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Digitization of operations in public sector procurement: A South African perspective

Applied Research Project Proposal

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[2024]

DECLARATION

I declare that this is my original MBA thesis, my own work (except as indicted in the references and acknowledgements), under the supervision of Dr. Euphemia Godspower-Akpomiemie and It has not been presented before for a degree at university of Witwatersrand or any other University.

Rantsatsi Paulus Salomane

…….

February 2024

DEDICATION TO:

My wife Mamsy Matjatji Salomane and my two beautiful daughters Puleng and Itumeleng Salomane

ACKNOWLEDGEMENT

My heartfelt gratitude to my research supervisor, Dr. Euphemia Godspower-Akpomiemie, for her invaluable guidance, unwavering support, and insightful feedback throughout this research journey. Her expertise, patience, and encouragement have been instrumental in shaping this study, and I am truly grateful for her dedication and mentorship.

I also extend my appreciation to my cohort Precious and Tshehlana, my family and friends, David! for their support and motivation during this process and lastly, I am thankful to all the participants who contributed their time and insights, making this research possible.

KEY WORDS

Digitization

National Public Department

National Treasury

Procurement

Tender

Robotic Process Automation

List of abbreviations and acronyms

ABBREVIATION	MEANING
NT	National Treasury
SCM	Supply Chain Management
RPA	Robotic Process Automation
RFQ	Request for Quotation
OCPO	Office of Chief Procurement Officer
TAM	Technology Acceptance Model
TAT	Turn Around Time

SASSA	South African Social Security Agency
SITA	State Information Technology Agency

Table of Contents

DECLARATION……..ii

DEDICATION……iii

ACKNOLEDGEMENT……...iv

LIST OF ACRONYMS……...v

ABSTRACT……viii

CHAPTER 1. INTRODUCTION 1

1.1. PURPOSE OF THE STUDY 1

1.2. CONTEXT OF THE STUDY.....1

1.3. PROBLEM STATEMENT.....1

1.4 RESEARCH MOTIVATION..... 3

1.5. RESEARCH OBJECTIVES.....3

1.6 SIGNIFICANCE OF THE STUDY 3

1.7. DELIMITATIONS OF THE STUDY.....4

1.8 ASSUMPTIONS 4

CHAPTER SUMMARY 4

CHAPTER 2. LITERATURE REVIEW 5

2. INTRODUCTION 5

2. 1. DISRUPTION OF TRADITIONAL BUSINESS MODELS 5

2.2. PRIOR STUDIES ON DIGITAL IN SOUTH AFRICA PUBLIC SECTOR PROCUREMENT.. 6

2.3 CURRENT STUDIES 6

2.5 FILLING THE GAPS..... 8

2.6. ROBOTIC PROCESS AUTOMATION IMPLEMENTATION..... 8

2.7 THEORETICAL FRAMEWORK 8

2.7.1 MANAGEMENT THEORIES 8

2.7.2 TECHNOLOGY ACCEPTANCE MODEL (TAM) 9

2.7.3 CONCEPTUAL FRAMEWORK.....10

CHAPTER 3. RESEARCH METHODOLOGY 12

3.1. RESEARCH METHODOLOGY AND DESIGN 12

3.2. POPULATION AND SAMPLE 12

3.2.1. POPULATION.....12

3.2.2. SAMPLE 12

3.2.3 Sample Size 13
3.4. Research Instrument 13
3.5. Procedure for data collections 13
3.6. Data analysis and interpretation 14
3.7. Reliability and Validity 14
3.8 Ethical Consideration 15

CHAPTER 4: PRESENTATION OF RESULTS 16

4.1 Introduction 16
4.2 Consent of the research respondents 16
4.3 Exploratory factor analysis (EFA) 17
4.3.1 Organisational culture on turnaround time of the current processes 21
4.3.2 Automation on customer satisfaction, transparency and efficiency 21
4.3.3 Leadership impact on the digitisation of procurement operations 22
4.4 Descriptive statistics 22
4.4.1 Turnaround time of the current processes 22
4.4.2 Automation on customer satisfaction, transparency and efficiency 25
4.4.3 Leadership on the digitisation of procurement operations 26
4.4 Chapter Summary 27

CHAPTER 5: DISCUSSION OF RESULTS 28

5.1 Introduction 28
5.2 Organisational culture and turnaround time of the current processes 28
5.3 Automation on customer satisfaction, transparency and efficiency 30
5.4 Leadership on the digitisation of procurement operations 31
5.5 Technology Acceptance Model interpretation 33
5.6 Chapter summary 35

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS 36

6.1 Conclusion 36
6.2 Policy Recommendations 37
6.5 Suggestions for further research 38

7. References 39

ABSTRACT

This study examines the implementation of digital technologies in public sector procurement departments in South Africa, with a focus on national departments in Gauteng province. The research aims to assess the impact of organizational culture on turnaround time, the effect of automation on customer satisfaction, transparency and efficiency, and the influence of management on the digitization of procurement operations. A quantitative research design was employed, utilizing a survey questionnaire distributed to 252 respondents from national departments in Gauteng. The Technology Acceptance Model (TAM) is applied as a theoretical framework to test user's technology acceptance.

The findings reveal that organizational culture significantly impacts the turnaround time of current processes, with key components such as leadership support, training initiatives, and best practices influencing the adoption of automation. Automation of tender processes was found to positively affect customer satisfaction, transparency, and efficiency in procurement operations. The results also indicate that management plays a crucial role in the digitization of procurement operations, although trust issues within departmental culture may hinder adoption.

This research contributes to the understanding of digital transformation in public sector procurement and provides insights for policymakers and practitioners on effectively implementing digital technologies to enhance governance, transparency, and operational efficiency in South African public procurement processes.

CHAPTER 1. INTRODUCTION

1.1. Purpose of the study

This study examines the implementation of digital technologies in public sector procurement departments to streamlining the end-to-end process with the goal to enhance the performance, customer experience and saving cost.

1.2. Context of the study

Public sector procurement in south Africa involves acquisition of goods, services, and government entities works. This process demands efficiency from sourcing to payment. Digital technologies, such as blockchain, Internet of Things (IoT), Robotic Process Automation (RPA), have the potential to revolutionize procurement processes through automation, data analytics, and enhanced transparency. This study focuses on national department in Gauteng province, considering the country's economic landscape, regulatory environment, and technological infrastructure. It aims to explore the challenges, opportunities, and implications associated with implementing digital technologies in public sector national departments.

1.3. Problem Statement

In South Africa, national agencies manage supply chain management in an organised approach that includes procurement, obsolescence planning, inventory or asset control and contract administration. However, efficiency and the provision of are affected by lack of lengthy response times and the reliance on human document processing. [1] The delays in adjudication, documents

[1] National Treasury, 2005.supply chain management a guide for accounting officers. https://www.treasury.gov.za/search.aspx?cx=018115738860957273853%3Aj5zowsrmpli&cof=FORID%3A11&q=SCM%20Jan900-Guideline

submission and tender approval result from lack of automation. Every step of supply chain management functions, from demand to disposal management adds value. Acquisition is a traditional primary focus of procurement activities which includes, contract administration, legal compliance and choosing how to approach the market.

Accounting officers and authorities are required by the National Treasury to post open competitive bids, amendments, cancellations and notifications on the e-Tender portal for a minimum of 21 days, with the exception of urgent cases or instructions with treasury regulations policies that do not apply (SCM financial report, 2022/2023). The implementation of this research will result in changes to procurement digitization, policy and financial implications of training department officials as the turnaround times has negative impact on efficiency and effectiveness of public service delivery due to lengthy process.

According to Telukdarie et al. (2018) and (Jabbour et al. (2019) assert that automating the procurement process can optimize efficiency, minimize the cycle times and optimize the resource consumption. There is however not much of data on how RPA and Procurement 4.0 affect national department's proficiency with the Circular Economy (CE).[2] This study on automation of procurement processes in national departments involves identifying and addressing the challenges and inefficiencies in the procurement process. This includes manual errors, lack of operational transparency, time-consuming manual tasks, and risks in the supply chain.

[2] Procurement 4.0 The concept that emerged because of the fourth industrial revolution, or Industry 4.0

1.4 Research motivation

The concept of Procurement 4.0 which emphasize incorporation of digital technology in procurement process was introduced by Bienhaus and Haddud (2018). However, there is still a lack of research on how it is applied in South African's national procurement departments. This study explores how to close the gap by offering a focused quantitative evaluation of the use of digital technology in public sector procurement within national departments in Gauteng province. It focuses on the effects of leadership on digitization, organizational culture and automation on customer satisfaction and efficiency which have received minimal attention in South Africa. The potential of digital disruption technologies to improve governance, transparency, innovation, and socioeconomic outcomes is examined in the study.

1.5. Research objectives

Based on the identified problems, the objectives of this research are as follows:

i. To assess the impact of organisational culture on turnaround time of the current processes.
ii. To assess the impact of automation on customer satisfaction, transparency and efficiency.
iii. To assess the impact of management on the digitisation of procurement operations.

1.6 Significance of the study

Theoretical contribution

This study analyses the Technology Acceptance Model (TAM) in South African's public sector procurement with an emphasis on organisational culture, automation effects, customer satisfaction, transparency, efficiency and leadership and also offered information for all-encompassing theoretical framework for public administration's digital transformation.

Practical contribution

This study conclusion will contribute to ensuring that investments in technology result in practical enhancements in accountability, efficiency, and service delivery, making a noticeable impact on government operations and the people they serve.

1.7. Delimitations of the study

i. This study primarily focuses on the procurement in national departments within Gauteng and may not provide a comprehensive view of the entire public sector procurement landscape in Gauteng.
ii. The study discusses digital technologies in general, but it concentrates on a subset of those that are important for public sector procurement, like Robotic Process Automation (RPA). This study may not fully address all cutting-edge technologies or their uses outside the purview of procurement.

1.8 Assumptions

i. It is assumed that the participants of this research understand the concept of digitisation of operations.
ii. It is believed that South African technology vendors and solution providers are easily accessible to give customized digital solutions.

Chapter Summary

The chapter highlighted the potential benefits of robotic process automation (RPA) in automating procurement procedures, resulting in increased productivity, transparency, cost savings, and reduced turnaround times, particularly in Gauteng national departments, focusing on digital technologies.

CHAPTER 2. LITERATURE REVIEW

2. Introduction

The industries evolve in response to technological advancements and traditional business models must adapt through digital transformation. Organisations that proactively embrace these changes are better positioned to meet emerging challenges and capitalise on new opportunities in an increasingly digital marketplace.

2. 1. Disruption of Traditional Business Models

Traditional business models characterized by long-standing practices and organisational structures, have been the cornerstone of many industries. These models often rely on physical infrastructure and in-person interactions to deliver goods and services (Auriacombe, 2016). However, the emergence of digital technology and its rapid development has fundamentally challenged and disrupted these traditional norms, reshaping industries, and redefining how businesses operate.

Digital innovations, such as synthetic intelligence, block chain, and the Internet of Things (IoT) have revolutionized how organisations engage with customers, manage operations, and supply products and services (Carter, 2017). These technological advancements allow automation, records-pushed decision-making, and customised patron reviews, disrupting established value chains and commercial enterprise procedures.

To navigate the challenges posed via technology conventional corporations must embrace innovation and digital transformation. This entails adopting new technologies, business fashions, and organisational practices that enable agility, resilience, and purchaser-centricity. Companies may additionally need to put money into studies and improvement, skills acquisition, and strategic partnerships to remain aggressive within the digital age (Elisa, 2018).

2.2. Prior Studies on Digital in South Africa Public Sector Procurement

The era of Procurement in South Africa, infrastructure supply chain management system in the public sector has been impacted by a number of difficulties related to the different elements in the value chain, consisting of organizational capability, systems and procedures, institutional setup, regulatory and governance controls, and systems and processes.[3]The office of chief procurement officer (OCPO) along with e-Tendering launched on September 1, 2015, a central supplier database (CSD) for government, marking a significant step towards modernizing the supply chain to leverage on reduction of administrative cost/compliance burden and to standardise and electronically verify supplier information. Provincial and national agencies release their bids in line with the demand plans for the procurement of products, services, and infrastructure (National Treasury, 2015).

According to digital procurement survey by PricewaterhouseCoopers (PwC) in (2022) investing in digitizing purchasing functions has brought varying degrees of success to organizations. If digital transformation is progressing along the path of procurement functions (+18% year-on-year) – largely driven by compliance and risk management then cost reductions (+ 37%) and strategic sourcing (+24%) remain the main reasons for switching to digital purchasing.

2.3 Current Studies

Research on the digitization of public sector procurement in South Africa highlights the pivotal role of digital change in the wider scope of Industry 4.0. Studies indicate that digitization can simplify processes, cut down inefficiencies, and tackle corruption, which are major concerns in South African public

[3] National Treasury,2015 budget speech. https://www.gcis.gov.za/sites/default/files/docs/resourcecentre/yearbook/Finance-SAYB1516.pdf

procurement (Mpehle & Mudogwa, 2020; Fourie & Malan, 2020). The National Treasury notes that public procurement encounters numerous challenges, such as transparency, accountability, and aligning socio-economic goals with efficiency (National Treasury, 2024).

Numerous investigations, including those examining SITA and SASSA, offer unscientific evidence and case studies of effective digital transformation efforts (Seybold Report, 2024; Moneyweb, 2025). Notable examples like SARS eFiling and SASSA's digital grant payments illustrate clear advantages such as streamlined operations, reduced inefficiencies, increased compliance, and enhanced security. The study of IoT and cloud computing adoption also highlights their role in promoting sustainability, stability, and efficiency (Mojaki, 2024).

2.4 Gaps identified in the existing Studies

Although the current literature offered a basic understanding of the pros and cons of digitizing South African public procurement, there were noticeable gaps that require further exploration, Limited detailed empirical studies on digital technologies, much of the existing research addressing digitization in general or centres on broad frameworks. There's a demand for more detailed empirical research on the effects of specific digital technologies such as blockchain for transparency, AI for predictive analytics in procurement, advanced data analytics for fraud detection on precise procurement operations within particular South African public entities. While some references to Industry 4.0 exist, in-depth case studies on its practical application and results are rare.

The impact on Small, Medium, and Micro Enterprises (SMMEs) and preferential procurement, South African public procurement has strong socio-economic objectives, including supporting SMMEs and preferential procurement. The existing literature does not fully explore how digitization specifically impacts these objectives both positively and negatively.

2.5 Filling the Gaps

The study examined South African public sector entities' digitization of procurement processes, focusing on benefits like reduced procurement times, cost savings, and better compliance. It also investigates the impact of digitized procurement systems on SMME participation and success. The research also explored post-implementation maintenance, updates, and adaptation to changing policy requirements. It aimed to provide policy-relevant recommendations for improving governance and service delivery outcomes.

2.6. Robotic Process Automation Implementation

This study focused on RPA software to digitise the procurement process in departments. RPA is software that performs routine process tasks based on simple rules, automating tasks such as entering data, performing simple calculations, and reading and extracting data from planning systems. Enterprise resource planning (ERP), an example of RPA fills out forms, respond to emails, open attachments, sign in to applications, move files or folders, extract data from web pages, extract information from PDF files or images, and more (da Silva Costa, et al. 2022).

2.7 Theoretical Framework

2.7.1 Management theories

The Socio-Technical Systems Theory emphasizes the importance of integrating social and technical systems in successful technology implementation. It emphasizes the connection between technology and organizational context and emphasizes the role of people and processes in digital transformation. However, it can be complex to operationalize and may fail if organizational culture, management support, or staff skills are neglected.

Change management theories, such as Kotter's 8-Step Model, are relevant for managing resistance to digital transformation and facilitating adoption. They offer actionable steps and emphasize leadership, communication, and quick wins. However, they may be too linear for complex changes and may not account for cultural nuances in the public sector. They are particularly useful for interpreting leadership and organizational culture results

Recommendation:

The TAM theory was recommended for this study because, the theory is frequently used to explain why individuals accept information systems, has its roots in the theory of reasoned action and the theory of planned behaviour. It suggests that an individual's attitude towards using a system is determined by their perception of its usefulness and ease of use (Marangunić & Granić, 2015). This attitude then influences their intention to use the system and their actual usage behaviour (Martin,2022). Although Socio-Technical Systems Theory and Change Management theory give a more thorough and comprehensive understanding of the obstacles to and facilitators of digital transformation in South African public sector procurement. The literature and practical experience both support this integrated approach.

2.7.2 Technology Acceptance Model (TAM)

This study deployed the Technology Acceptance Model (TAM) as it continues to be a prevalent framework in information systems research, backed by solid empirical evidence and continual enhancements to enhance its ability to explain phenomena and test only hypothesis one.

The Technology Acceptance Model (TAM) has been utilized to examine user approval across various fields such as e-services, mobile data services, self-service technologies, e-learning, internet banking, online auctions. The research areas for TAM in this study involves examining how it can be used in new technology settings, studying the impact of moderating factors, and combining

TAM with other related theories to build stronger models of technology acceptance (Marangunić & Andrina Granić, 2015).

2.7.3 Conceptual Framework

This research, which is based on TAM, looked at how leadership support, organisational culture, and regulatory issues affect the adoption of digital procurement. This is the structure of the suggested research model:

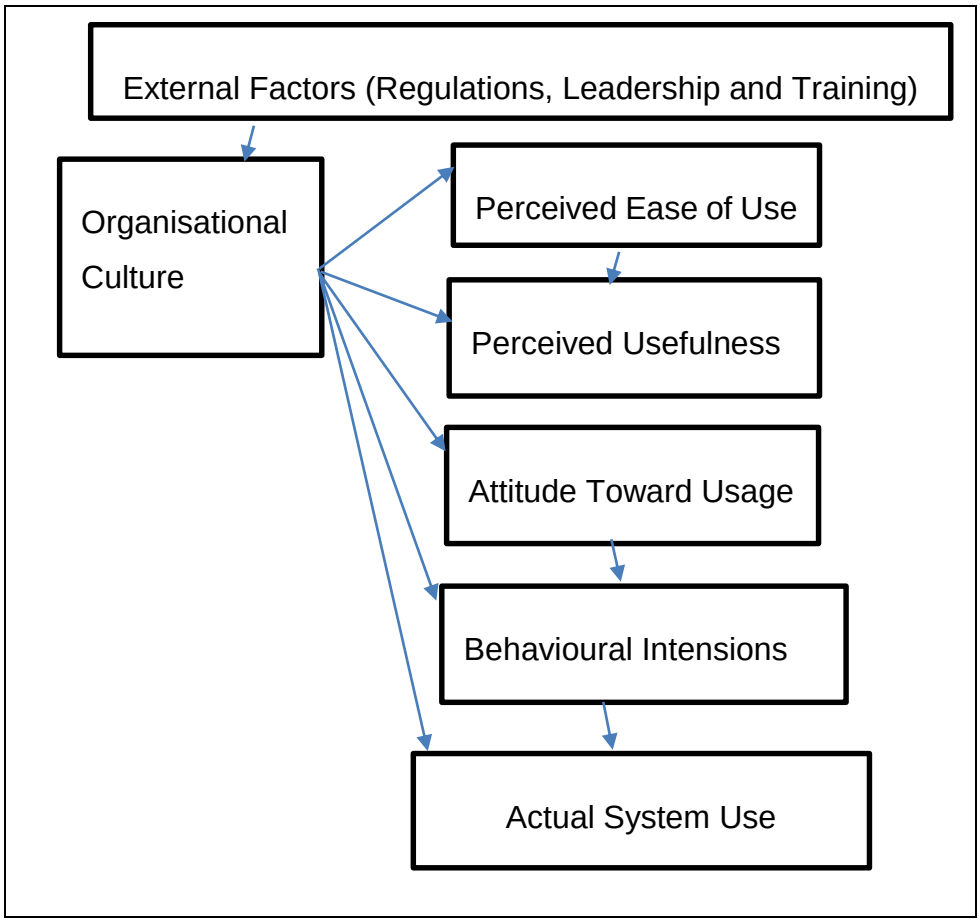


Figure 1: Technology Acceptance Model

Hypothesis 1: RPA reduces the manual intervention and making task more and efficient for users. Procurement professional's perception of ease of use of will influence their acceptance of automation technology.

Hypothesis 2 and 3: Perceived usefulness and ease of use will shape of the users towards adoption of new technology.

Hypnosis 4: Organizational culture, leadership support and regulatory frameworks impact technology adoption, a positive attitude shaped by perceived usefulness and ease of use will translate into a stronger behavioural intention to use automation

Hypothesis 5: Trust issues in organisational culture negatively impact Behavioural intention and actual system use

CHAPTER 3. RESEARCH METHODOLOGY

3.1. Research Methodology and Design

This study deployed a quantitative research design to investigate the determinants affecting the successful implementation of digital technologies in public sector procurement operations. Quantitative research allows for the measurement and analysis of variables related to technology adoption, departmental processes, and performance outcomes in a systematic and rigorous manner. Quantitative research methodology offers a systematic, rigorous, and replicable approach to investigating the determinants affecting the successful integration of digital technologies in business operations (Turley,2023).

3.2. Population and Sample

3.2.1. Population

The population for this study consists of policy makers, procurement specialist and procurement officers involved in public sector departments, however this study is limited to national departments in Gauteng Province.

3.2.2. Sample

Due to the diverse nature of this population, the sample for this study comprises stakeholders representing various departments, geographical location, and organizational levels. To ensure comprehensive representation, two sampling techniques were used: stratified random sampling and purposive sampling. Stratified random sampling involves dividing the population into distinct groups or strata based on relevant characteristics such as industry sector, organisational size, and geographic location. Participants are then

randomly selected from each stratum to ensure adequate representation of diverse perspectives (Auriacombe,2016).

3.2.3 Sample Size

In south Africa, government it categorised into four spheres namely, National, Provincial, local and municipality. The Sample Size used in this study is 252 respondent's national departments in Gauteng province.

3.4. Research Instrument

The questionnaire was developed based on a comprehensive review of literature on digital transformation in public sector procurement with emphasis on constructs identified in the Technology Acceptance Model (TAM) and studies on organizational culture and automation. For instance, items measuring 'perceived usefulness' and 'ease of use' were adapted from validated TAM instruments (Marangunić & Granić, 2015), while questions related to leadership support and trust issues drew on findings from recent South African and international studies on digital adoption barriers. The draft questionnaire was reviewed by subject matter experts and piloted with a small sample of procurement professionals to ensure clarity and relevance.

3.5. Procedure for data collections

The data collection involved administering the survey questionnaire sample of departments identified through stratified random sampling. The questionnaire was made available online on the Qualtrics survey platform as a primary source of data collection. Respondents completed the survey after accepting a disclaimer as a form of agreement to be part of the study. The use of 5-point Likert scales is widespread in a variety of fields, including information systems, psychology, and health communication. For example, in the field of information systems, a study on the introduction of robotic process automation (RPA)

systems used a 5-point Likert scale to measure information quality, system quality, system satisfaction, benefits of using the system, and system usage. (Hsiung & Wang,2022).

3.6. Data analysis and interpretation

The exploratory factor analysis (EFA) was carried out to determine the number of variables under each section of the questionnaire (Weiers, 2011). The EFA “is a statistical method that helps identify the underlying relationships between a large set of variables. It's often used when researchers do not have hypotheses about the underlying structure of their data” (Tabachnick & Fidell, 2000). Also, the EFA can be used as “EFA deals with theory building since it uses a dimension reduction technique to investigate the underlying factors that could have caused the observed variables to correlate.” (Tabachnick & Fidell, 2000).

The variables were then reorganised according to the factor loadings of the EFA. Further, the quantitative data gathered was analysed using descriptive statistics. Consistent with Weiers (2011), descriptive statistics consist of summarising the quantitative data by computing the means as measures of central tendency and the standard deviations as measures of dispersion. The reliability measure called Cronbach's alpha was also calculated for each section of the questionnaire (Crawley, 2013; Weiers, 2011; Saunders, Lewis, & Thornhill, 2016). To facilitate the data analysis process, the study used the R programming software (R, 2024). The data was first formatted on Excel spreadsheet and then the spreadsheet was exported into R for analysis.

3.7. Reliability and Validity

According Joppe (2000), the Reliability of study is the degree to which findings hold up over time and provide an accurate picture of the entire population being studied. A research instrument is deemed reliable if its findings can be replicated using a comparable methodology. This study ensured measurement consistency

over repeated trials, stability over time, and similarity within a specific period (Kirk & Miller, 1986). The questions were concise less bias and easy for the participants to understand. Cronbach's alpha was computed for each construct to verify the instrument's dependability all values were above the suggested cut-off of 0.70, showing strong internal consistency. Expert review was used to verify content validity, and exploratory factor analysis (EFA) was used to evaluate construct validity. Principal Component Analysis with Varimax rotation was used for EFA. Only items with loadings above 0.40 were included and factors were kept based on the screen plot and eigenvalues greater than 1. The data's suitability for factor analysis was confirmed by the Kaiser-Meyer-Olkin (KMO) score of 0.85 and the significant results of Bartlett's Test of Sphericity ($p < 0.001$). The obtained components supported the validity of the instrument by being consistent with the theoretical constructs found in the literature research.

3.8 Ethical Consideration

As part of this submission, an application was submitted to and approved by University of Witwatersrand ethics committee and thereafter, targeted sample were formally contacted through questionnaire via online survey. The email detailing the approved objectives of this study, along with a copy of the ethical permission form and the signatures of both the supervisor and the researcher, were made available up on request prior to the distribution of the questionnaire.

The participants' names and organisations were kept anonymous, privacy and anonymity were guaranteed to the participants. The participants were made aware that no incentive will be offered and can only answer questions willingly. The study data is stored in a more secured and encrypted media sufficiently backed up and in the sole possession of the researcher.

CHAPTER 4: PRESENTATION OF RESULTS

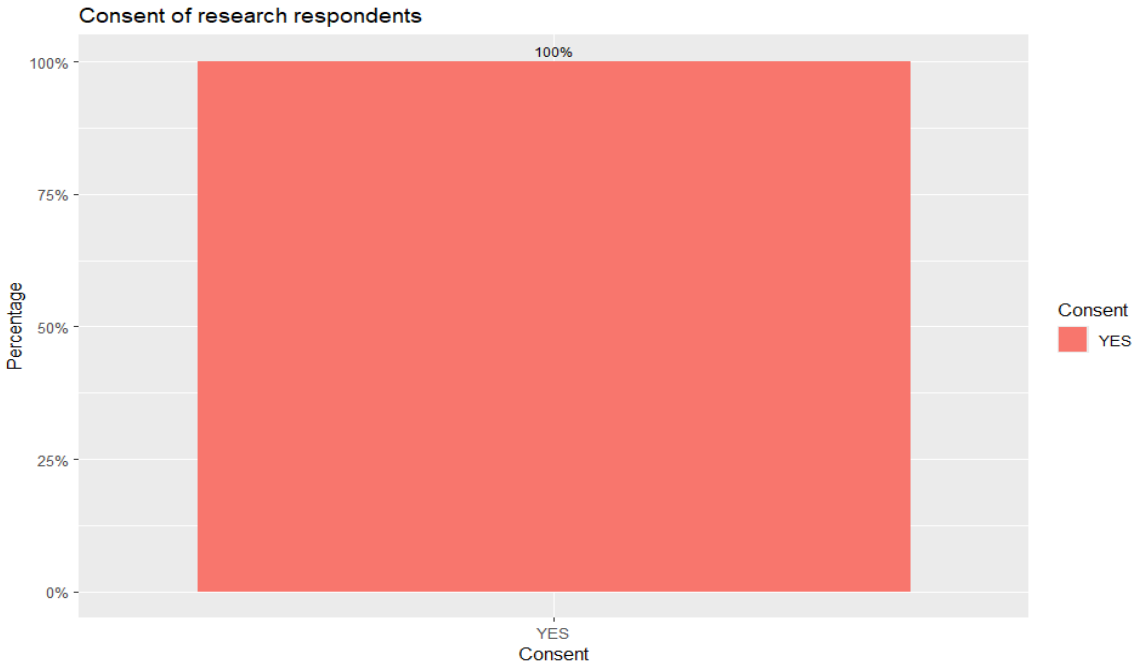
4.1 Introduction

Chapter 4 presents the results of the data analysis of this study. Based on the identified problems, this section outlines the consent process for the research respondents involved in the study. The study is based on the idea that effective automation in procurement calls for a thorough grasp of the organisational environment in which these technologies are used, in addition to being a technical undertaking. Perceptions and experiences surrounding automation are greatly influenced by elements including departmental culture, leadership support, and employee engagement. To do this, a thorough poll with 252 participants from different public sector departments was carried out. A five-point Likert scale was used in the poll to measure respondents' opinions about three main points, how organisational culture affects turnaround times, how automation affects customer happiness and efficiency and how management helps with digital transformation.

4.2 Consent of the research respondents

This segment reports the consent of the research respondents. Figure 4.1 shows that 100% of the research respondents agreed to participate in the survey by answering yes to this question. Therefore, the study ensured that there was informed consent from all the research respondents. In addition, the research respondents were informed that their participation in the study was essentially voluntary and that they could withdraw from participating in the study at any point and time.

Figure 4.1: Consent of the research respondents



Source: R (2024)

4.3 Exploratory factor analysis (EFA)

This section reports the results of the exploratory factor analysis (EFA). The EFA "is a statistical method that helps identify the underlying relationships between a large set of variables. It's often used when researchers do not have hypotheses about the underlying structure of their data" (Tabachnick & Fidell, 2000). Also, the EFA can be used as "a dimension reduction technique to explore the underlying dimensions that could have caused correlations among the observed variables, and therefore, EFA deals with theory building" (Tabachnick & Fidell, 2000).

Table 4.1 shows the EFA results for the digitisation of operations in public sector procurement questionnaire. The total number of observations was 252 and the extraction technique was principal component analysis (PCA) with a promax rotation. The overall measurement system analysis (MSA) was 0.93. The Kaiser-meyer-olkin (KMO) test result was 0.82, a number tolerable as clarified by Hastie, Trispirane, and Friedman (2009) that the KMO ought to be larger than 0.6. The

p-value of the Bartlett's test is less than 0.05 indicating that questionnaire items are significantly correlated, and therefore, there is room for dimension reduction using principal component analysis (Hastie, Trispirane, & Friedman, 2009).

Table 4.1: EFA results for the digitisation of operations in public sector procurement questionnaire

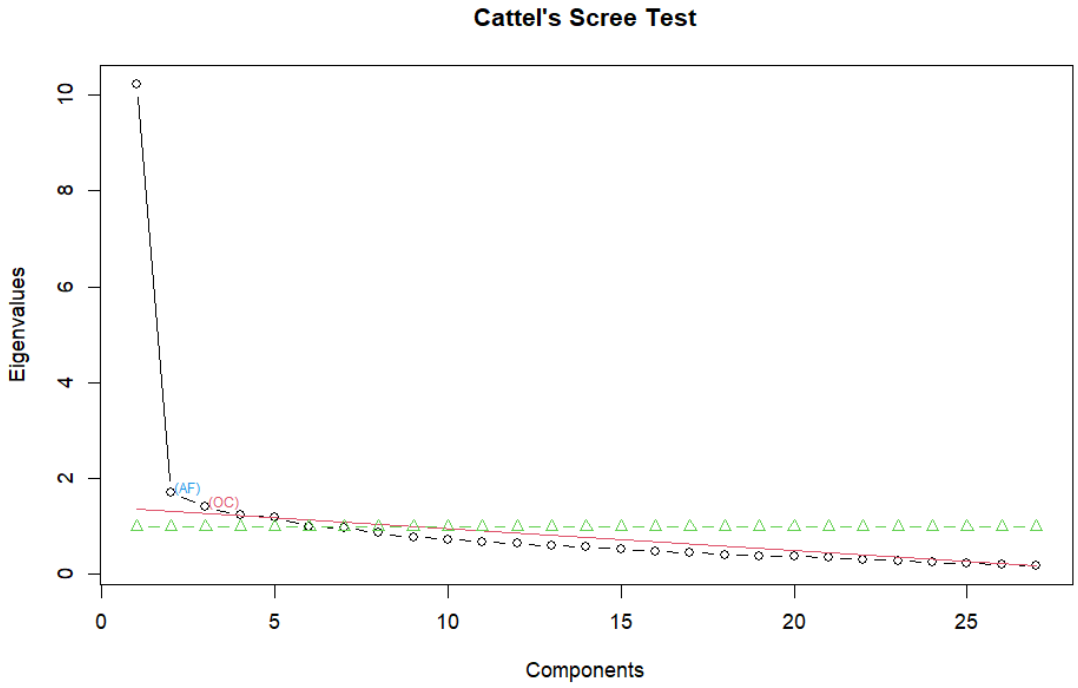
Factor loadings	RC1	RC2	RC3
A1. The key components of a departmental culture support the successful implementation of automation process.	**0.591**		
A2. Integration between automation strategy and culture impact on employee engagement.	**0.634**		
A4. The departmental culture will influence the adoption of automation.	**0.744**		
A5. The department has best practices for integrating automation into existing processes.	**0.660**		
A8. Departmental factors such as leadership support and training initiatives influence employees' perceptions of the usefulness of automation.	**0.708**		
A10. Does individual characteristics influence perceptions of the usefulness of automation?	**0.872**		
A11. Do procurement professionals find it easy to use automation tools in their daily tasks?	**0.637**		
A12. External factors such as regulatory requirements will influence the decision-making process regarding adoption of automation tools.	**0.781**		
A13. The department has clear performance indicators (KPIs) to be used to measure the success of automation.	**0.539**		
A14. Do procurement professionals find it easy to use automation tools in their daily tasks?	**0.596**		
A15. External factors such as regulatory requirements will influence the decision-making process regarding adoption of automation tools.	**0.553**		
B1. The volume of tenders impacts the ability to select the most qualified and capable supplier.	**0.573**		
B3. Strategies for managing high volumes of tenders, such as pre-qualification stages has impact on tender adjudication.	**0.608**		
B4. The role of automation has impact in streamlining tender evaluation for high-volume procurement.	**0.554**		
B5. The turnaround has impact on SMEs participation in tenders.	**0.529**		

B6. There is low turnaround in evaluating and adjudication of tenders.	**0.524**		
C1. Automation can influence customer satisfaction.		**0.823**	
C2. Automation process can improve efficiency in public procurement.		**0.740**	
C3. Automation can improve transparency of procurement professionals.		**0.785**	
C5. The automation can well be integrated with existing procurement systems and processes.		**0.554**	
A6. The department workflows will likely impact on culture.			**0.507**
A7. The departmental culture reduces the level of trust and collaboration among procurement professionals.			**-0.669**
C4. The department has resources to manage potential risks and challenges associated with implementing automation.			**0.711**

Source: R (2024)

Figure 4.2 shows the Cattle's scree plot for the digitisation of operations in public sector procurement questionnaire using the eigen values. Correspondingly, Figure 4.3 shows the plot of the principal components of the research instrument. The rule of thumb is the elbow rule that guides analysts to select the factors up to the point where the curve flattens off as illustrated in Figure 4.2. The first three factors from the top left-hand corner up to the point OC in Figure 4.2 were selected.

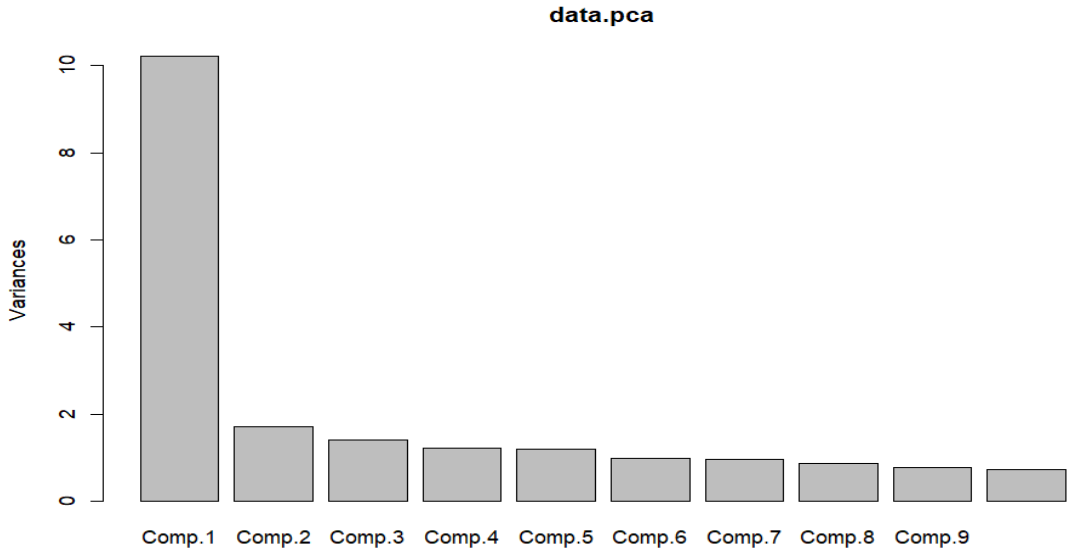
Figure 4.2: Cattel's scree plot



Source: R (2024)

Similarly, in Figure 4.3, the first three components are obvious. Consequently, the first three factors were chosen as having basic dimensions that could have generated correlations between the observed variables.

Figure 4.3: Plot of the principal components



Source: R (2024)

4.3.1 Organisational culture on turnaround time of the current processes

In the EFA results shown in Table 4.1, the Rotated Component 1 (RC1) is called the *impact of organisational culture on turnaround time of the current processes*, and sixteen variables loaded under this component**.** The variables that loaded under this component are A1, A2, A4, A5, A8, A10, A11, A12, A13, A14, A15, B1, B3, B4, B5, and B6.

4.3.2 Automation on customer satisfaction, transparency and efficiency

Also, in Table 4.1, the Rotated Component 2 (RC2) is called the *impact of automation on customer satisfaction, transparency and efficiency*, and four variables loaded under this component**.** The variables that loaded under this component are C1, C2, C3, and C5.

4.3.3 Leadership impact on the digitisation of procurement operations

Lastly, in Table 4.1, the Rotated Component 3 (RC3) is called the *impact of management on the digitisation of procurement operations*, and only three variables loaded under this component**.** The variables that loaded under this component are A6, A7, and C4.

4.4 Descriptive statistics

This section reports the results of the descriptive statistics. Based on the EFA results, descriptive statistical analysis was conducted on the instrument's three principal components:

i. Impact of organisational culture on turnaround time of the current processes (Section A)
ii. Impact of automation on customer satisfaction, transparency and efficiency (Section B), and
iii. Impact of management on the digitisation of procurement operations (Section C)

The following five-point Likert-like scale was used:

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

4.4.1 Turnaround time of the current processes

This section reports the results of the impact of organisational culture on turnaround time of the current processes. This group of items of the instrument had a Cronbach's alpha of 0.93. As explained by Cortina (1993), a Cronbach's alpha greater than 0.69 indicates a reliable research instrument. Table 4.2 displays the mean and standard deviation of these items.

Table 4.2: Impact of organisational culture on turnaround time of the current processes

Code	Variable	Cronbach's alpha	Mean	Standard
Section A	**Impact of organisational culture on turnaround time of the current processes**		**4.00**	**0.70**
A1	The key components of a departmental culture support the successful implementation of automation process.	0.93	3.97	1.01
A2	Integration between automation strategy and culture impact on employee engagement.		3.81	1.07
A4	The departmental culture will influence the adoption of automation.		3.93	0.99
A5	The department has best practices for integrating automation into existing processes.		4.01	1.02
A8	initiatives influence Departmental factors such as leadership support and training employees' perceptions of the usefulness of automation.		3.81	0.92
A10	Does individual characteristics influence perceptions of the usefulness of automation?		4.15	0.97
A11	Do procurement professionals find it easy to use automation tools in their daily tasks?		3.96	1.04
A12	External factors such as regulatory requirements will influence the decision-making process regarding adoption of automation tools.		4.00	1.03
A13	The department has clear performance indicators (KPIs) that can be used to measure the success of automation.		3.86	0.92

Code	Variable	Cronbach's alpha	Mean	Standard
A14	Do procurement professionals find it easy to use automation tools in their daily tasks?		3.85	0.95
A15	External factors such as regulatory requirements will influence the decision-making process regarding adoption of automation tools.		3.96	1.01
B1	The volume of tenders impacts the ability to select the most qualified and capable supplier.		4.05	1.06
B3	Strategies for managing high volumes of tenders, such as pre-qualification stages has impact on tender adjudication.		4.22	0.98
B4	The role of automation has impact in streamlining tender evaluation for high-volume procurement.		4.30	0.93
B5	The turnaround has impact on SMEs participation in tenders.		4.17	0.96
B6	There is low turnaround in evaluating and adjudication of tenders.		4.30	0.95

The findings in Table 4.2 reveal that all the means are close to 4, overall mean= 4.00, standard deviation = 0.70, implying a consensus among the research participants about the statements assessing the influence of organizational culture on the turnaround time of current procedures. Respondents concurred that essential elements of departmental cultures, the integration of automation strategies departmental best practices, leadership support and training programs favourably impact the implementation and perceived efficacy of automation. Procurement professionals find automation tools easy to use, with regulatory requirements and volume of tenders impacting adoption and selection of qualified suppliers and SME participation turnaround time. There is strong agreement among the responders about these claims, as seen by the consistently low standard deviation, usually less than 1.

4.4.2 Automation on customer satisfaction, transparency and efficiency

Correspondingly, this part reports the results of the impact of automation on customer satisfaction, transparency and efficiency. This set of items of the instrument had a Cronbach's alpha of 0.83. As elucidated by Cortina (1993), a Cronbach's alpha greater than 0.69 indicates a reliable research instrument. Table 4.3 exhibits the mean and standard deviation of these items.

Table 4.3: Impact of automation on customer satisfaction, transparency and efficiency

Code	Variable	Cronbach's alpha	Mean	Standard
Section B	**Impact of automation on customer satisfaction, transparency and efficiency**		**4.40**	**0.73**
C1	Automation can influence customer satisfaction.	0.83	4.24	0.95
C2	Automation process can improve efficiency in public procurement.		4.47	0.91
C3	Automation can improve transparency of procurement professionals.		4.53	0.84
C5	The automation can well be integrated with existing procurement systems and		4.19	0.88

The findings in Table 4.3 show that all the means are close to 4 suggesting agreements among the research respondents on the statements measuring the impact of automation on customer satisfaction, transparency and efficiency. Therefore, the research respondents agreed that:

i. Automation can influence customer satisfaction.
ii. Automation process can improve efficiency in public procurement.
iii. Automation can improve transparency of procurement professionals.
iv. The automation can well be integrated with existing procurement systems and processes.

Based on the findings in Table 4.3, the research respondents agreed that automation of tender processes impact on customer satisfaction, transparency and efficiency in their organisations. All the standard deviations in Table 4.3 are less than 1 and this implies that most of the respondents were close to the mean of each statement, and that the agreement among them was generally high.

4.4.3 Leadership on the digitisation of procurement operations

Lastly, this section reports the results of the impact of management on the digitisation of procurement operations. This group of items of the instrument had a Cronbach's alpha of 0.12 which is too low for a research instrument. As explained by Cortina (1993), Cronbach's alpha should be greater than 0.69 to ensure a reliable research instrument. Therefore, this measure of the impact of management on the digitisation of procurement operations is not reliable. Table 4.4 shows the mean and standard deviation of these items.

Table 4.4: Impact of management on the digitisation of procurement operations

Code	Variable	Cronbach's alpha	Mean	Stan dard
Section C	**Impact of management on the digitisation of procurement operations**		**3.30**	**0.52**
A6	The department workflows will likely impact on culture.	0.12	3.81	0.94
A7	The departmental culture reduces the level of trust and collaboration among procurement professionals.		2.12	0.67
C4	The department has resources to manage potential risks and challenges associated with implementing automation.		3.91	0.95

The findings in Table 4.4 show that two of the means are close to 4 suggesting agreements among the research respondents on the statements measuring the

impact of management on the digitisation of procurement operations. Therefore, the research respondents agreed that:

i. The department workflows will likely impact on culture.
ii. The department has resources to manage potential risks and challenges associated with implementing automation.

However, the findings in Table 4.4 also show that one of the means is close to 2 suggesting disagreements among the research respondents on one of the statements measuring the impact of management on the digitisation of procurement operations. Therefore, the research respondents disagreed that:

i. The departmental culture reduces the level of trust and collaboration among procurement professionals.

Based on the findings in Table 4.4, the research respondents agreed that management impacts on the digitisation of procurement operations in their organisations. All the standard deviations in Table 4.4 are less than 1 and this implies that most of the respondents were close to the mean of each statement, and that the agreement among them was generally high.

4.4 Chapter Summary

Chapter 4 reported the results of the data analysis. Exploratory factor analysis was carried out to better understand the digitisation of operations in public sector procurement questionnaire that was used in this study. Also, the Cronbach's alpha estimates of reliability for the research instrument were computed. Then, on account of the exploratory factor analysis results, descriptive statistical analysis was carried out on the three principal components of the instrument using the means and standard deviations. The results revealed that organisational culture impact on the turnaround time of the current processes in their organisations. The results also revealed that automation of tender processes impact on customer satisfaction, transparency and efficiency in their organisations, and that management impacts on the digitisation of procurement operations in their organisations. Chapter 5 discusses the data analysis results with respect to the research objectives.

CHAPTER 5: DISCUSSION OF RESULTS

5.1 Introduction

Chapter 5 discusses the data analysis results relating to the research questions of the study. The findings of the factor analysis show that organisational culture affects automation adoption, with important elements like training, leadership support, and best practices having an effect. A second important point is that automation in public procurement increases efficiency, transparency, and consumer happiness. The results are consistent with the Technology Acceptance Model (TAM), showing that organisational culture, perceived utility, and simplicity of use all effect automation adoption. Adoption is positively impacted by compliance and leadership support, but it is hampered by trust difficulties.

5.2 Organisational culture and turnaround time of the current processes

The factor analysis results revealed that one of the principal components of the digitisation of operations in public sector procurement questionnaire is the *impact of organisational culture on turnaround time of the current processes*, and sixteen variables loaded under this component. This group of the questionnaire items had a Cronbach's alpha of 0.93, indicating a reliable research instrument since a Cronbach's alpha greater than 0.69 indicates a consistent research instrument (Cortina,1993; Taber, 2018).

In addition, the descriptive statistics results of this group of the questionnaire items revealed that organisational culture impact on turnaround time of the current processes in their organisations. All the means were close to 4 suggesting agreements among the research respondents on the statements measuring the impact of organisational culture on turnaround time of the current processes. The mean is a measure of central tendency that can be used to summarise or represent a particular data set (Weiers, 2011; Saunders et al. 2016). Also, most of the standard deviations were less than 1 and this implies that most of the respondents were close to the mean of each statement, and that the agreement

among them was generally high. The standard deviation is a measure of dispersion or the amount of variation of the values of a variable about its mean (Weiers, 2011; Saunders et al. 2016). A low standard deviation suggests that the values tend to be close to the mean of the data set, while a high standard deviation suggests that the values are spread out over a wider range (Weiers, 2011; Saunders et al. 2016).

According to the results, the key components of departmental culture support the successful implementation of automation process in organisations, and the integration between automation strategy and culture impact on employee engagement. Also, the departmental culture will influence the adoption of automation, and the department has best practices for integrating automation into existing processes. Further, departmental factors such as leadership support and training initiatives influence employees' perceptions of the usefulness of automation, and individual characteristics influence perceptions of the usefulness of automation.

In addition, procurement professionals find it easy to use automation tools in their daily tasks, and external factors such as regulatory requirements will influence the decision-making process regarding adoption of automation tools. Next, the department has clear performance indicators (KPIs) that can be used to measure the success of automation, and procurement professionals find it easy to use automation tools in their daily tasks, and external factors such as regulatory requirements will influence the decision-making process regarding adoption of automation tools. Moreover, the volume of tenders impacts the ability to select the most qualified and capable supplier, and strategies for managing high volumes of tenders, such as pre-qualification stages has impact on tender adjudication. Also, the role of automation has impact in streamlining tender evaluation for high-volume procurement, and the turnaround has impact on SMEs participation in tenders, and there is low turnaround in evaluating and adjudication of tenders.

Traditional business models characterised by long-standing practices and organisational structures, have been the cornerstone of many industries. These models often rely on physical infrastructure and in-person interactions to deliver goods and services (Auriacombe, 2016). However, the emergence of digital technology and its rapid development has fundamentally challenged and disrupted these traditional norms, reshaping industries, and redefining how businesses operate. Digital innovations, such as synthetic intelligence, block chain, and the Internet of Things (IoT) have revolutionised how organisations engage with customers, manage operations, and supply products and services (Carter, 2017). These technological advancements allow automation, records-pushed decision-making, and customised patron reviews, disrupting established value chains and commercial enterprise procedures.

To navigate the challenges posed via technology, conventional corporations must embrace innovation and digital transformation. This entails adopting new technologies, business fashions, and organisational practices that enable agility, resilience, and purchaser-centricity. Organisations may additionally need to put money into studies and improvement, skills acquisition, and strategic partnerships to remain aggressive within the digital age (Elisa, 2018).

5.3 Automation on customer satisfaction, transparency and efficiency

Also, the factor analysis results revealed that the second principal component of the digitisation of operations in public sector procurement questionnaire is the *impact of automation on customer satisfaction, transparency and efficiency*, and four variables loaded under this component. This group of the questionnaire items had a Cronbach's alpha of 0.83, indicating a reliable research instrument since a Cronbach's alpha greater than 0.69 indicates a consistent research instrument (Cortina,1993; Taber, 2018).

In addition, the descriptive statistics results of this group of the questionnaire items revealed that automation of tender processes impact on customer satisfaction, transparency and efficiency in their organisations. According to the

results, automation can influence customer satisfaction and can improve efficiency in public procurement. In addition, automation can improve transparency of procurement professionals and can well be integrated with existing procurement systems and processes. All the means were close to 4 suggesting agreements among the research respondents on the statements measuring the impact of automation on customer satisfaction, transparency and efficiency.

As explained earlier, the mean is a measure of central tendency that can be used to summarise or represent a particular data set (Weiers, 2011; Saunders et al. 2016). Also, all the standard deviations were less than 1 and this implies that most of the respondents were close to the mean of each statement, and that the agreement among them was generally high. As expounded earlier, the standard deviation is a measure of dispersion or the amount of variation of the values of a variable about its mean (Weiers, 2011; Saunders et al. 2016). A low standard deviation signifies values are close to the data set mean, while a high standard deviation indicates values are dispersed across a larger range (Weiers, 2011; Saunders et al. 2016).

5.4 Leadership on the digitisation of procurement operations

Lastly, the factor analysis results revealed that the third principal component of the digitisation of operations in public sector procurement questionnaire is the *management on the digitisation of procurement operations*, and three variables loaded under this component. However, this group of the questionnaire items had a Cronbach's alpha of only 0.12 which is too low for a research instrument. As explained by Cortina (1993) and Taber (2018), Cronbach's alpha should be greater than 0.69 to ensure a reliable research instrument. Therefore, this measure of the impact of management on the digitisation of procurement operations is not reliable.

In addition, the descriptive statistics results of this group of the questionnaire items revealed that management impacts on the digitisation of procurement operations in organisations. According to the results, the department workflows will likely impact on culture and the department has resources to manage potential risks and challenges associated with implementing automation. In addition, the departmental culture does not reduce the level of trust and collaboration among procurement professionals.

Two of the means were close to 4 suggesting agreements among the research respondents on the statements measuring the impact of management on the digitisation of procurement operations. As illuminated earlier, the mean is a measure of central tendency that can be used to summarise or represent a particular data set (Weiers, 2011; Saunders et al. 2016). Also, all the standard deviations were less than 1 and this implies that most of the respondents were close to the mean of each statement, and that the agreement among them was generally high. As explicated earlier, the standard deviation is a measure of dispersion or the amount of variation of the values of a variable about its mean (Weiers, 2011; Saunders et al. 2016). A low standard deviation suggests that the values tend to be close to the mean of the data set, while a high standard deviation suggests that the values are spread out over a wider range (Weiers, 2011; Saunders et al. 2016).

In the era of procurement in South Africa, the public sector infrastructure supply chain management system has been impacted by a number of difficulties related to the different elements in the value chain, consisting of organizational capability, systems and procedures, institutional setup, regulatory and governance controls, and systems and processes. The office of chief procurement officer (OCPO) along with e-Tendering launched on September 1, 2015, a central supplier database (CSD) for government, marking a significant step towards modernizing the supply chain to leverage on reduction of administrative cost/compliance burden and to standardise and electronically verify supplier information.

Provincial and national agencies release their bids in line with the demand plans for the procurement of products, services, and infrastructure (National Treasury, 2015). According to digital procurement survey by Pricewaterhouse Coopers (PwC) in (2022) investing in digitising purchasing functions has brought varying degrees of success to organizations. If digital transformation is progressing along the path of procurement functions (+18% year-on-year) – largely driven by compliance and risk management then cost reductions (+ 37%) and strategic sourcing (+24%) remain the main reasons for switching to digital purchasing.

5.5 Technology Acceptance Model interpretation

The TAM variables were being aligned from the three rotated components of the three research questions presented in this study.

TAM Construct	**Aligned Variable (Factor Loading)**	**Interpretation**
Perceived Usefulness	A8 (0.708), A10(0.872), A12 (0.781), A13 (0.539), A15 (0.553), B1 (0.573), B3 (0.608), B4 (0.554), B5 (0.529), B6 (0.524), C1 (0823), C2(0.740), C3 (0.785)	Automation may improve decision-making, efficiency, and transparency for procurement professionals
Perceived ease of use	A11 (0.637), A14 (0.5596), C5 (0.554)	The degree to which automation solutions are seen as simple to use and incorporated

Attitude toward Usage	A1 (0.591), A2 (0.634), A4 (0.744), A5 (0.660), A6 (0.507), C4(0.711)	Indicate that workflows, leadership, and corporate culture affect attitudes towards automation
Behavioural intention Use	A7 (-0.669)	Whether procurement professionals plan to employ automation tools depends on organisational and trust-related issues.
Actual System Use	Dependent on PU & BI	The practical use and incorporation of automation in the procurement process

Strong loadings on variables like A1 (0.591), A2 (0.634), A4 (0.744), A5 (0.660), and A8 (0.708) imply that leadership support and a well-integrated culture have a good impact on attitudes towards automation tool usage (ATU) and perceived utility (PU). The adoption process is also influenced by regulatory factors, as shown by A12 (0.781) and A15 (0.553), which show that compliance considerations affect procurement professionals' behavioural intention (BI).

Additionally, A10 (0.872) indicates that PU is influenced by individual characteristics, suggesting that automation may be more beneficial to professionals who have previously worked with digital tools. On the other hand, A7 (-0.669) shows that BI is negatively impacted by decreased collaboration and a lack of trust in automation, which leads to resistance to adoption.

The impact of automation on procurement efficiency, transparency, and satisfaction is the subject of the second factor (RC2). The high factor loadings on C1 (0.823), C2 (0.740), and C3 (0.785) are consistent with PU, as experts understand that automation might improve procurement results. In a similar vein, C5 (0.554) emphasises that perception of PEOU is influenced by

integration with current systems. These findings imply that procurement professionals are more inclined to use automation solutions when they perceive them as practical and simple to integrate.

Workflow structures, risk management, and their impact on adoption are all included in the third component (RC3). Workflows have a considerable impact on ATU, according to A6 (0.507), which shows that defined processes might make the adoption of automation go more smoothly. C4 (0.711) further emphasises PU as a critical predictor by showing that departments with resources to mitigate automation risks have greater adoption rates.

A7 (-0.669), on the other hand, has a negative correlation with system adoption, indicating that BI is hampered by a lack of confidence in automation. The necessity of leadership action to foster trust in procurement automation is highlighted by this study.

5.6 Chapter summary

Chapter 5 has discussed the data analysis results of this study. The chapter discussed the impact of organisational culture on turnaround time of the current processes, and the impact of automation on customer satisfaction, transparency and efficiency. In addition, the chapter discussed the impact of management on the digitisation of procurement operations.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

Chapter 6 completes the study and suggests recommendations on digitisation of operations in public sector procurement in South Africa. Because of the study results, organisational culture impact on turnaround time of the current processes in their organisations. Accordingly, the key components of departmental culture support the successful implementation of automation process in organisations, and the integration between automation strategy and culture impact on employee engagement. Also, the departmental culture will influence the adoption of automation, and the department has best practices for integrating automation into existing processes.

Further, departmental factors such as leadership support and training initiatives influence employees' perceptions of the usefulness of automation, and individual characteristics influence perceptions of the usefulness of automation. In addition, procurement professionals find it easy to use automation tools in their daily tasks, and external factors such as regulatory requirements will influence the decision-making process regarding adoption of automation tools. Next, the department has clear performance indicators (KPIs) that can be used to measure the success of automation, and procurement professionals find it easy to use automation tools in their daily tasks, and external factors such as regulatory requirements will influence the decision-making process regarding adoption of automation tools.

Moreover, the volume of tenders impacts the ability to select the most qualified and capable supplier, and strategies for managing high volumes of tenders, such as pre-qualification stages has impact on tender adjudication. The role of automation has impact in streamlining tender evaluation for high-volume procurement, and the turnaround has impact on SMEs participation in tenders, and there is low turnaround in evaluating and adjudication of tenders.

Furthermore, automation of tender processes impact on customer satisfaction, transparency and efficiency in their organisations. According to the results, automation can influence customer satisfaction and can improve efficiency in public procurement. In addition, automation can improve transparency of procurement professionals and can well be integrated with existing procurement systems and processes. Also, management impacts on the digitisation of procurement operations in organisations. According to the results, the department workflows will likely impact on culture and the department has resources to manage potential risks and challenges associated with implementing automation. In addition, the departmental culture does not reduce the level of trust and collaboration among procurement professionals.

6.2 Policy Recommendations

Based on this study's findings, the following recommendations are made for digitizing procurement process in public sector in South Africa:

National departments should use a staged implementation plan to guarantee the effective digitalization of procurement operations. This strategy should start with stakeholder engagement and skill development, then move on to process redesign and careful technology selection. Sustaining advantages requires incremental improvement and ongoing monitoring. Legislators must think about creating a single task force to direct and coordinate departmental digitization initiatives.

Future study should concentrate on comparative assessments across sectors, longitudinal studies to evaluate the long-term effects of digital procurement, and a more thorough examination of the behavioural and cultural elements driving technology adoption. The validity of the instrument will be supported by broadening the scope to include cutting-edge digital tools which will further enhance comprehension and inform policy constructs found in the literature study.

To promote accountability and transparency, the National Treasury SCM Regulations require that competitive bids be posted on the e-Tender Portal. Long turnaround times and manual processes, however, point to the necessity of strong digital solutions to boost efficiency and compliance. Value addition at every stage of the supply chain is emphasized by the Public Sector Supply Chain Management Framework; however, inefficiencies such as manual errors and a lack of transparency compromise this objective.

Digital technology integration should be promoted by policy to optimize value and streamline operations. Stakeholders ought to make investments in digital tools, improve training initiatives, examine current supply chain management policies, set up frameworks for monitoring and evaluation, involve suppliers from the private sector, encourage innovation, carry out additional research, exchange best practices, and promote openness in public procurement procedures.

6.5 Suggestions for further research

Through qualitative case studies and interviews, future research on digital procurement should examine how organisational culture affects adoption. A comparison of procurement in the public and private sectors might reveal variations in effectiveness, difficulties, and adoption rates. Examining cutting-edge technologies like artificial intelligence (AI), blockchain, and the Internet of Things (IoT) can reveal how they affect efficiency, transparency, and the fight against fraud. Furthermore, evaluating regulatory and policy frameworks helps enhance governance and compliance. The preparedness of procurement experts should also be studied, with an emphasis on their abilities, training requirements, and change management techniques. To ascertain how digital procurement affects inclusivity, research should be done on how it affects SME involvement. Finally, tracking the long-term return on investment (ROI) of procurement automation can reveal insights into long-term operational and financial benefits.

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