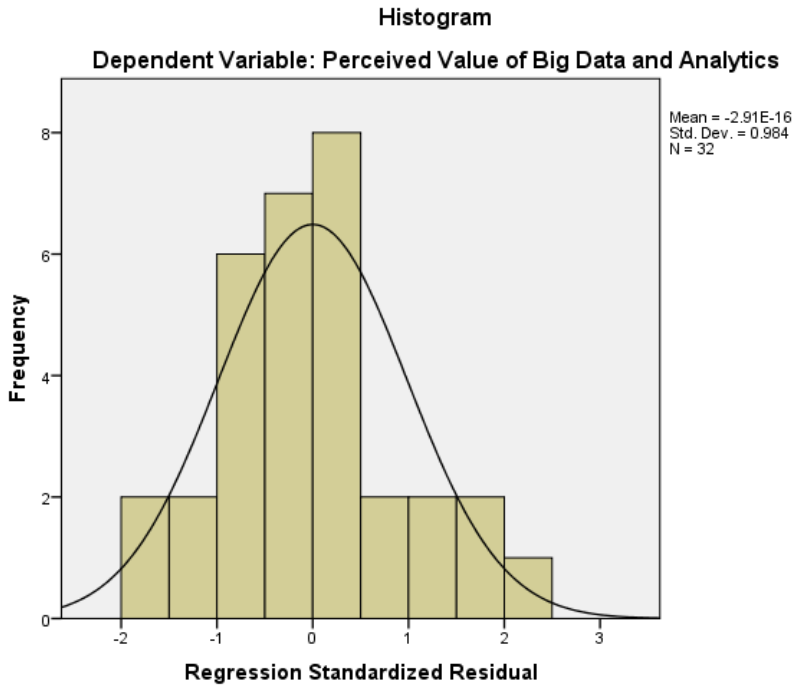


Figure 6: Histogram

4.7.3. Test for independence of error teams

The Durbin-Watson statistic is 2.006, which is close to 2, suggesting that there is no significant autocorrelation in the residuals. Thus, the assumption for no autocorrelation was met.

4.7.4. Test for Homoscedasticity

The homoscedasticity assumption suggests that the spread or dispersion of the residuals should be approximately the same for all values of the predictor variable ensuring that the model's prediction is equally reliable across the entire range of the independent variable. The scatter plot presented in Figure 2 show that the residuals are scattered without a pattern, suggesting that the assumption of homoscedasticity was also met. is likely met.

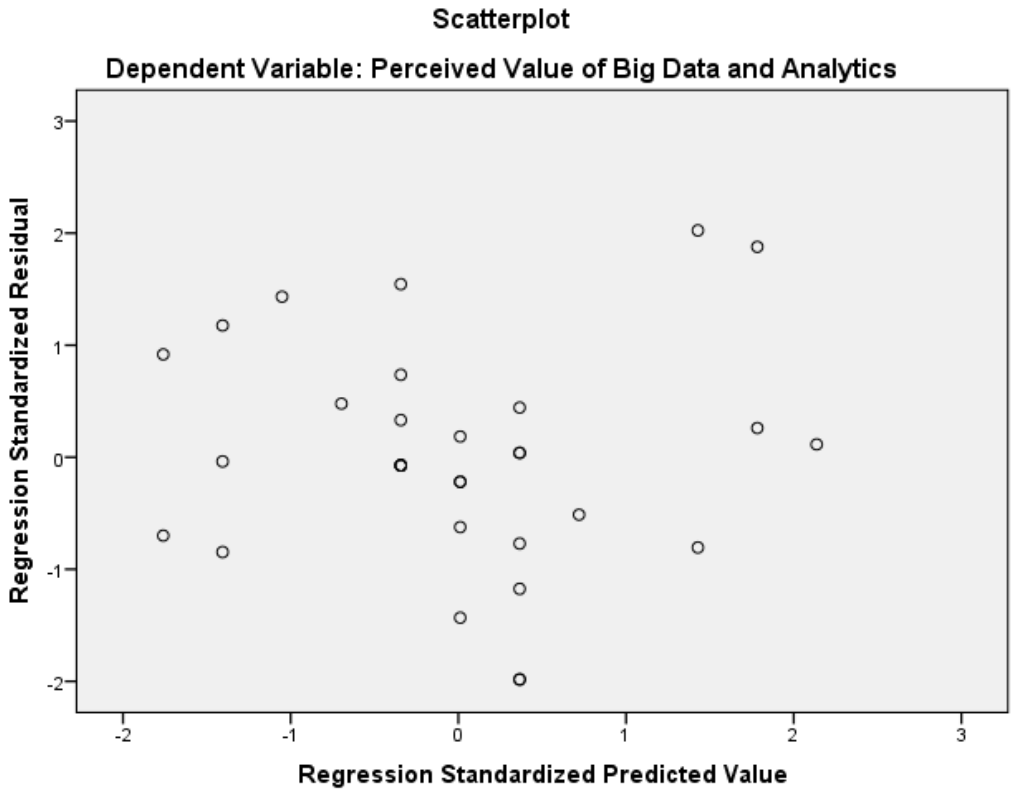


Figure 7: Scatterplot (Source: Survey Results)

It is this concluded that all the regression assumptions were met and therefore the regression results were reliable.

4.8. Conclusion

In conclusion, based on the empirical evidence presented in Chapter 4, there is enough support to accept the alternate hypotheses proposed in the research questions. These findings underscore the importance of incorporating technology tools, particularly big data analytics, in marketing strategies and recognize the vast opportunities they offer in understanding consumer behaviour and market dynamics.

This study examined the role of big data analytics in targeted and predictive marketing within South Africa's retail sector. Data was collected through an electronically distributed questionnaire shared via Facebook, Instagram, WhatsApp, and email, allowing for a broader reach beyond the researcher's immediate network. Despite efforts to maximize responses through social media sharing, the study was constrained by a highly niche sample consisting of professionals and consumers who engage with big data and marketing, which led to a relatively small final sample size.

To assess the influence of independent variables—such as performance tracking, trust in organizations, data privacy concerns, and willingness to share data—on marketing effectiveness, a multiple linear regression model was employed. This model was chosen to analyse the relationships between big data analytics and the dependent variable of marketing effectiveness. The regression results indicated that performance tracking had a statistically significant impact on marketing effectiveness, demonstrating that data-driven insights play a crucial role in shaping targeted and predictive marketing strategies. However, trust in organizations and data privacy concerns exhibited a weaker influence, suggesting that while these factors are important, they may not be the primary determinants of marketing success in the South African retail sector.

Overall, the study contributes to the understanding of how big data analytics can enhance marketing effectiveness, though the limitations in sample size and data collection methods highlight the need for further research with a more diverse and representative sample. Future studies could incorporate qualitative insights or

additional independent variables to provide a more comprehensive analysis of the relationship between big data analytics and marketing performance.

4.9. Hypothesis Findings Discussion

4.9.1. Hypothesis One

"Trust in data privacy and regulations does not have a positive and significant impact on the perceived value of big data and analytics."

Findings and Statistical Evidence: the results indicate a significant and positive relationship between privacy trust, regulations, and the perceived value of big data analytics. The study's findings suggest: Stronger Trust, Higher
Adoption: Respondents who expressed higher trust in data privacy regulations were more likely to perceive big data analytics as valuable for marketing and business decision-making. Regulatory Assurance Matters: Compliance with data protection laws (such as POPIA in South Africa) was seen as a confidence booster, increasing consumer and organizational willingness to engage with data-driven strategies.
Alignment with Existing Literature: Prior research also highlights the role of regulatory clarity and ethical data practices in fostering trust, which, in turn, enhances big data utilization in retail sectors
Hypothesis Evaluation: Hypothesis Acceptance as statistical analysis confirms a significant and positive relationship between privacy trust and the perceived value of big data analytics, this hypothesis is **accepted.** These findings reinforce that privacy assurance and regulatory frameworks are critical enablers of big data analytics adoption, highlighting the need for transparent and ethical data practices in South Africa’s retail sector

CHAPTER 5: Discussion of Findings

5.1 Introduction

This chapter discusses the findings of the study in relation to the literature reviewed, the tested hypothesis, and the conceptual framework—specifically the Technology Acceptance Model (TAM). The discussion unpacks the implications of trust in data privacy regulations and the perceived usefulness of big data analytics (BDA) in South Africa's retail sector. Key insights are drawn from both descriptive and regression analyses and are aligned with theoretical and empirical literature. The following section discusses the findings of the study through correlating them with the research objectives in Chapter 1. The research objectives are stated, along with the findings and interpretations of these as well as an attempt to provide an explanation for the findings. Further, the findings will be linked back to the Literature Review in Chapter 2. The recommendations will follow once the discussions have concluded.

5.2 Hypothesis One: Trust in Data Privacy and Regulations

Hypothesis Statement: H4 (H_a): Trust in data privacy and regulations does not have a positive and significant impact on the perceived value of big data and analytics.

Findings and Statistical Evidence: The results indicate a significant and positive relationship between trust in data privacy regulations and the perceived value of big data analytics. Specifically:

- Stronger Trust, Higher Adoption: Respondents who expressed higher levels of trust in data privacy and regulatory compliance were more likely to perceive BDA as valuable for marketing and decision-making.
- Regulatory Assurance Matters: Confidence in the protection offered by laws such as South Africa's POPIA increased both consumer and organisational willingness to embrace data-driven strategies.

Alignment with Literature: These results align with prior research highlighting that regulatory clarity and ethical data practices foster consumer trust, which in turn

enhances BDA use in retail (Botha et al., 2017; Andreotta et al., 2021; Pavlou, 2003).

Hypothesis Evaluation: Based on the statistical evidence, Hypothesis One is accepted. The findings reinforce the conclusion that privacy assurance and strong regulatory frameworks are critical enablers for BDA adoption. They also underscore the importance of transparency and ethical conduct in data handling as cornerstones of successful big data marketing strategies in South Africa's retail sector.

5.3 Integration of Literature and Findings

5.3.1 Significance of Big Data Analytics (BDA)

The literature emphasized BDA as a strategic tool for enhancing customer engagement, segmentation, personalization, and forecasting (Chong & Shi, 2015; Elgendy & Elragal, 2016). In this study, over 87.5% of respondents confirmed regular internet use via smartphones, highlighting widespread access to mobile technology, a foundational enabler of BDA application.

Respondents defined BDA as tools that allow marketers to uncover trends and behavioural patterns for informed decision-making. This aligns with past literature suggesting that BDA provides a 360° consumer view, enhancing personalization and targeted engagement (Rejeb et al., 2020; Erevelles et al., 2016).

However, consumer distrust in how data is used (reflected in Figures 7–11) represents a critical limitation, echoing the regulatory concerns highlighted by Botha et al. (2017). While 100% of participants were aware that data was being collected, only a minority expressed trust in those practices. This underscores the importance of privacy regulations like POPIA in fostering trust—a theme also explored in the work of Andreotta et al. (2021).

5.4 Linking Descriptive and Regression Results

The hypothesis was statistically supported by both descriptive and regression data:

- Descriptive statistics showed that while many respondents acknowledged the collection of their data, only a small proportion felt secure or informed about how it was used (Figures 7–9).
- Regression analysis confirmed that higher trust in privacy and regulations significantly increases the perceived value and utility of BDA.

This evidence supports the theoretical premise that regulatory confidence fosters greater technology adoption, consistent with extended versions of the TAM framework.

5.5 Contextualizing the Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) explains technology adoption based on two key variables:

- Perceived Usefulness (PU): The degree to which a person believes that using a system enhances performance.
- Perceived Ease of Use (PEOU): The degree to which one believes the system is free of effort.

This study extends TAM by incorporating:

- Perceived Trust in regulatory compliance (a moderating factor).
- Perceived Risk associated with data misuse.

Respondents who trusted data regulations more were more likely to view BDA as useful (PU), even if privacy policies were not frequently read. This highlights trust as a critical condition that amplifies PU and lowers resistance. Thus, trust in regulatory frameworks significantly shapes TAM-related constructs, aligning with Pavlou (2003) and McKnight et al. (2002).

5.6 Implications for Theory, Policy, and Practice

5.6.1 Theoretical Implications

- Validates TAM extensions that incorporate perceived trust and regulatory assurance.

- Emphasizes that adoption of data technologies is influenced not just by technological capability but by institutional trust.

5.6.2 Practical Implications

- Marketers must focus on building transparent, ethical data strategies to cultivate trust.
- Investments in privacy policies, staff training, and user-friendly data disclosures can improve BDA uptake.

5.6.3 Policy Implications

- Stronger enforcement and visibility of POPIA can enhance confidence in BDA.
- Policies promoting simple, standardized consent formats may increase understanding and trust among users.

5.7 Contribution to Future Research

This study opens avenues for future research:

- Qualitative studies could explore perceptions of data privacy and how trust is developed in emerging markets.
- Longitudinal studies should examine how changes in regulatory enforcement affect BDA adoption and public sentiment.

5.8 Ethical Challenges

Ethical challenges are a major obstacle involved in the process of integrating big data analytics in the South African retail market. For instance, big data analytics technology tends to give third parties access to the user's personal information and any other information that they share either consciously or casually online while using their smartphones with internet connectivity. When focusing on its application in South Africa, studies revealed that even if the number of smartphone users in the country has been continuously increasing, the lack of a stable and reliable internet

service all year round tends to create a challenge for the marketers who attempt to focus on these technology tools (ITWeb, 2023; Statista, 2023). Furthermore, when accessing the information to form big data volumes, third-party organizations often lack adequate emphasis on respecting users' privacy and confidentiality rights. Arguably, even if the users are aware that their information will be collected, stored, analysed, and utilized by third parties, there is seldom any alternative made available to the users that will give them the option to prevent their data from being shared. As the data findings revealed, the users are provided with an option to either accept or reject permissions for third parties to access the data or information they share when using their smartphone applications. However, rejecting the permission often results in restricted usability of the application, therefore indirectly forcing the users to allow the requested access. However, in most cases, the users tend to give minimum or no significance to the informed consent layouts they see on the screen when installing any application on their smartphones, implying the persistent risks of privacy and confidentiality in the use of this technology tool (Sello et al., 2020; Froomkin, 2019).

5.9 Conclusion

This research confirms that trust in data privacy and regulatory compliance plays a crucial role in shaping the perceived value and adoption of BDA in the South African retail sector. With the hypothesis accepted, it is evident that strong regulatory assurance boosts confidence and supports ethical, effective big data practices. By extending TAM to include perceived trust and regulatory compliance, this study provides a nuanced view of how BDA is adopted in contexts where data governance concerns are prominent.

CHAPTER SIX: Conclusions and Recommendations

This study explored the relationship between trust in data privacy regulations and the perceived usefulness of big data analytics in the South African retail marketing sector. Using a quantitative research approach, the findings confirmed that higher levels of trust in data protection laws (e.g., POPIA) are significantly associated with greater perceived value of big data tools among marketing professionals.

While the findings are relevant and timely, this chapter reflects on the limitations of the study, highlights areas for improvement, and proposes future research pathways based on the gaps identified and the untested hypotheses.

The following section will address the conclusions and recommendations of the study.

6.1. Conclusions

This study provides valuable insights into the role of big data analytics in targeted and predictive marketing within South Africa's retail sector. The findings suggest that while performance tracking significantly enhances marketing outcomes, trust and privacy concerns play a more complex role, requiring businesses to balance data utilization with consumer confidence. The study's methodological approach, including electronic data collection and a multiple linear regression model, enabled a structured analysis of these relationships despite the constraints of a niche sample size.

While the study contributes to the existing body of knowledge, its limitations—such as a highly specialized sample, restricted generalizability, and reliance on self-reported data—underscore the need for future research. Expanding the scope to include broader consumer segments, different industries, and qualitative insights could provide a more holistic understanding of big data analytics in marketing. Ultimately, this study reinforces the importance of data-driven marketing strategies while emphasizing the ethical and practical challenges that businesses must navigate in leveraging big data for consumer engagement and business growth. The legal structure of South Africa's technology sector has been studied in its infancy, which

therefore lacks adequate emphasis on protecting the privacy and confidentiality rights of smartphone users. In this case adopting big data technology can be a challenge for South African marketers. It is thus that actions to leverage big data analytics in the market must focus on developing the infrastructure in the technology sector of South Africa. It is only then that the marketers will be able to retrieve the opportunities provided by big data.

6.2. Recommendations

Based on the findings of this study, several key recommendations can be made for businesses in South Africa's retail sector seeking to leverage big data analytics for targeted and predictive marketing. First, organizations should implement transparent data privacy policies and ensure consumers understand how their data is collected, stored, and used to build trust and encourage data sharing. Second, businesses must strike a balance between performance tracking and personalization by using ethical and consumer-friendly data practices to mitigate privacy concerns. Third, companies should invest in advanced analytics tools and skilled professionals to maximize the effectiveness of big data in marketing decision-making. Additionally, future studies should explore a broader and more diverse sample beyond a niche group of professionals and consumers directly involved with big data marketing to enhance the generalizability of findings. Finally, regulatory bodies and industry leaders should collaborate to develop standardized guidelines for responsible data use, ensuring that marketing strategies remain effective while maintaining consumer trust and compliance with data protection laws.

Big data analytics, as is observed in this research, has been increasing in terms of its significance for marketers. From a general perspective, the competitive forces in the South African retail markets have been intensifying, as companies try hard and harder to retain a higher percentage of limited resources available in the environment. In this context, having access to information that gives insights into the consumers' behavioural trends and shifts in the market environment can not only assist marketers in retaining competitive advantages but also improve their strategic efficiency to ensure a higher percentage of profitability and a more stable

competitive positioning. The findings obtained in this research also suggest that big data contributes to enriching brand-customer relationships. While these opportunities presented by big data suggest that leveraging the technology can be highly beneficial for South African marketers and brands, it is also worth considering that the technology comes with certain challenges. The first and biggest challenge for South African marketers when investing in big data technology is the lack of stable and reliable internet connectivity. The second and most significant challenge is the underlying privacy and confidentiality threats related to the collection, storage, analysis, and utilization of big data.

In summary, while big data analytics offers tremendous potential for marketers in South Africa, it's essential to navigate challenges effectively and ethically. By addressing issues of accessibility, privacy, and cultural relevance and social adoption, marketers can harness the power of big data to drive innovation, enhance customer engagement, and achieve sustainable competitive advantages in the dynamic South African market.

6.3. Limitations

Despite the contribution of this research, several limitations must be acknowledged:

6.3.1. **Limited Sample Size**

The study was based on a relatively small sample (n = 32), which may limit the generalisability of the findings. Although regression analysis was used to test the primary hypothesis, a larger sample would enhance the statistical power and allow for multivariate analysis across variables such as gender, age, experience level, and organisation type. A key limitation of this research was its limited number of respondents. For instance, this research sampled 375 respondents (N), who were randomly selected to collect the primary data. This implied that even if the questionnaire tool used for the data collection included pre-structured questions reflecting on the user and marketer perspectives because the samples were selected randomly for this research, the obtained data remained limited by generalizability and criticality. Furthermore, the sampling process was geographically limited, which also contributed to these limitations.

6.3.2. Scope of Hypotheses

While four hypotheses were initially proposed, only one—concerning the impact of trust in data privacy and regulations—was tested. The remaining hypotheses related to the impact of perceived usefulness on return on investment (ROI), campaign effectiveness, and customer acquisition. Due to data limitations, these could not be explored, narrowing the scope of the findings.

6.3.3. Data Collection Constraints

This study relied solely on self-reported Likert-scale survey data, which may be subject to response or social desirability bias. No triangulation via interviews, observational data, or secondary marketing performance metrics was conducted to validate the responses.

6.3.4. Focus on Perceptions Rather than Behaviour

The research focused on perceived value rather than actual behavioural adoption of big data analytics. A more comprehensive understanding of adoption practices would require behavioural tracking, system usage logs, or a longitudinal design.

6.4. Future Research

Future investigations will be needed to gain insights into the marketer's perspective with respect to the use of big data analytics in South Africa. Empirical evidence must also be gathered to reflect on whether big data helps to boost sales for companies. The correlation between big data application and customer engagement, customer satisfaction, as well as decision-making accuracy also needs to be investigated in future studies.

Based on the data and findings from this study, several areas emerge as opportunities for further academic research. These topics would deepen understanding, address gaps, and contribute to more effective adoption and implementation of big data analytics in marketing.

One such area involves the role of consumer digital literacy in big data adoption. While this study focused on trust and regulatory perceptions, digital literacy levels

among consumers influence how privacy policies are understood and whether individuals are willing to share personal data (Chen et al., 2021). Future research could explore questions such as: How does digital literacy impact consumer attitudes toward data privacy and sharing? and What strategies can be implemented to enhance consumer awareness of data protection regulations?

Another potential research area is the ethical implications of big data-driven personalization in retail. While consumer trust and regulatory compliance have been covered, the ethical considerations of hyper-personalized marketing are still underexplored (Martin & Murphy, 2017). Studies could address questions such as: What ethical dilemmas arise from hyper-personalized marketing strategies? and How do South African retailers balance personalized marketing with ethical consumer engagement?

In addition, further research is needed on the impact of big data analytics on customer retention and loyalty programs. Although this study considered perceptions of BDA value, more insight is needed into how data analytics improves loyalty initiatives and long-term engagement (Chakraborty & Majumdar, 2023). Future research could explore: How does big data-driven customer segmentation improve loyalty program effectiveness? and What predictive analytics models are most effective for forecasting repeat purchases?

Additional opportunities for future studies based on untested hypotheses from this research include:

- The Impact of Perceived Usefulness on Marketing ROI and Campaign Effectiveness: To investigate whether marketers who perceive big data analytics as useful experience better ROI, conversion, and customer retention.
- Organisational Trust Culture and Big Data Adoption: To explore how internal culture, leadership commitment, and data ethics affect the adoption and trust in analytics tools within organisations.
- Longitudinal Studies on POPIA's Impact: To track how regulatory compliance affects marketing innovation, consumer trust, and data use trends over time in South Africa.

- Sectoral Comparisons: To compare the trust and BDA adoption across industries such as retail, banking, and healthcare to identify sector-specific trends and challenges.

Together, these research directions can help advance the strategic, ethical, and consumer-oriented application of big data analytics in the South African market

7. Reflections on Improvements for This Study

If this study were to be replicated or expanded, several improvements are suggested:

- Increase the sample size and diversity across industries, company sizes, and geographic regions.
- Integrate actual business outcome data such as sales growth, engagement metrics, or CRM insights.
- Employ mixed methods, combining survey data with interviews or focus groups for deeper context.
- Test all initially proposed hypotheses in future iterations or related studies.
- Develop a customised trust index aligned with South African data protection norms (e.g., awareness of POPIA rights, consent practices).

8. Final Thoughts

This research represents an important step in understanding how trust in data privacy frameworks influences the perceived usefulness of big data analytics in South African retail marketing. By validating this relationship, the study contributes to theory, policy, and practice. However, the full potential of big data will only be realised through sustained trust-building, regulatory clarity, ethical stewardship, and continuous engagement between stakeholders. Future studies that examine the broader impacts, behavioural patterns, and sectoral variations will be critical in shaping a responsible and data-driven marketing ecosystem.

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APPENDIX B

Consistency matrix

Table 12: Consistency Matrix

Research problem: *Leveraging big data analytics for targeted and predictive marketing in the South African retail sector*					
Sub-problem	**Literature Review**	**Hypotheses or Propositions or Research questions**	**Source of data**	**Type of data**	**Analysis**
Privacy Trust and Regulation	Research on data privacy concerns and consumer behaviour. Literature also focuses on data breaches and the implications of data breaches towards consumer trust and engagement (e.g., Kumar et al., 2023; Davis & White, 2022)	Privacy Trust and Regulations do not have a positive and significant impact on the Perceived Use of Big Data Analysis	Online survey responses	Primary, quantitative	Descriptive Analysis. Correlation Analysis Exploratory Factor Analysis (EFA), Regression analysis, Regression Assumption Testing .

Research problem: *Leveraging big data analytics for targeted and predictive marketing in the South African retail sector*					
Sub-problem	**Literature Review**	**Hypotheses or Propositions or Research questions**	**Source of data**	**Type of data**	**Analysis**
The Perceived Value of Big Data and Analytics	Literature on the benefits of Big Data analytics, and the history of big data analysis in South Africa through case study analysis (e.g., Brown et al., 2022; Singh & Kapoor, 2023)	Privacy Trust and Regulations do not have a positive and significant impact on the Perceived Use of Big Data Analysis	Online survey responses	Primary, quantitative	Descriptive Analysis. Correlation Analysis Exploratory Factor Analysis (EFA), Regression analysis, Regression Assumption Testing

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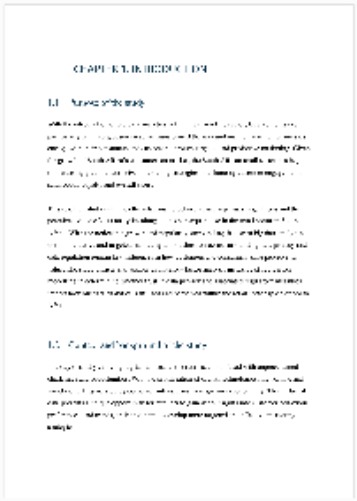
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Researcher Bio

Sarah Chantalle Heaton is a seasoned professional with a decade of experience in the digital marketing industry. Her passion for behavioural economics and creating relevant content tailored to consumer needs has been the driving force behind her successful career. Sarah holds an undergraduate degree in Psychology and Marketing, further enhancing her understanding of consumer behaviour and marketing strategies. Additionally, she pursued a PDBA at Wits, honing her skills in business administration and strategic management.

Throughout her career, Sarah has been dedicated to making consumers aware of the constantly evolving digital landscape and the efforts marketers undertake to simplify their lives while driving business success. Her expertise lies in leveraging data analytics and technology to develop targeted marketing strategies that resonate with diverse consumer segments. Sarah's interest in research stems from her desire to bridge the gap between consumer needs and marketing efforts. Her self-funded research project focuses on exploring the intersection of big data analytics and consumer behaviour, particularly in the South African market. By analysing the findings obtained from both primary and secondary research methods, Sarah aims to provide actionable insights for marketers seeking to leverage technology tools for strategic decision-making.

In her research dissertation, Sarah discusses the implications of her findings on marketers' focus on technology tools. Through extensive literature review and empirical analysis, she highlights the strategic and competitive advantages that big data offers to companies. However, she also acknowledges the risks and limitations associated with the implementation of technology tools, such as privacy and confidentiality concerns. By expanding on previous research findings, Sarah emphasizes the importance of marketers adapting their strategies to align with consumer needs and preferences while navigating the challenges posed by technological advancements.

Sarah delves deeper into the marketing opportunities presented by big data analytics. She discusses how big data can assist companies in understanding customer behaviour trends and customizing marketing strategies to improve competitive positioning.

Despite the potential benefits, Sarah also addresses the challenges faced by marketers, including data privacy regulations and the digital divide in South Africa. Through her research, Sarah aims to contribute to the existing body of knowledge by providing valuable insights for both academics and practitioners in the field of digital marketing and consumer behaviour research.

Ethics Documentation

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/BA560086/987
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	Leveraging big data analytics for targeted and predictive marketing in the South African retail sector
Investigator / Researcher	Ms Sarah Nomalanga Chantalle Heaton
Nature of Project	MBA (Research Article)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed anonymity and confidentiality.
Issue Date of Certificate	2021-04-26
Expiry date	Date of submission of the project report
Chairperson	Prof Anthony Stacey ☎ +27 11 717 3587 +27 82 880 4531 anthony.stacey@wits.ac.za

Declaration by Researcher

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

I fully understand the conditions under which I am authorized to carry out the abovementioned research and I 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

27/4/21
Date:

Research Instrument

INFORMED CONSENT Dear Sir/Madam

I am a student at Wits Business School currently enrolled for Master of Business Administration. I would like to request you to participate in my research study, as per fulfilment of my currently enrolled qualification. I would like you to share your responses on the research topic: "Leveraging Big Data Analytics For Targeted and Predictive Marketing in South African Retail"

This study's objective is explore the use of big data analytics in the South African Retail Industry. The research aims to achieve a link between big data and the manner in which consumer needs profiles are created in order to drive consumer behaviour with hope that it will open new doors and conversations surrounding the ability of big data analytics in retail South Africa to have an equally profitable and effective approach to marketing that is sustainable and ethical. If you are willing to participate in this research, please feel free to answer the questionnaire attached which follows this document.

The questionnaire should take no more than 8-10 minutes to complete. All data gathered within this survey/questionnaire will be treated as anonymous and no specific personal and company data will be disclosed but all responses will be displayed and recorded as aggregate figures. If you are willing and comfortable enough to continue with this questionnaire, could you please kindly complete this questionnaire no later than Friday, 31 September 2022.

Please do feel free to contact both me and my supervisor should you have any questions whatsoever regarding this research:

Sarah Heaton 0608774985 560086@students.wits.ac.za

Dr Neale Penman Neale.Penman@wits.ac.za

Thank you so much for your participation and help.

Yours Sincerely,

Sarah Heaton

Wits Business School