



**EFFECTIVENESS OF E-PROCUREMENT AT THE FREE STATE PROVINCIAL
DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE**

By

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DECLARATION

I declare that the field study hereby submitted for the Magister in Business Administration at the UFS Business School, University of the Free State, is my own independent work and that I have not previously submitted this work, either as a whole or in part, for a qualification at another university or at another faculty at this university.

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ABSTRACT

The aim of this study was to evaluate the effectiveness of electronic procurement (e-procurement) at the Free State Provincial Department of Public Works and Infrastructure (DPWIFS) Bloemfontein regional office. E-procurement is now among the most widely used means of procuring commodities, work, and services. This practice aims to maximise efficiency and effectiveness within an organisation's procurement procedures. A sample of 24 participants was selected through a purposive, convenience sampling approach. The data were collected through in-depth face-to-face focus-group discussions and were analysed by means of content analysis.

The study explored the reasons for the non-usage of e-procurement and the factors affecting the implementation of e-procurement at DPWIFS. It was found that there are several inhibiting factors (challenges and disadvantages) that impact the adoption and implementation of e-procurement at DPWIFS. The study also found that there are more benefits (advantages) than inhibiting factors associated with using e-procurement. Benefits include efficiency and effectiveness, cost savings, elimination of human error, reduced transaction time, improved and accurate reporting, safer storage, and reduction of corruption and fraud. The main disadvantages were found to be lack of data security, slow internet and poor network coverage, and an increase in process complexity. The main challenges were resistance to change, power outages, information and communication technology (ICT) infrastructure costs, and poor integration with existing systems. The study reveals that DPWIFS can embrace and implement e-procurement, as the benefits appear to outweigh the costs of implementation. However, the bottlenecks (inhibiting factors) need to be addressed before the implementation of the system. Implementing e-procurement would lead to a good return on investment (i.e., value for money) for DPWIFS. This system would need to be carefully created and implemented to ensure DPWIFS's growth, competitiveness, sustainability, and development.

Keywords: e-procurement, DPWIFS, implementation, adoption, benefits, inhibiting factors, efficiency, effectiveness, competitiveness.

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LIST OF ABBREVIATIONS AND ACRONYMS

AGSA	AUDITOR-GENERAL OF SOUTH AFRICA
AO	ACCOUNTING OFFICER
BBBEEA	BROAD-BASED BLACK ECONOMIC EMPOWERMENT ACT
B2B	BUSINESS-TO-BUSINESS
B2C	BUSINESS-TO-CONSUMER
C2C	CONSUMER-TO-CONSUMER
CSD	CENTRAL SUPPLIERS DATABASE
EDI	ELECTRONIC DATA INTERCHANGE
EPWP	EXPANDED PUBLIC WORKS PROGRAMME
FSPG	FREE STATE PROVINCIAL GOVERNMENT
FSPT	FREE STATE PROVINCIAL TREASURY
FSSMS	FREE STATE SUPPLIER MANAGEMENT SYSTEM
HDIS	HISTORICALLY DISADVANTAGED INDIVIDUALS
HRM	HUMAN RESOURCE MANAGEMENT
ICT	INFORMATION AND COMMUNICATION TECHNOLOGIES
IOT	INTERNET OF THINGS
MFMA	MUNICIPAL FINANCE MANAGEMENT ACT
PAIA	PROMOTION OF ADMINISTRATIVE JUSTICE ACT
PAIA	PROMOTION OF ACCESS TO INFORMATION ACT
PFMA	PUBLIC FINANCE MANAGEMENT ACT
PMU	PROJECT MANAGEMENT UNIT
PO	PURCHASE ORDER
PPPFA	PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT
QDA	QUALITATIVE DATA ANALYSIS
RFQ	REQUEST FOR QUOTATION
RME	RESEARCH, MONITORING, AND EVALUATION
SARS	SOUTH AFRICAN REVENUE SERVICES
SCM	SUPPLY CHAIN MANAGEMENT
SITA	STATE INFORMATION TECHNOLOGY AGENCY

SMES	SMALL AND MEDIUM-SIZED ENTERPRISES
SMME	SMALL, MEDIUM, AND MICRO ENTERPRISES
SOE	STATE-OWNED ENTERPRISES

CHAPTER 1: RESEARCH PROPOSAL

1.1 Introduction

This study focuses on the Department of Public Works and Infrastructure of the Free State Provincial Government (hereafter referred to as the DPWIFS). The DPWIFS is a government department in the Free State province that operates within the provincial sphere of government. The DPWIFS has district offices in Motheo, Xhariep, Thabo Mofutsanyane, Lejweleputswa, and Fezile Dabi. The national as well as provincial governments have promulgated a variety of legislation that governs and regulates the DPWIFS. One of the most important of these pieces of legislation is the Public Finance Management Act of 1999 (Act No. 1 of 1999) – a statute that governs budget spending in the national and provincial domains of government, as well as departments, public entities, constitutional institutions and the provincial legislatures.

The DPWIFS is divided into three operational programmes, namely:

- a) Administration Programme
- b) Public Works Infrastructure and Property Management Programme
- c) Expanded Public Works Programme (EPWP)

1.1.1. Administration Programme

The goal of Administrative Programme 1 is to give operational, strategic, financial, and organisational assistance to the DPWIFS in order for it to fulfil its mandate in an integrated, efficient, effective, and sustainable manner (DPWIFS: 2020).

1.1.2. Public Works Infrastructure and Property Management Programme

The goal of this programme is to encourage long-term, integrated, and environmentally conscious accessibility that promotes economic development and social empowerment in order to create a balanced and equitable provincial government infrastructure. (DPWIFS: 2020).

1.1.3. Expanded Public Works Programme (EPWP)

The goal of EPWP programme 3 is to supervise the implementation of community development and contractor empowerment programmes and policies (DPWIFS: 2020).

1.2 Background

According to Bakarr (2020: 15), the term "e-procurement" refers to the use of electronic procurement techniques at every stage of the purchasing process – from the identification of a necessity through to payment and, possibly, contract administration. Bakarr (2020: 15) highlights that e-procurement boosts operational efficiency and lowers institutional administrative costs. Electronic procurement involves automated purchasing of goods and services by an organisation through web-based applications (Nawi, Deraman, Bamgbade, Zulhumadi & Riazi, 2017: 209) and has been acknowledged for its capacity to reduce administrative costs, increase operational efficiency, and rationalise organisational spending. In an organisation's cost structure, procurement is often one of the most significant aspects. Depending on the circumstances, public sector institutions using e-procurement wisely for contracts can gain in a variety of ways (Nawi et al., 2017: 209). The main benefits derived from the deployment of e-procurement include competitiveness, dematerialisation, and decrease in procurement services corruption among public officials and (Nawi, et al., 2017: 209).

Ngeno and Kinoti (2017: 19) clarify that technology-based services are a must for both public and private institutions in today's dynamic, and fiercely competitive business environment. It is essential for a company to use innovative ideas and processes to give customers cost-effective overall solutions and a better customer experience. In fact, it is argued that the most important force driving change in the world's social, political, and economic spheres of life today is e-procurement (Ngeno & Kinoti, 2017: 19). People live in a world dominated by information and communication technology (ICT), where computer and telecommunications technologies are at the core of all industrial and commercial activities as well as all facets of human life (Ngeno & Kinoti, 2017: 19).

Organisations that are part of "hybrid supply chain networks" are motivated by shifting consumer demands and behaviour on the one hand, and escalating competition on the

other, to function in a quickly expanding economic environment spanning multiple continents and borders on the other (Bienhaus & Haddud, 2018).

The DPWIFS is under increasing pressure from service delivery mandates due to lengthy procurement processes resulting from outdated ways of doing things. For example, most government procurement is still paper-based rather than electronic. National Treasury supply chain management (SCM) Instruction note No. 02 of 2021/22, paragraph 3.2.4, states that institutions should obtain at least three written price quotations from three different suppliers registered on the Central Suppliers Database (CSD) when procuring goods and services. This process becomes lengthy due to re-advertisements as a result of receiving less than three quotations because service providers or suppliers are hesitant to complete a thick request for quotation (RFQ) document manually with a pen. However, if this process were done electronically, it would be quicker, more responses would be received, and service delivery would be improved.

The Auditor-General of South Africa (AGSA) (2020: 127) highlights that, as required by Section 44 of the PFMA and Treasury Regulations 8.1 and 8.2, contracts have occasionally been extended or modified without the consent of a duly authorised authority. However, securing signatures is a problem in most cases because some managers are at times unavailable to sign the necessary documents. If e-procurement is established and is successful, such incidents can be eliminated since the Accounting Officer can delegate signing rights if the person next in line to sign electronically is unable to do so. Given these examples of the inefficiency of current procurement systems in the DPWIFS, this study focuses on the effective use of e-procurement to improve and expedite the procurement processes for the delivery of goods, works, and services in this government department.

1.2.1 Laws, policies, and regulations governing the DPWIFS

Various laws, policies, and regulations govern and regulate the DPWIFS. The PFMA is the primary Act that regulates the financial management of the DPWIFS. The PFMA was enacted in 1999, with the intention of ensuring the proper management of all revenues, expenditures, liabilities, and assets; governing the finances of the national and provincial

spheres of government, constitutional institutions, and state-owned entities; ensuring that all revenues, expenditures, assets, and liabilities of those governments are managed efficiently and effectively; and defining the duties of various individuals (section 2 of the PFMA).

The PFMA states that in accordance with Section 38(1)(a)(iii), the Department's Accounting Officer (AO) shall ensure that fair, equitable, transparent, competitive, and cost-effective procurement and provisioning procedures are followed. Section 38(1)(b) of the PFMA determines that the AO ensures the Department's resources are used effectively, economically, transparently, and efficiently.

Section 217(1) of the Constitution of the Republic of South Africa, 1996 (the Constitution), states that when making purchases of goods or services, institutions in the national, provincial, or local spheres of government, as well as any other institutions recognised by national law, must follow a procedure that is fair, equitable, transparent, competitive, and cost effective. Given that Section 217(1) of the Constitution establishes the requirements for government procurement in South Africa, the DPWIFS must ensure that the provision of goods and services is cost effective. As a result, the use of e-procurement and digital procurement platforms should be implemented for the Department to keep up with ever-changing technology, remain relevant, and save costs. The National Treasury (2020) points out that the current state of public procurement in South Africa is not optimal.

1.3 Problem Statement

Khalil and Waly (2015: 1) state that the public sector's procurement procedures continue to be dominated using outdated paper-based methods. The introduction of e-procurement enables businesses to scale back on paper-based operations, which can help prevent environmental degradation, a lack of raw material supplies, and rising pollution levels (Belisari, Binci, & Appolloni, 2020: 3). The use of obsolete paper-based procurement processes is still prevalent in the public sector and is no longer effective, as documents get lost due to inadequate record-keeping and safeguarding, resulting in, among other

negative effects, a limitation of scope during an audit (Auditor-General of South Africa, 2021).

It is important to draw attention to systemic shortcomings in laws and policies adopted by the government. A good example is the customary procedure for government tendering, which demands that interested parties acquire a printed tender document from physical offices. This makes it impossible for the government to use an electronic tendering system, which is a significant setback for the government's aspirations to create an electronic government system. A diversified yet fragmented e-procurement environment is the result of the lack of standards used in the development of e-procurement systems, which prevent users of one system from electronically interacting with users of another system (Nawi et al., 2016: 332). The problem is that e-procurement and digital procurement platforms are not adequately adopted and exploited in the public sector. If the problem is not addressed, it has the potential to derail service delivery as well as the credibility of the DPWIFS during audit processes. Paper-based processes have several negative consequences, including that documents are damaged, lost, or misplaced, and information which is physically kept in files rather than saved and backed-up electronically cannot be easily retrieved if lost or damaged.

Such incidents occur frequently with documents that are kept manually, including: SCM tender documents (physically stored in cabinets at SCM tender office), financial documents emanating from payment batches and journals (physically stored in cabinets at finance office), human resource management (HRM) documents (physically stored in cabinets at HRM office). There has recently been a wider acceptance of the necessity for public sector institutions to use cutting-edge technologies to boost organisational efficiency and save costs (Toroitich, Mburugu, & Waweru, 2017: 246). One of the major goals the DPWIFS wants to achieve every year during the audit is a clean audit or unqualified audit opinion. If the documents (tender documents and payment batches) to support the figures on the annual financial statements could not be submitted to the AGSA as part of the audit process, such a goal cannot be achieved, because the AGSA raise findings on limitation of scope. This means that the AGSA could not express an opinion, which could lead to a disclaimer or adverse audit opinion.

Based on the best practice, it is believed that the effective implementation of e-procurement can help solve the challenges of corruption and inefficiencies in the public sector which, in turn, will enhance the efficiency of operations, reduce costs, and save time (Bakarr, 2020: 16). E-procurement can also reduce human interference in the bidding process (Bakarr, 2020: 16).

Due to the fact that documents will be saved electronically online, e-procurement and digital procurement platforms will make it possible to speed up and improve the procurement processes as well as improve record-keeping, archiving, management, and document security. SCM and procurement processes are considered integral parts of the DPWIFS, and the government sector in general, and if these procurement processes are ineffective, the entire institution will be in jeopardy, as the DPWIFS will be unable to meet its key strategic goals and performance targets, which negatively affects service delivery. As a result, the DPWIFS will not be able to fulfil its constitutional mandate for a suitable procurement and provisioning system that is fair, equitable, transparent, competitive, and economical if it cannot successfully implement e-procurement.

1.3.1 Research questions

This study explores the following research questions:

- How is e-procurement currently adopted and implemented in a South African public sector context according to extant literature?
- What are the main/key reasons for the non-usage of e-procurement and digital procurement platforms in the DPWIFS, and the public sector in general?
- What are the factors affecting the effective implementation of e-procurement in the DPWIFS and the public sector in general?
- Which strategies can be employed to enhance the use of e-procurement in the DPWIFS?

1.4 Primary and secondary objectives

1.4.1 Primary objective

To determine the factors that will to the effective adoption and implementation of e-procurement in the DPWIFS.

1.4.2 Secondary objectives

Literature objective

- To provide an overview of the literature on the adoption and implementation of e-procurement.

Empirical objectives

- To determine the main reasons for the non-usage of e-procurement and digital procurement platforms in the DPWIFS.
- To determine the factors that affect the effective implementation of e-procurement within the DPWIFS.
- To identify strategies that can be employed to enhance the usage of e-procurement in the DPWIFS.

1.5 Literature review

1.5.1 E-procurement

The purpose of this section is to review existing literature relevant to this study. The literature study is crucial in that it establishes what is already known about the subject within the discipline. The goal of the literature review is to identify the elements that contribute to the general effectiveness of e-procurement, the implementation of this strategy in the public sector, particularly in the national, provincial, local government, constitutional institutions and state-owned entities in South Africa, as well as the elements that contribute to the inefficient use of e-procurement platforms in the public sector. Journals, books, published articles, academic texts, and web-based reports were all used in the research.

As technology develops and markets grow more global, organisations, especially small and medium-sized enterprises (SMEs), need assistance to adopt new technologies and use e-procurement practices to obtain a competitive advantage. To help SMEs and public

sector expand, information technologies like e-procurement have become more connected with other operations like supply chain integration (Mafini, Dhurup, & Madzimore, 2020).

Rukuni, Maziriri, and Mulaudzi (2020: 394) found that institutions in South Africa have been accused of poor management, inefficiency, and abuse of power. In most instances, it was discovered that state-owned enterprises (SOEs) procurement departments were involved in corrupt activities. Rukuni et al. (2020: 394) argue that one of the measures that SOE authorities can use to increase transparency and accountability, and to prevent corruption, is to properly establish an e-procurement system. Rukuni et al. (2020: 394) bemoan the fact that most SOE supply chain authorities, particularly in developing countries, have yet to recognise the need for incorporating procurement staff members' ideas into the deployment of e-procurement.

According to Magubane (2017: 1), one of the many examples of public officials from SOE procurement divisions being involved in dishonest operations is the infamous Gupta affair involving Transnet and Eskom.

According to Korir, Afande, and Maina (2015: 59), poor implementation and the ongoing use of paper-based procurement techniques that are susceptible to corruption have stemmed from SOE supply chain authorities' inability to consider the opinions of procurement workers on factors affecting e-procurement. Awati and Pratt (2021: 1) highlight that e-procurement was created after electronic data interchange (EDI) was introduced in the 1980s. A decade later, EDI advancements made it possible for businesses to build online vendor catalogues. The term "e-procurement" currently refers to a wide range of activities, including contract administration, electronic orders, and payments, in addition to supplier evaluation and selection.

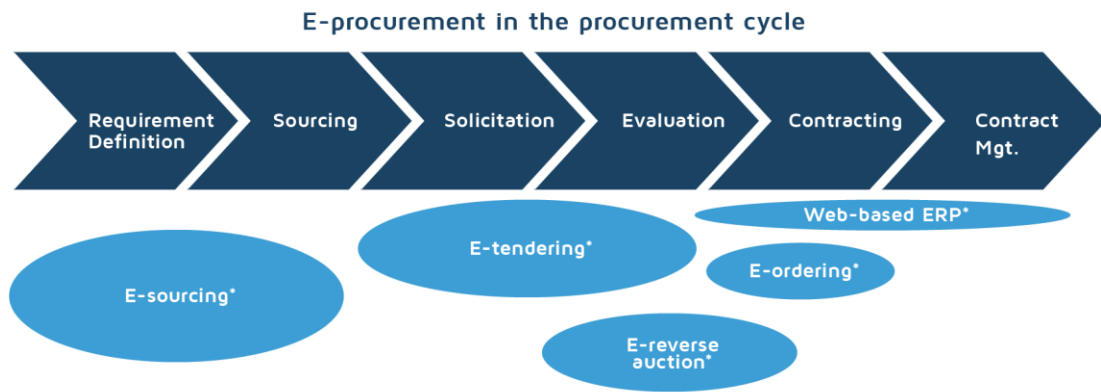


Figure 1.1: E-procurement in the procurement cycle

Source: Development Aid (2020, online)

Anthony (2018: 39) states that for the government to operate effectively, certain goods and services are required. It may enter into agreements with outside parties or use internal resources to acquire these products and services. Anthony (2018: 40) further points out that for many years, e-procurement has been used in a variety of countries, and it has been done through a variety of methods, each with its own set of benefits; however, e-procurement is not generally used in Africa. According to the World Bank, there are three main factors that contribute to Africa's slow adoption of e-procurement. first, the continent's governments have been slow to build the necessary capacity; second, there is a lack of both information technology infrastructure and widespread internet access; and third, African governments have outmoded administrative cultures Anthony (2018: 40).

Ngeno and Kinoti (2017: 19) highlight that public sector should investigate the numerous advantages that e-procurement offers in terms of automating the supply chain process as governments in emerging markets are often unaware of the benefits that e-procurement can provide (Purchasing & Procurement Center, 2021) . In the 2000s, the internet was extensively enabled and became a key resource for procurement automation, with the addition of multimedia advanced processing capabilities. Building on this technology, it is argued that e-procurement has become the most significant force behind change in the social, political, and economic aspects of the world (Ngeno & Kinoti, 2017: 19).

In today's world dominated by ICT, computer and telecommunications technologies are at the core of most business and industrial activities as well as human endeavours. The following figure represents the supply chain practice view of digital procurement.

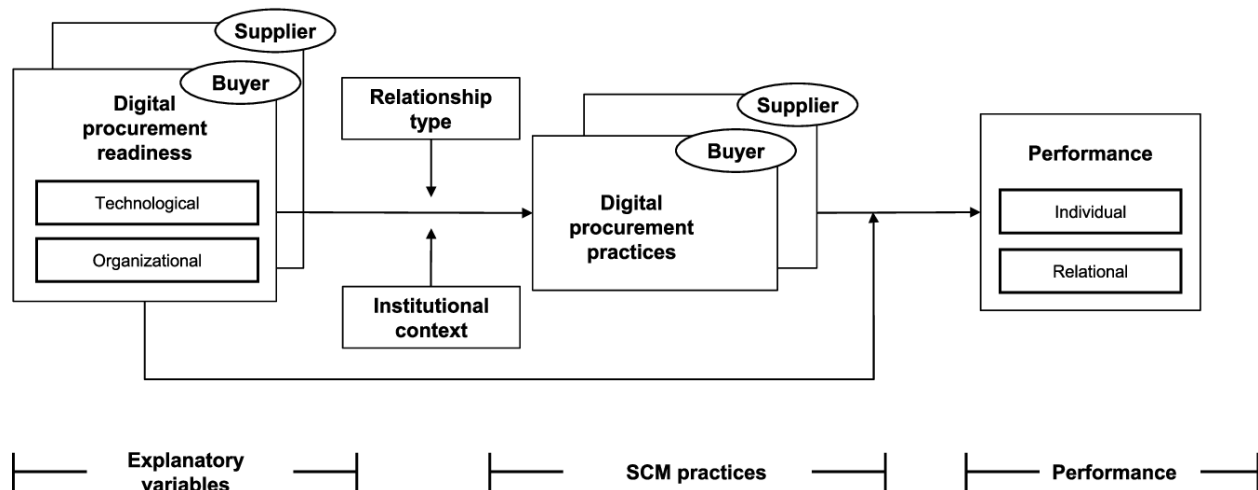


Figure 1.2: A supply chain practice view of digital procurement

Source: Kosmol, Reimann, & Kaufmann (2019: 100553)

1.5.2 Defining e-procurement

Pattanayak and Punyatoya (2020: 1428) define e-procurement as a business-to-business purchasing strategy that comprises leveraging electronic commerce to identify potential suppliers, make purchases, send payments, and communicate with suppliers.

Aman and Kasimin (2011: 330) define e-procurement as the term used to describe the use of electronic methods during all phases of the purchase process, including requirement identification, payment, and possibly contract administration.

Kumar and Ganguly (2021: 1039) describe how, over the past two decades, e-procurement, an IT intervention in the procurement function, has revolutionised how buyers do business with suppliers and how businesses communicate with suppliers. According to Nawi et al. (2016: 329), e-procurement is the process of automating a company's procurement procedures through the use of web-based applications; it is a term used to describe how companies buy goods and services. E-procurement is the term

used to describe the process of requisitioning, ordering, and purchasing goods and services online. It involves business-to-business transactions (Awati & Pratt, 2021).

Ramkumar, Schoenherr, and Jenamani (2016: 1171) assert that e-procurement is the process of acquiring goods and services using ICT-based solutions. It has the advantages of reducing cycle time, raising visibility, reducing erratic spending, and resulting in overall lower costs.

These e-procurement definitions offered by various writers (Nawi et al., 2016: 329; Pattanayak & Punyatoya, 2020: 1428; Ramkumar et al., 2016: 1171) acknowledge the significance of digital technology, like the internet and computers, in facilitating the supply of goods and services to a company. The definitions also state that paper-based systems have multiple flaws and are vulnerable to manipulation and exploitation.

The definition of e-procurement that will be used in this study is that given by Nawi et al. (2016: 329) – namely, the automation of an organisation's procurement operations through the use of web-based applications for the purchase of products and services.

1.5.3 The legislative framework for public procurement in South Africa

The legislation applicable to procurement, in general, includes the following:

- Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000) and its Preferential Procurement Regulations of 2022.
 - It governs preferential procurement by establishing a framework within which preferential procurement policies must be carried out.
- At national and provincial government levels, the Public Finance Management Act, 1999 (Act No. 1 of 1999) (PFMA) and its regulations.
 - It regulates public financing in general and therefore also public procurement.
- At the local government level, the Local Government: Municipal Finance Management Act No. 56 of 2003 (MFMA), its regulations, and the Municipal Systems Act 32 of 2000.
 - These manage public finances in general as well as procurement in the public sector.

- Promotion of Administrative Justice Act 3 of 2000 (PAJA) well as the Promotion of Access to Information Act 2 of 2000 (PAIA).
 - Access to information kept by private and public entities is governed by this law.
- Broad-Based Black Economic Empowerment Act 53 of 2003 (BBBEEA).
- Prevention and Combating Abuse in the Supply Chain Management – National Treasury Instruction Note 3 of 2016/2017.
- Electronic Communications and Transactions Act, 2002 (Act 25 of 2002).

This Act intends, among others, to provide for the facilitation and regulation of electronic communications and transactions, and to provide for the development of a national e-strategy for the Republic of South Africa.

1.5.4 Importance of using e-procurement platforms

E-procurement aids in the improvement of procurement transparency and the reduction of corruption among public officials and managers in organisations (Nawi et al., 2016: 329). Nawi et al. (2016: 329–330) indicate that the e-procurement system helps the government to streamline its operations and increase the quality of its services. Suppliers can engage in government procurement exercises by signing up for the electronic procurement system (Nawi et al., 2016: 330). Nawi et al. (2016: 330) further highlight that e-procurement converts the government's customary manual procurement process into an electronic, internet-based strategy. By adopting e-procurement, paper-based methods that are prone to errors and corruption can be replaced with digital and electronic procurement platforms that use error-free, paper-free methods. Nawi et al. (2016: 330) conclude that it helps businesses keep strictly within the law's compliance requirements while expediting regulatory processes and cutting red tape.

According to Toroitich et al. (2017: 244), an institution can benefit from the advantages an e-procurement system has to offer after it is successfully implemented. Although e-procurement technologies have many advantages, their adoption is still in early stages in many government institutions.

1.5.5 Benefits/advantages of e-procurement

Nawi et al. (2016: 331) clarify that using e-procurement will result in high-quality bidding, promptness, cost savings, minimal business effort, decreased financial and technical risks, and ultimately increased supplier competition, which will result in lower costs for purchasing goods and services at premium prices.

Through the electronic publication of tender notices and contract awards, e-procurement in the public sector is associated with improved transparency in the procurement process, which increases the likelihood of enhancing accountability and reducing instances of corruption (Salamba, 2021: 16).

The advantages of switching to an e-procurement system include the following:

Visibility

A user can have centralised access to all data using e-procurement, which can track down a purchase order (PO) or an invoice and analyse metadata to find places where processes could be improved (Jandrell, 2018).

Control

E-procurement platforms allow additional flexibility and control over the entire purchasing process. This is accomplished by limiting who has access to submit orders, authorise and purchase them, and receive or pay them. The modern e-procurement system relies heavily on control (Jandrell, 2018).

Automation

The use of automation to create purchase-related paperwork helps to reduce the number of errors. As a result, data accuracy and procurement-order quality increase (Ilhan & Rahim, 2017: 279). According to Ilhan and Rahim (2017: 279), a requisition form may be picked up and sent to the next relevant department for processing after waiting at multiple locations. One of the following options can be used in contemporary e-procurement systems to increase efficiency, rather than having one employee manually enter a PO or invoice:

- Automated PO generation

- Templates
- Internal catalogues
- Punchout catalogues

The system can email each approver in turn, saving them from having to carry a piece of paper from desk to desk and allowing them to approve the purchase right away from their inbox. To keep things flowing, even if one of the approvers is absent from the office, the system sends the document to a backup or the next-in-line approver (Jandrell, 2018))

Budgeting

All budgeting procedures can be automated by modern e-procurement systems, which will also alert authorised users of budget availability and any potential effects of spending before it happens (Jandrell, 2018).

Easy vendor management

This includes being able to see all vendor orders in one place, which can help with cost-cutting strategies (Jandrell, 2018).

Reduced rogue spending

Rogue spending is a major problem in many organisations, with roughly 40% of public officials admitting to going off the rails. This narrative can be changed if organisations use e-procurement systems since rogue spending is significantly reduced when there is an irrevocable electronic audit trail (Jandrell, 2018). E-procurement enables organisations to reduce maverick expenditure by utilising the internet, so minimising the instability and uncertainty associated with obtaining resources from vendors with whom the organisation has no official ties (Salamba, 2021: 16).

Clear audit trail

For many businesses, knowing who was involved in a purchase from a payment request is more important than knowing what was purchased. Switching to contemporary e-procurement systems can help to record every touchpoint and provide a clear trail of exactly who did what (Jandrell, 2018). E-procurement systems lessen the difficulty of

generating audit trails by electronically integrating POs, invoices, and receipts (Ilhan & Rahim, 2017: 280).

Money-saving

Jandrell (2018) highlights that converting to an e-procurement system can save money in addition to time. By eliminating fraudulent expenditure, taking advantage of early payment discounts, and lowering number of employees by using an e-procurement system, the majority of large organisations can save millions of dollars every year. Since it enables larger purchases, a wider range of buyers and suppliers, higher quality, quicker delivery, less paperwork, and lower administrative costs, e-procurement is used to reduce costs and increase efficiency (Makoba, Nyamagere, & Eliufoo, 2017: 180).

Praveen and Khaliq (2018: 105) also cite a few of the many advantages of e-procurement, including cost savings, process redesign, increased contract fulfilment, and higher expenditure under supervision. Praveen and Khaliq further pointed out that the use of e-procurement by the government results in significant cost and time savings because POs can be processed more easily and at a lower cost, and inventory costs and order fulfilment times are also significantly reduced.

Cost effectiveness

Salamba (2021: 16) indicates that cost effectiveness is an e-procurements benefit. Organisations can save money in many different areas by using e-procurement, including a decrease in labour expenses and an increase in buy volume, which enables better supplier bargaining and, ultimately, a lower price. E-procurement is believed to increase process efficiency in addition to cost effectiveness, given that the company offers capabilities like spending analysis, transaction analysis, market analysis, and other strategic activity-related factors. A company and its suppliers can share information quickly using current computer systems and internet networks under e-procurement, increasing the information flow between parties and enabling immediate responses on both ends.

1.5.6 Disadvantages of e-procurement

Das (2021) highlights the following perceived disadvantages of e-procurement:

Culture shock

Adopting e-procurement solutions can cause a culture shock, as happens with virtually any digital transformation, due to perceived software limitations and an organisational resistance to embracing new processing models.

Integration challenges

Due to a lack of planning and goal understanding, the adoption of the chosen e-procurement software will likely have significant implementation and functioning challenges.

1.5.7 COVID-19's effect on work performance

The COVID-19 outbreak has highlighted the critical need for customs and other supply chain partners to digitise operations and leverage technology for better communication and cooperation (Mikuriya, 2020). The world was gripped by worries over the COVID-19 virus's proliferation during the pandemic, and many employees had to work in a closed, isolated environment or work from home due to mitigation measures implemented to stop the virus from spreading (Wolor et al., 2020). The importance of supply networks in business and society has been highlighted by the COVID-19 pandemic (Ivanov, 2020). There were several gaps discovered in organisational systems and processes when the globe was initially confronted with the novel COVID-19 outbreak, and organisations were unprepared for the implications – particularly those still using outdated systems (Kniffin et al., 2021).

1.5.8 Sustainability of supply chains in the wake of COVID-19

De Sousa Jabbour et al. (2020: 119) highlight that risk assessment management should be integrated into a company's and supply chain's everyday operations in order to develop the capacity to foresee and respond to disruptions. Taking the initiative to create risk assessment teams and fostering this culture would be beneficial for businesses. A

systematisation of lessons acquired over time would be aided by the gathering and archiving of data and knowledge about past events, especially following the COVID-19 pandemic. Methods for gathering and storing data for analysis include big data analytics and blockchain.

De Sousa Jabbour et al. (2020: 117) point out that the disruptions brought on by the pandemic and the ensuing global lockdown have caused societies and businesses all over the world to experience previously unheard-of issues. For instance, people have had to deal with a variety of changes in their lives, from self-isolation to challenges stocking up on necessities. Some businesses, primarily in the hospitality industry, have failed to survive due to the slowdown in trade, while other businesses, such as farms, retailers, third-party logistics, and participants in healthcare supply chains, have battled to meet the population's needs.

De Sousa Jabbour et al. (2020: 118) add that supply networks face a significant external risk from pandemics like COVID-19. Additionally, this source of risk has the potential to destabilise supply chains, rendering them incapable of meeting demands. One major lesson to learn from COVID-19's disruptions is the need to switch to e-procurement in order to create supply chains that are smarter and more resilient.

1.6 Research Methods

1.6.1 Research design

The study design was a qualitative case study because it focused on a DPWIFS (Cooper & Schindler, 2011: 160). A case study design is appropriate because it allows the study to gain a better understanding of the complexities and dynamics of adopting an e-procurement system in DPWIFS. Case studies are also useful for developing and extending ideas as they investigate factors for future statistical testing (Adjei-Bamfo et al., 2020: 747)

Bryman and Bell (2014: 382) highlight that when collecting and analysing data for qualitative research, words are typically prioritised over quantification. It is an

interpretivist, constructionist, and inductivist research methodology, although qualitative researchers do not necessarily adhere to all three aspects.

1.6.2 Epistemological consideration

The interpretivism method was used to approach this qualitative research project. According to Bryman and Bell (2014: 378), in an interpretivist epistemological framework, social scientists must understand the individualised significance of social action.

1.6.3 Sampling

1.6.3.1 Population

The population, as defined by Bryman and Bell (2014: 381), is the collection of units from which a sample is taken. SCM and financial directorates, as well as other public officials who deal directly with procurement, make up the target audience for this study.

The population was the officials of the DPWIFS. The DPWIFS has a total population size of 1,303 officials (DPWIFS, 2021: 106). This total consists of the officials of the DPWIFS in the three budget programmes into which the Department is divided.

1.6.3.2 Sampling strategy

Bryman and Bell (2014: 383) define a sample as the segment of the population that is selected for research; it is a subset of the population. The sample size of this study was 24. The researcher conducted face-to-face focus groups with the 24 participants, with eight participants per focus group from each of the three budget programmes which the DPWIFS is divided into.

A non-probability sampling strategy was used, as the purpose is not to generalise the data to the whole population as it is not representative of the whole population. Bryman and Bell (2014: 380) define non-probability sampling as a sample that has not been chosen using a random sampling procedure. A purposive, convenience sampling approach was followed as this allowed the researcher to manage the sample size, resulting in improved statistical efficiency. Bryman and Bell (2014: 381) define purposive sampling as a non-probability, non-random sampling technique that prevents the

researcher from generalising to a population. The purpose is to intentionally pick cases or participants so that those sampled are relevant to the study topics (Bryman & Bell, 2014: 381).

1.6.4 Data collection methods

Data was gathered using face-to-face focus-group discussions with participants at the DPWIFS offices in the Mungaung Municipal region. Only participants from the DPWIFS stationed at the Mungaung regional office were contacted for the study. The requirements for the study, as well as the study's goal, were communicated to all participants and management.

A qualitative research approach was used to collect data, with semi-structured face-to-face focus-group discussions conducted. According to Adhabi and Anozie (2017: 3), an interview is a type of consultation in which the researcher seeks to gain additional information about a subject from the viewpoint of the person being interviewed. The objective of the study discussion is to discover people's viewpoints, experiences, beliefs, and motivations about particular themes; another justification for this technique is that the participant's point of view has a more potent, in-depth significance (Adhabi & Anozie, 2017: 7).

The researcher used semi-structured, open-ended questions to elicit suitable replies from the participants during the discussion. Adhabi and Anozie (2017: 4–5) point out that semi-structured group discussions are also ideal since they provide the researcher adequate time to delve deeper into the topic. Semi-structured discussions, unlike structured discussions, have no set format and are dependent on how the participant answers the researcher's questions or topics (Adhabi & Anozie, 2017: 4). Adhabi and Anozie (2017: 5) further add that semi-structured interview discussions are the best method for gathering data for qualitative studies.

1.6.5 Ethical considerations

According to Cooper and Schindler (2011), ethics are behavioural norms or principles that guide moral decisions about our conduct and interactions with others. Cooper and

Schindler (2011) further state that participants should have no apprehensions about taking part in this survey. The researcher ensured that the study's ethical requirements were followed. Public officials from the DPWIFS were informed of any concerns that may affect their participation in the study.

The researcher ensured that the information of the participants is kept confidentially and no information could be divulged to external parties except for the researcher. The following ethical considerations were fully addressed:

Permission obtained

Written permission from the DPWIFS was obtained before conducting any focus-group discussions.

Ethical clearance from UFS was obtained (UFS-HSD2022/1636/22)

Ethical clearance from UFS was obtained before proceeding with data collection.

Informed consent

All the participants who took part in this study were made aware of the details of the study; a consent form was provided that was signed by each respondent to show their understanding (Cooper & Schindler, 2011).

Voluntary participation

There was voluntary participation, and no one was misled or forced into taking part in the study (Cooper & Schindler, 2011). Consent forms were signed in this regard.

Confidentiality and anonymity

Integrity issues in research are critical when dealing with people's sensitive information and maintaining their anonymity. The participants' rights must be safeguarded. The researcher ensured that the participants stayed anonymous and that any information they provided is treated with the utmost discretion. Only the statistician and researcher had access to the data. This was utilised as a motivating tactic to urge participants to complete the surveys openly and honestly (Polonsky & Waller, 2014).

No harm

Participants were certain that they would be safe and that no one would be harmed in any manner. There was no risk of physical harm, psychological harm, emotional harm, shame, or any negative consequences for the participants and the DPWIFS. Any risk of damage was detected and mitigated (Polonsky & Waller, 2014).

Right to withdraw

There were no repercussions for participants who chose to withdraw; they were free to leave at any moment.

Avoid undue intrusion

Research questions only addressed the pertinent concerns in light of the research purpose. The personal lives of participants were respected.

All participants remained anonymous, and no means of identification has been made available to any person.

1.7 Demarcation of study

Research demarcation is the process of establishing boundaries for a study topic. Choosing the topic of the research as well as identifying contributing elements and practical limitations was required.

The research aims to evaluate the effectiveness of e-procurement at the DPWIFS in the Mangaung region. The study was conducted at the DPWIFS in the Mangaung region and involved the employees under the three programmes of the Department – namely, Administration (Programme 1), Public Works and Infrastructure, Strategic Immovable Assets, and Facility operations (Programme 2); and EPWP (Programme 3). Although the DPWIFS is divided into four regions (Mangaung/Motheo, Xhariep, Thaba-Mofutsanyane, and Lejweleputswa regions), the study only focused on the effectiveness of e-procurement in the Mangaung/Motheo region. The population and sample were from the DPWIFS.

Demarcation helps the researcher uncover additional factors affecting the research issue. In order to choose data-gathering methods and tools, the researcher must first identify these variables. This research study falls under the discipline of SCM in the DPWIFS.

1.8 Chapter layout

Chapter 1: Research proposal

Chapter 2: Literature review

Chapter 3: Research methodology

Chapter 4: Data analysis and interpretation

Chapter 5: Conclusion and recommendations

1.9 Conclusion

This research study endeavoured to evaluate the effectiveness of e-procurement at the DPWIFS's Mungaung regional office. Any organisation can benefit greatly from automating the procurement function. As off-contract and non-catalogue spending are decreased, cost savings increase. The procurement team has a far better understanding of all of its activities, allowing it to better minimise risk and maximise efficiency and resources. More activity, including tail spend, can be brought under management. E-procurement increases efficiency by boosting competition, lowering transaction costs, and reducing time taken and mistakes made during the bidding process. Following the completion of this study, the Department will have the chance to put the study's suggestions into action by establishing and implementing appropriate e-procurement systems and methods that will improve service delivery and thereby help the Department maximise profits. As a result, implementing an e-procurement system can benefit this institution at all levels.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

This chapter discusses procurement in general and defines what e-procurement is. The components of e-procurement are discussed, while the use of technology is highlighted. The chapter examines the theoretical and empirical research on ICT adoption in cooperative societies that has been done in the past. The chapter focuses on the following topics: SCM's emerging technologies, procurement, e-procurement, the difference between e-procurement and procurement, the advantages of practising e-procurement, perceived disadvantages of e-procurement, challenges in e-procurement implementation, reasons behind non-usage of e-procurement, and the conclusion.

2.2. Procurement

2.2.1 Procurement and public procurement defined

Procurement entails the purchasing of goods and services that allows an institution to function effectively and responsibly (Chartered Institute of Procurement and Supply Management, 2022). Figure 2.1 depicts the proposed solution for digitising gaps in some public procurement processes.

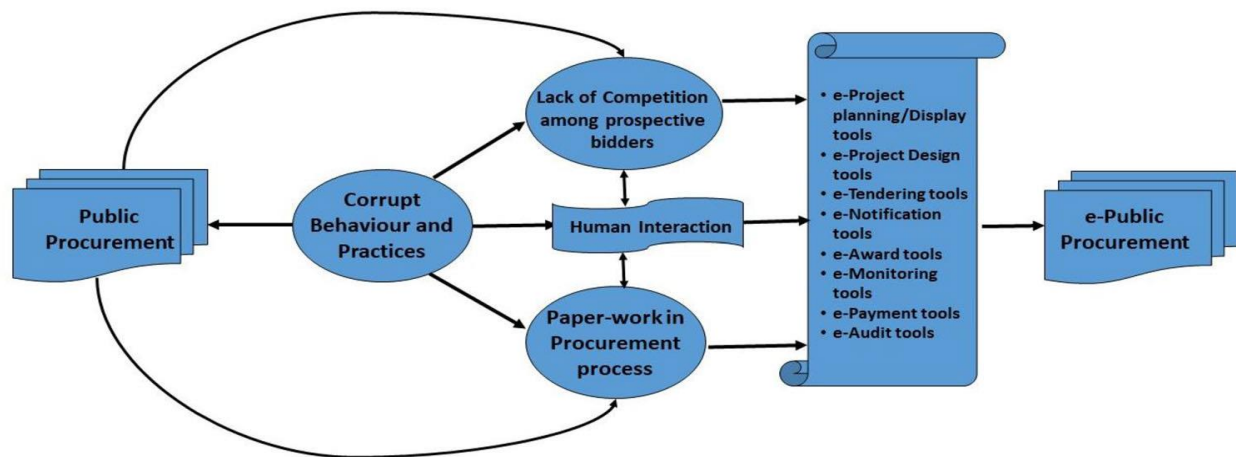


Figure 2.1: The proposed solution for digitising gaps in some public procurement processes.

Source: Afolabi et al. (2020: 9).

The term "public procurement" refers to the government's acquisition of goods and services from the private sector (Anthony, 2019: 1). Due to its central role in the provision of public services, public procurement is essential to a nation's economy and public spending. It can be considered as a significant determinant of a government's effectiveness and as a crucial evaluation of that effectiveness (Fourie & Malan, 2020: 1).

2.2.2 The five procurement pillars

Sithole (2017: 15) identifies five pillars as crucial for procurement. These pillars primarily promote and advance small, medium, and micro enterprises (SMMEs), but can be more broadly applied in every state department's procurement policy. The pillars are to be followed and utilised by all bid evaluation committees. Figure 2.2 below depicts the five pillars.

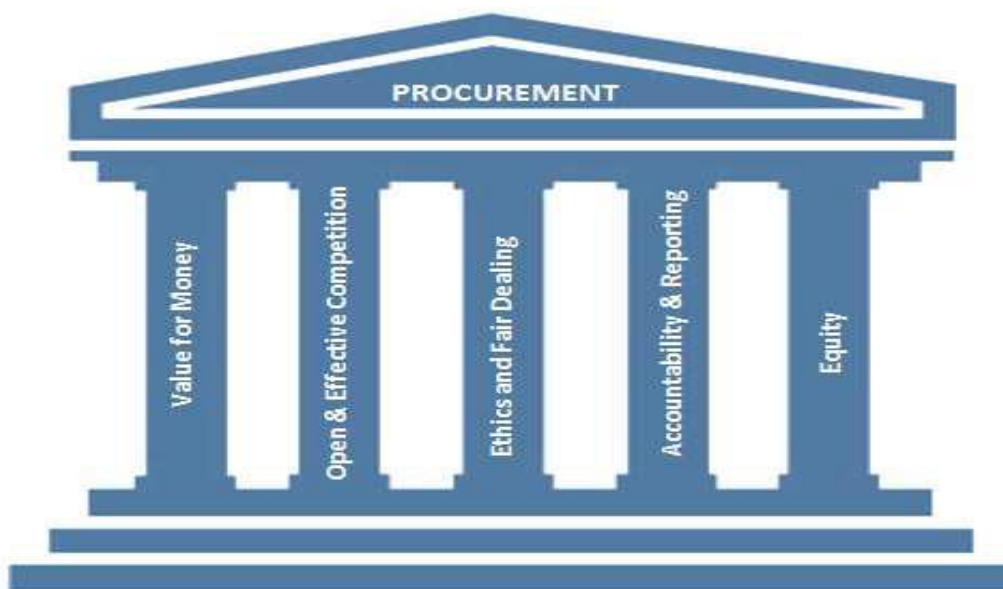


Figure 2.2: Procurement's Five Pillars

Source: Sithole (2017: 15)

The pillars should constitute the foundation for all public procurement systems, including legislation, standards, and processes. Therefore, it is necessary for all institutions within the public sector to include these pillars in their procurement procedures (Sithole, 2017:

15). These pillars' main objective is to facilitate the growth, development, and improved performance of the government and SMMEs. This will raise economic and social well-being levels and contribute to South Africa's shared prosperity. The entire procurement process will be in jeopardy if one of the pillars disintegrates. Sithole (2017: 16–17) reflected on the pillars as follows:

Pillar 1: Value for money

Sithole (2017: 16) argues that because adopting the lowest provided price is sometimes difficult to justify in terms of providing the best value for money, public organisations might not always be able to do so. The "best available conclusion" is referred to as "best value for money" if all pertinent costs and advantages accrued during the procurement cycle have been taken into account. Price alone is not a reliable predictor. Procurement officers in the public sector must investigate and go beyond the price. In this instance, government institutions must:

- a) Save money and time for themselves and their suppliers; they should avoid unnecessary costs and delays.
- b) Keep an eye on the supply agreements and re-evaluate them if they are no longer providing the intended benefits.
- c) Ensure that internal procedures and systems are constantly improved in terms of effectiveness.

Pillar 2: Open and effective competition

Institutions in the public sector are required to make sure that everyone has a fair chance to submit a bid for tenders during their procurement processes. They shall refrain from using procurement procedures that exclude or have the effect of excluding interested parties. Their procurement procedures must be open to all parties, accessible, and understandable, and they must work to eliminate any potential for favouritism (Sithole, 2017: 16). Sithole (2017: 16–17) adds that public sector institutions must make sure that the following are ensured by procurement procedures and guidelines:

- Purchasing opportunities are reasonably accessible to potential suppliers, and those that are offered are at the very least announced via the Government Tender Bulletin.
- Whenever there is less competition in the market, departments are aware of this and use procurement strategies that account for it.
- All parties or suppliers are given sufficient and timely information to enable them to submit a bid.
- Favouritism and bias are not tolerated.
- Competent vendors are not discouraged by the expenses of competing for opportunities.
- The advantages obtained outweigh the costs at least proportionally when competition is promoted.

For all parties to contest fairly and honestly, transparent and accessible regulations, guidelines, processes, and policies are required (Fourie & Malan, 2020: 6).

Pillar 3: Ethics and fair dealing

This pillar focuses on the behaviour of authorities in charge of public sector procurement. According to the pillar, public sector procurement officers must perform their duties with honesty and should avoid all conflicts of interest. The pillar mandates that public sector procurement officials' behaviour should not be influenced by accepting favours and gifts (Sithole, 2017: 17). All public sector procurement and other representatives who deal with suppliers on a direct basis must:

- Identify and resolve conflicts of interest, whether real or hypothetical.
- Be impartial while dealing with suppliers.
- Make sure they do not accept gifts or host guests in a manner that would harm the state's reputation.
- Be careful with how they use public property.
- Give all assistance possible to combat fraud and corruption (Sithole, 2017: 17).

Pillar 4: Accountability and reporting

This pillar necessitates the inclusion of proper reporting systems in both suppliers' and government officials' tenders. Suppliers must be able to disclose their intentions,

strategies, and results to the AOs and Ministers, while public sector employees and organisations must report to the AOs and Ministers (Sithole, 2017: 17).

Pillar 5: Equity

This pillar ensures that the government will support economic growth by implementing policies that support business generally, SMMEs, and historically disadvantaged individuals (HDIs). The National Development Plan and the Reconstruction and Development Programme both recommend that the government participate more actively in the economy (Sithole, 2017: 17). The adoption of specific industry assistance programmes with an emphasis on SMMEs and HDIs makes up the fifth pillar, which is crucial for South African public sector procurement (Fourie & Malan, 2020: 7).

2.2.3 The legislative framework for South African public procurement

2.2.3.1 Constitution of the Republic of South Africa, 1996

According to Section 217(1) of the Constitution, when contracting for products or services, national, provincial, and municipal government organs of state, as well as institutions recognised in national legislation, must do so following a system that is fair, equitable, transparent, competitive, and cost effective.

Fairness in this regard includes a procedurally fair bid review as well as equitable process accessibility. By posting contracts electronically on a website that is open to all potential bidders, the e-procurement technique ensures that all interested parties have equal access to contract opportunities. Since bidders are fairly valued and corruption is reduced, using a mathematical formula to evaluate bids reduces the need for human intervention (Anthony, 2018: 45).

Contractors are evaluated in accordance with Section 9 of the Constitution in South Africa since there is substantive equality in public procurement. In accordance with this clause and the equality provision of Section 217 of the Constitution, contractors' socioeconomic circumstances are taken into consideration when evaluating bids (Anthony, 2018: 46). Contractors could experience discrimination as a result of past discriminatory actions in South Africa. A formula should be developed to enable the evaluation of bids for equality

in order to fully fulfil this principle, especially when e-procurement is eventually adopted in the case of large-value bids (Anthony, 2018: 46).

Anthony (2018: 46) emphasises that during the procurement process, bidders must be kept fully informed of competing bids and their contents. However, in order to preserve the integrity of the process and avoid collusion, the identity of the bids should not be made public. All bidders must be given the information they need to participate in the process, including the assessment standards, details on how the process will end, and the reasons why. The transparency concept will therefore be upheld.

The minimum number of bidders should be stated in the invitation to tender in order to ensure effective competition. This provision thereby guarantees the upholding of the competitive concept as outlined in Section 217 of the Constitution (Anthony, 2018: 46).

Anthony (2018: 46) states that e-procurement will significantly cut down on the amount of paper utilised in the procurement process and save on administrative expenditures. It is quicker than a conventional paper-based tender process, thus ensures the most value for money. E-procurement will thereby improve cost effectiveness in accordance with Section 217 of the Constitution. In general, the following legislation applies to procurement:

Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000) and its Preferential Procurement Regulations, 2022

It prescribes how preferential procurement in the government sector should be executed and to give effect to section 217(3) of the Constitution.

The Public Finance Management Act, 1999 (Act No. 1 of 1999) (PFMA) and the Treasury Regulations, 2005

Oversees public finance in general as well as public procurement.

Municipal Finance Management Act, 2003 (Act No 56 of 2003) (MFMA), its Regulations, and Municipal Systems Act, 2000 (Act No 32 of 2000)

These acts apply to local government and manage public finances and procurement in this sphere of government.

There are also the Municipal Supply Chain Management Regulations, 2005, issued in terms of the MFMA.

Access to information held by private and public entities is governed by the Promotion of Administrative Justice Act 3 of 2000 (PAJA) and the Promotion of Access to Information Act 2 of 2000 (PAIA).

Broad-Based Black Economic Empowerment Act 53 of 2003 (BBBEEA)

It regulates black economic empowerment by governing preferential procurement.

Prevention and Combating of Corrupt Activities Act 12 of 2004

It is relevant because it aims to prevent corruption in the public and private sectors.

2.3 E-procurement

2.3.1 Defining e-procurement

The use of web-based tools to automate companies and public sector procurement activities is known as e-procurement. It refers to electronic business and organs of state purchases of goods and services (Nawi et al., 2016: 329).

Patel, Kumar, and Khajuria (2016: 264) define e-procurement as the practice of completing various steps of the procurement process, such as search, sourcing, negotiation, ordering, receipt, and post-purchase review, using internet-based ICT.

Pattanayak and Punyatoya (2020: 1428) define e-procurement as a business-to-business (B2B) purchasing strategy that entails using electronic commerce to find potential suppliers, buy from them, pay them, and communicate with them.

Kumar and Ganguly (2021: 1039) indicate that e-procurement is IT involvement in the procurement system that has revolutionised how buyers do business with suppliers and how organisations engage with them over the last two decades.

Awati and Pratt (2021) imply that e-procurement, often known as the B2B process, is the process of requesting, ordering, and buying goods and services online.

Ramkumar et al. (2016: 1171) highlight that by employing ICT-based solutions to source goods and services, e-procurement achieves several advantages, including accelerated cycle times, better visibility, decreased maverick spending, and decreased overall costs.

E-procurement refers to the buying and selling of goods, machinery, labour, and services over the internet or through other networked systems (Otundo, 2021: 2).

From the different definitions of e-procurement (Nawi et al., 2016: 329; Patel et al., 2016: 264; Ramkumar et al., 2016: 1171; Pattanayak & Punyatoya, 2020: 1428), it is evident that the value of digital technology, such as computers and the internet, in facilitating a company's procurement and provision of goods and services are recognised. Paper-based systems contain flaws such as being vulnerable to manipulation and exploitation.

This study follows the definition of e-procurement provided by Nawi et al. (2016: 329), who define it as "the automation of an organisation's procurement activities through the use of web-based applications for the purchase of goods, works, and services for organisations."

Sithole (2017: 18) is of the opinion that e-procurement has been adopted in both the private and public sectors in order to create procurement systems that effectively handle all five procurement pillars and accomplish constitutional procurement goals. E-procurement, commonly referred to as digital procurement, is a vital part of supply chains in today's markets. E-procurement services include supplier management, catalogue management, e-ordering, e-invoicing, and e-contract management. They also include e-informing, e-purchasing, e-tendering, and e-auctioning.

According to Perera, Nanayakkara, and Weerasuriya (2021: 1–2), there are three major eras in the evolution of e-procurement:

- a) Documents connected to procurement were transferred through emails and digital storage devices during the 1980s.

- b) Suppliers interacted directly with the client's e-procurement portal during the second era, which was web-based e-procurement, in the 1990s.
- c) In the 2000s, the third era incorporated cloud computing and system-to-system communication. The third era saw direct communication between client and supplier systems made possible by standardised application processes, which reduced human error and improved efficiency, accuracy, and performance.

2.3.2 Components of e-procurement

The term "e-procurement" refers to a range of electronic procurement processes. These processes include electronic notification or informing (e-notification or informing), internet bidding, purchasing cards, the exchange of information and data about construction projects, tendering, evaluation, contract administration, reverse auctions, and integrated automatic procurement systems, to name just a few (Sithole, 2017: 19). According to Otundo (2021: 2–4), the following are the components of e-procurement.

2.3.2.1 E-informing

The term "e-informing" describes the use of internet technology to collect and disseminate purchasing-related information to both internal and external parties (Sithole, 2017: 22). E-informing is the process of gathering and distributing information from and to domestic and international parties using internet technologies. This type of e-procurement is different from the others in that it is not directly related to closing a deal. E-informing via the internet from both internal and external parties facilitates the process of gathering and disseminating purchase information. Using an extranet, for example, to publish purchasing management information that internal clients and suppliers may access is referred to as e-informing (Mahdillou & Akbary, 2014: 26).

2.3.2.2 E-tendering

E-tendering is the electronic integration and management of all supply chain processes, including purchase orders, supplier authorisation, ordering, delivery, and payment (Ngeno & Kinoti, 2017: 22). E-tendering is designed to improve the awarding process for high-value, specialised works, products, or services.

Kennedy (2017: 12) highlights that e-tendering has a number of advantages, such as increased process efficiency, lower overhead costs, improved transparency and accountability in the procurement function, lower costs for ordering and holding items, less paperwork, better cash flow, and lower costs for credit control. Furthermore, e-tendering helps shorten the length of the tendering cycle, improves adherence to legal requirements and protocols, improves labour costs and time management, and improves accuracy, transparency, and integrity in the procurement processes. These procedures are intended to enhance the process of awarding modest but valuable specialised works, goods, or services. Reduced bidding cycle times, improved legal compliance, labour cost and time management, and improved accuracy, transparency, and integrity in the procurement processes are all benefits of e-tendering.

By combining online collaboration technologies with e-procurement, e-tendering enables purchasing teams to create detailed tender contracts, invite private bidders to submit bids online, disseminate tender reports, and award tenders online (Kennedy, 2017: 13). According to Kennedy (2017: 14), the following are the benefits of e-tendering:

- Shortened buying cycle and lower costs.
- Greater budgetary control attained through reduced spending and better reporting tools.
- The eradication of administrative mistakes.
- Boosting the efficiency of buyers, allowing them to focus on strategic purchasing concerns.
- Reducing costs by consolidating purchases and standardising products.
- Improving administration of information and ensuring easier access to cost estimates from different providers.

2.3.2.3 E-auctioning

E-auction is the process of selling assets, raw materials, or other goods through an online auction with competitive bidding. An electronic auction gives total transparency and accommodates more bidders when compared to a conventional auction (Bhasin, 2023: 1). An electronic auction is an online transaction between bidders and auctioneers that

takes place in a digital marketplace. B2B, business-to-consumer (B2C), and consumer-to-consumer (C2C) transactions are all examples of electronic commerce (Kennedy, 2017: 19). Kennedy (2017: 19) highlights the following two major types of e-auctioning:

Forward auctions

- A forward auction is one in which multiple sellers compete for a single buyer's business, and it involves multiple buyers bidding on a single seller's items.
- When a single seller offers an item for sale in a forward auction, interested parties compete by raising the asking price in an effort to get the item.
- Since forward auctions are more commonly used at the consumer level, the general public has a much better understanding of how they work than they have of reverse auctions.
- A forward auction is best used for all sales of goods and services, whether they are made offline, online, or through a combination of both.

Reverse auction

- A single bidder alerts potential sellers of their desire to purchase a certain good or service in a reverse auction.
- The vendors compete with one another to win the buyer's business during the real reverse auction, which lowers the amount that must be paid for the item.
- Private businesses, government entities, and non-profit organisations most frequently use reverse auctions for their procurement needs.

Electronic reverse auctions streamline bid gathering and bid comparison, and they centralise pertinent data for quick search and presentation. This shortens the cycle time, lowers the possibility of human error and offers a strong basis for award analysis and optimisation (Kennedy, 2017: 19).

2.3.2.4 Vendor management

The e-procurement method is still thought to have several problems, including some vendors' unwillingness to be flexible or sluggishness to respond, as well as difficulties identifying a competent and suitable vendor during the tender bidding process due to a lack of vendor information. A mobile-based e-procurement system is recommended to

address the current shortcomings. The aim is to lessen the shortcomings of the prior procurement system with the newly developed e-procurement system, which entails creating a framework for an e-procurement system that is directly integrated with the vendor management system and vendor score system (Angrian & Sahroni, 2019: 1–2). Vendor management is used by the contracting authority to reduce costs and promote quality services. Risks are reduced, and they get more value from their providers as a result (Bhasin, 2023: 1).

2.3.2.5 Catalogue management

Bhasin (2023: 1) defines catalogue management as a strategic process that starts with the electronic publication of a supplier's product line, the accessibility of goods and services by customers, and the accuracy of product information along the sales chain. Kennedy (2017: 16) emphasises that one of the most important uses of electronic procurement is electronic catalogues. E-Catalogues give internet users access to information about goods and services, which can then be purchased either online or through traditional methods. Kennedy (2017: 16) further indicates that by ensuring that the purchased components do not result in complaints from the user department or the customer, e-catalogues may help lower quality expenses.

2.3.2.6 E-purchasing

E-purchasing, as opposed to e-tendering, is used to purchase high volumes of low-value goods and services. Online stores make it easier to buy these items and services (Bhasin, 2023: 1).

2.3.2.7 E-ordering

The supply chain's efficiency is greatly enhanced by the use of software to create and approve buy requests for placing and receiving orders as well as delivering purchased goods. When making an online purchase, the requested goods and services are unrelated to the item. The commodities and services are connected to the product in the case of enterprise resource planning (Bhasin, 2023: 1).

2.3.2.8 E-invoicing

According to Bhasin (2023: 1), e-invoicing refers to the presenting of an invoice to a customer for payment electronically. Accounts payable divisions are in charge of approving, processing, and paying invoices. The digitalisation of papers and their processing through electronic channels are crucial components of e-procurement in order to increase procurement efficiency, effectiveness, and transparency (Kennedy, 2017: 17). E-invoicing is the process of requesting payment for products and services that have been ordered and supplied in accordance with predetermined terms (Sithole, 2017: 39)

According to Sithole (2017: 39), recent technological advancements enable suppliers to send customer bills electronically. These are processed, received, and reviewed for conformity online, along with the payments. E-invoicing enables prompt supplier payments and lowers the cost of invoice administration.

Businesses have discovered a variety of advantages from their e-invoicing initiatives, including that it makes it simpler, quicker, and less expensive for organisations to buy goods and services. These process efficiencies result in annual savings, the ability to connect directly to existing systems, such as ERP, and lead times within the procure-to-pay cycle that are sometimes cut in half (Kennedy, 2017: 17). To fully utilise e-invoicing, all business partners from the public and commercial sectors must adopt and use the electronic exchange of invoices (Kennedy, 2017: 18).

2.3.2.9 E-contract management

This management comprises of handling payments, receivables, contract settlements, contract modifications, auditing, performance securities, and all pertinent control activities and their electronic variants (Bhasin, 2023: 1). According to Sithole (2017: 34), information technology is used to administer contracts, which enhances communication and accelerates production and reporting during project contracting procedures. Sithole (2017: 35) highlighted the advantages of e-contract management are as follows:

- **Easy access to contract agreements**

For most businesses, choosing a contract document-storage solution is never easy. This is because these contract agreements are preserved in hard form, which causes them to end up being held in a variety of locations: the Legal department files them, the

Procurement Manager keeps them on their desk, or they are forwarded to the appropriate stakeholder. The problem arises when it is necessary to recover the documents for use as references. They aren't widely available right now, which is what is needed.

- **Organised data = smarter spend**

To access necessary documents quickly, contract management software includes sorting and searching features. One of the first measures for lowering off-contract costs is having an accessible inventory of your company's agreements.

- **Quick and easy location of key data (searchable contracts)**

Administrators have a platform to locate important contract terms and fields for quick reading and reference thanks to e-contract management solutions.

- **Keep track of important dates (increased visibility and analytics)**

Implementing e-contract management creates a foundation for easy monitoring and tracking the progress of projects by keeping track of when important deadlines and milestones are met.

- **Heightened security**

High-level encryption, data-loss prevention, safe server locations, and file corruption prevention are all used to protect information or documents saved in the cloud. Cloud-based storage prevents unauthorised users from accessing documents. This is not the case with hard copies, which are protected by locks and keys.

- **Better contracts**

By using e-contract management systems, faults and errors in contract documents during preparation can be reduced. Consolidating contract documents makes it simple for stakeholders to work together more frequently. Standardising contracts in terms of their applicability, language, and substance has additional benefits. Consequently, contracts are improved.

- **Simpler negotiations**

Regardless of where the negotiators are physically located, contract talks can be conducted and concluded promptly and efficiently. Current drafts and content that is simple to download, examine, and date can be maintained. Further efficient and effective data recording and retrieval is possible.

- **Integrations and approvals**

There is increased effectiveness in the delivery of instructions, their approval, the issuance of variation orders, the processing of payments, and other aspects of contracts.

- **Complete control**

Usage logs monitor data submission and compliance, helping to enhance adherence to deadlines, payments, and delivery. Standard clause libraries are kept centrally and are accessible to anyone.

2.3.3 E-procurement in the procurement cycle

The e-procurement cycle is depicted in Figure 2.3 below. In short, it means the entire procurement process – including making offers, exchanging contracts, sending out tender papers, and filling out supplier questionnaires – is automated rather than being done manually. E-procurement demands the creation of a technology platform that enables electronic interactions between parties participating in the procurement process (DevelopmentAid, 2020: 1).

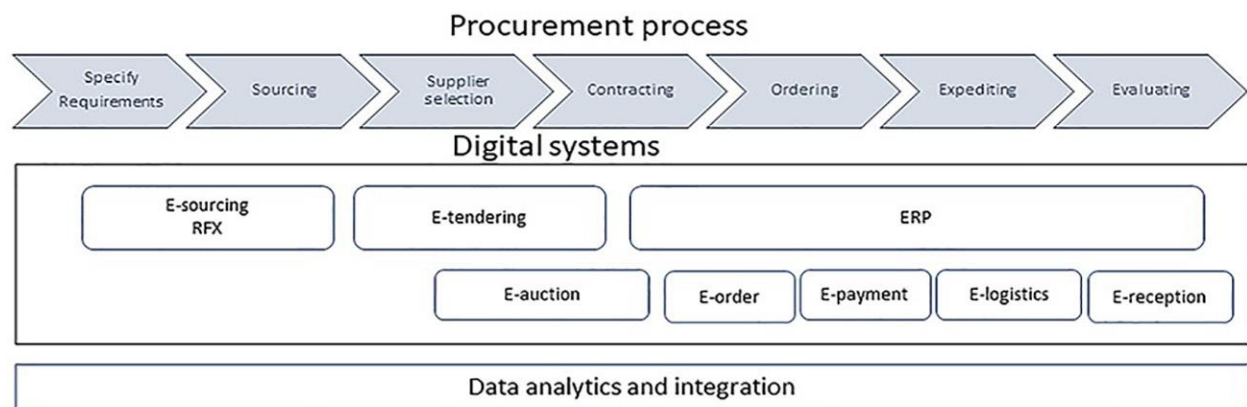


Figure 2.3: E-procurement in the procurement cycle

Source: Hallikas, Immonen, & Brax (2021: 635)

According to Anthony (2018: 39), the government requires products and services to function properly. These products and services can be purchased using internal resources or through agreements with independent businesses. It has been demonstrated that using electronic procurement solutions increases supply chain performance by enhancing transparency, as seen in Figure 2.4 below:

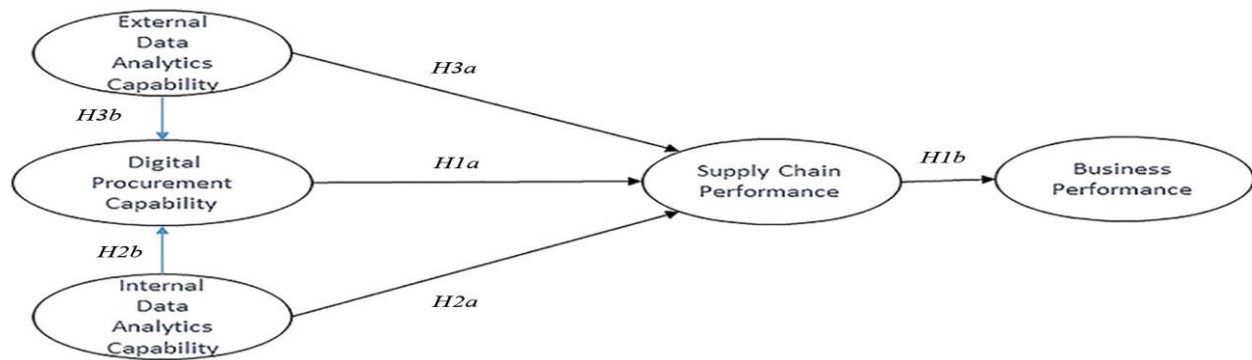


Figure 2.4: Major components of and digital systems for e-procurement

Source: Hallikas et al. (2021: 633)

Anthony (2018: 40) points out that, for many years, e-procurement has been used in a variety of countries, and it has been done using a variety of methods, each with its own benefits. In Africa, e-procurement is not commonly used, and there are three key reasons for this, First, African countries have taken a long time to put in place the required infrastructure; second, internet connectivity is limited due to a lack of information technology infrastructure; and third, African governments have extremely outdated administrative cultures (Anthony, 2018: 40).

Ngeno and Kinoti (2017: 19) highlight that every organisation should study the benefits of e-procurement in the digitisation of the supply chain process. In the 2000s, the internet was extensively enabled and became a key resource for procurement automation, with the addition of multimedia advanced processing capabilities. Ngeno and Kinoti (2017: 19) assert that the most important force behind change in the world's social, political, and economic aspects is e-procurement. In the modern era of ICT, telecommunication technologies are central to every industrial and economic activity, as well as all aspects of human endeavour. Figure 2.5 below represents the supply chain practice of digital procurement.

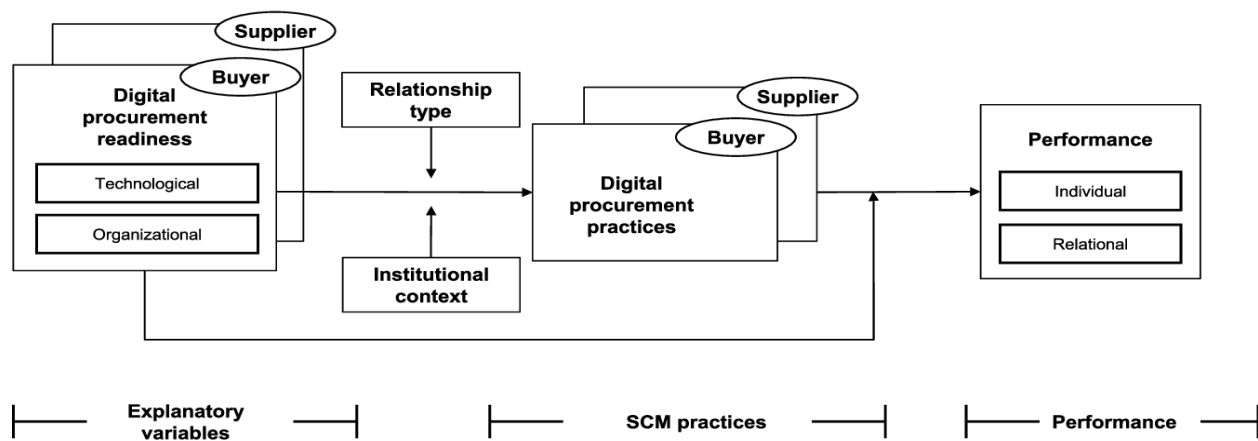


Figure 2.5: Digital procurement

Source: Kosmol et al. (2019: 2)

2.4 A contrast between procurement and e- procurement

This section examines the literature on the differences between procurement and e-procurement as well as the research variables under consideration, which include e-procurement systems, resources, compatibility, organisational culture, infrastructure, environmental factors, and empirical evidence on the factors influencing e-procurement implementation (Rukuni et al., 2020: 396).

Procurement is defined by Dhull and Narwal (2016: 62) as the integration of manufacturing processes from raw materials to finished products and consumer delivery. Rukuni et al. (2020: 396) consider procurement to be a supply-chain idea intended to increase productivity and efficiency. When compared to the conventional paper-based procurement approach, electronic procurement represents a major improvement (Nawi et al., 2016: 329). According to Patel et al. (2016: 264), traditional purchases and supply of goods and services have been superseded by online procurement procedures such as e-tendering, e-awarding, e-auction, and e-sourcing. As a result, e-procurement is a step forward from the traditional paper-based procurement approach (Nawi et al., 2016: 329). E-procurement is the conversion of conventional product and service acquisitions and supply into electronic processes including online e-tendering, e-awarding, e-auctioning, and e-sourcing (Patel et al., 2016: 264). E-procurement substitutes for the conventional

paper-based system by using computers and the internet (Rukuni et al., 2020: 396). Different writers' definitions of e-procurement (Nawi et al., 2016: 329; Patel et al., 2016: 264) acknowledge the significance of digital technology, including computers and the internet, in simplifying the supply of goods and services to an organisation.

2.5 Supply chain management's emerging technologies

Robotics, intelligent warehousing, 3D printing, big data, the Internet of Things (IoT), and artificial intelligence are examples of emerging SCM technology. These technologies have an effect on sourcing suppliers, making purchases, distributing goods, shipping goods, and storing goods. These innovative technologies have the potential to increase supply chain efficacy and efficiency, as well as cut prices and lead times. However, new technology could also lead to job losses in the lower-level or clerical sector. Supply chain experts need to be knowledgeable about these quickly developing technologies if they want to remain competitive in the industry (Khuan & Raman, 2018: 5).

Khuan and Raman (2018: 6) highlight that artificial intelligence (AI) may be used by purchasing professionals to find, identify, and match commodities with suitable suppliers. Additionally, purchasing managers can be informed about potential price increases or supply shortages using this tool. Notifying vendors about contract renewal and administration can also be done using AI.

2.5.1 Technology's emerging trends in procurement

Some of the most recent technological advancements affecting procurement administration include procurement 4.0, big data, the IoT, 3D printing, robotics, and cognitive procurement. As a result of growing technological innovations, procurement managers must employ critical thinking to discover important and actionable information (Khuan & Raman, 2018: 53).

2.5.2 Electronic procurement technology

The two most popular forms of electronic procurement are e-sourcing and e-requisition. E-sourcing is the process of making decisions and developing strategies about how and

where to obtain goods and services utilising the internet. With technology like e-tendering and e-RFQs, e-sourcing is primarily for contractual processes (request for quotation and e-auctions). E-requisition is a web-based application for managing and tracking buy requisitions; with a tool like e-catalogues, it's more transactional (Khuan & Raman, 2018: 45).

2.6 E-procurement Technology Models: Adoption and Implementation

Praveen and Khaliq (2018: 102) reveal that, for large organisations, online procurement has been regarded as the most important component of e-business operational excellence. Automating work procedures, integrating and leveraging authority spending power, and finding new sourcing possibilities online are the goals of e-procurement software, B2B barter, B2B market exchanges, and acquiring consortia.

South African law permits a wide variety of procurement practices in government. It controls the use of verbal and written quotations and single-source supplier purchases. These simple procedures call for the submission of proposals from three different providers, with the best offer being selected. This method of purchase can easily be switched to an electronic format, lowering the carbon footprint of both the public and commercial sectors. On the other side, switching to e-procurement through a competitive bidding procedure is more challenging and time-consuming (Anthony, 2018: 41).

2.7 Benefits in Practising E-Procurement

Nawi et al. (2016: 331) confirm that installing an e-procurement system has provided the government with a number of advantages, and that it is another way for the government to reduce administrative costs while improving the effectiveness of the online procurement process. E-procurement has the potential to reduce costs, reorganise processes, boost contract fulfilment, and bring spending under better management, among other advantages. The government can save money using e-procurement by reducing inventory costs, order fulfilment times, and the time and effort required to handle POs that can be updated electronically (Nawi et al., 2016: 331; Praveen & Khaliq, 2018: 105). According to Nawi et al. (2016: 331), using e-procurement would minimise expenses for buying goods or services at high prices since it would encourage quality

bidding, promptness, cost savings, and convenience of doing business. It would also reduce financial and technological risks. Because the information received through electronic bidding is so transparent, the optimum place to conduct e-procurement of products and services is when vying for public sector projects. Bag et al. (2020: 2) state that automating the procurement process can greatly cut the procurement cycle time and optimise resource utilisation and that digitisation will help to reduce uncertainty by increasing information transparency among supply-chain stakeholders.

Afolabi et al. (2019: 2) state that e-procurement technologies can help overcome the difficulties that traditional procurement methods in the construction industry have. E-procurement systems offer a seamless process for the construction company and prospective bidders. As a result of fewer paper-based transactions, e-procurement platforms promote efficiency while accelerating the productivity of the building cycle. They also enable construction stakeholders to closely monitor the procurement process, which reduces costs and improves efficiency. In industrialised nations, the potential for cost optimisation makes e-procurement a priority. Given the advantages that an efficient e-procurement system can provide, it is critical to include procurement staff in the evaluation of issues that influence its adoption (Rukuni et al., 2020: 397).

Nawi et al. (2017: 211) state that, among other advantages, e-procurement can aid in cost reductions, process reorganisation, and contract fulfilment. There are four ways that utilising an e-procurement system can result in cost savings:

- order costs,
- administrative costs,
- lead-time order costs; and
- capital opportunity costs.

2.8 Advantages of E-procurement

A number of benefits come with using an e-procurement system, including improved communication, increased openness, decreased corruption, full organisational process integration, better decision making, and time and money savings (Patel et al., 2016: 267).

Praveen and Khaliq (2018: 106) reveal that employing an e-procurement system has significant advantages over conventional procurement and tendering methods, such as a quicker government procurement process and more transparency. Jandrell (2018: 1) highlights the following eight advantages of switching to e-procurement.

Visibility

Visibility is ensured by the ability to track a PO or an invoice and examining the metadata to find potential opportunities for process improvement.

Control

E-procurement tools give buyers more flexibility and control over their purchases at every stage of the process. This is done by limiting who can place orders, approve and buy them, and then finally accept or pay them.

Automation

Instead of having one person manually submit a PO or invoice, one of the following strategies can be employed in contemporary e-procurement systems to alleviate difficulties: automated PO generation, templates, internal catalogues and punchout catalogues.

Budgeting

All budgeting procedures can be automated by contemporary e-procurement systems, which informs authorised users of the available budget as well as the potential effects of expenditures before they happen.

Easy vendor management

This includes being able to see all vendor orders in one place, which can help with cost-cutting strategies.

Reduced rogue spending

Illegal spending is a significant challenge for many organisations. Approximately 40% of workers admit to acting dishonestly at some point, either by making an unapproved

purchase or by making an unapproved purchase of a different item. With paper and spreadsheets, it is easy to conceal an unauthorised transaction. With e-procurement platforms, this is not the case. An unbreakable electronic audit trail is a powerful barrier to fraudulent spending.

Clear audit trail

Many organisations place more value on knowing who was engaged in a purchase from a payment request than on knowing what was purchased; nevertheless, implementing modern e-procurement systems will make it easier to track every touchpoint and offer a clear trail of who did what.

Money-saving

An organisation can save time and money by converting to an electronic procurement system.

2.9 Disadvantages of E-Procurement

Das (2021: 1) highlights the following perceived disadvantages of e-procurement:

Culture shock

E-procurement system adoption, like other digital transformations, causes a culture shock because of perceived software constraints and organisational resistance to embracing novel processing techniques.

Integration challenges

The adoption of the chosen e-procurement software can face considerable implementation and operating issues as a result of a lack of preparation and awareness of the goals.

Over-reliance on technology and the disabling of due diligence

This frequently results in significant delays, interruptions to the supply chain, lack of employee buy-in, and resistance to change. These negative consequences, in turn, result

in e-procurement system circumvention, loss of process control, back door purchasing, and theft.

Increased complexity

E-procurement solutions frequently increase complexity and cost, mainly as a result of the care needed to comprehend user requirements.

Poor Integration with existing systems.

This is a significant drawback and a common justification for circumvention.

Cost

When the aforementioned elements are present in a procurement context, the outcome frequently entails a stunning financial loss and loss of competitive advantage.

2.10 Supply Chain Risk Management Culture

De Sousa Jabbour et al. (2020: 119) maintain that, in order to construct an institution's capacity to foresee and react to disruptions, risk assessment management should be developed as part of daily operations. Institutions would profit from leadership in the creation of risk assessment teams in order to develop this culture. Systematising the lessons learned throughout time, especially following COVID-19, requires the gathering and storing of data and knowledge about past incidents. Block-chain and big data analytics are two terms describing techniques for gathering and storing data for analysis (De Sousa Jabbour et al., 2020: 119).

2.10.1 Organisational culture

Korir et al. (cited in Rukuni et al., 2020: 397) indicate that acceptance of the e-procurement system is determined by the organisation's culture. Eei, Husain, and Mustaffa (cited in Rukuni et al., 2020: 397) recommend that obtaining e-procurement system acceptability and the organisation's readiness to embrace change, creativity, and innovation require a positive organisational culture.

2.10.2 Risks of e-procurement

According to Patel et al. (2016: 266), hacking, viruses, pirating, unlawful trade, fraud, money laundering, and libel are among the key risk issues associated with electronic transactions on the internet. All of these factors hurt tendering process confidence and openness. The adoption of e-procurement technologies is connected with four risks identified by Patel et al. (2016: 266):

1. Internal business risks

E-procurement technology must be integrated carefully with other business applications, including accounting, human resources, accounts payable, and cash management.

2. External business risk

E-procurement tools must be able to connect to suppliers' IT infrastructure.

3. Technology risks

Many businesses are unclear whether an e-procurement system is ideal for their specific requirements.

4. E-procurement process risks

Process risks pertain to the security and oversight of the e-procurement process.

The above-mentioned risks, as well as the obstacles connected with e-procurement, must be addressed before e-procurement can be implemented successfully.

2.11 Challenges in E-Procurement Implementation

Patel et al. (2016: 265) discovered the following three issues with the use of e-procurement:

- a) Lack of system integration and are standardisation issues.
- b) End-user resistance to solutions, e-procurement service providers' immaturity, and a lack of supplier preparedness.
- c) Difficulty modifying the purchasing habits of an institution's employees.

Nawi et al. (2016: 332) state that the absence of a benchmark has allowed reference models to be developed for e-procurement systems – a relatively recent development in the business application domain, particularly in young enterprises that are just learning about the features of these systems and how to apply them in their organisations. An e-procurement initiative's performance is influenced by a variety of factors, including technology, infrastructure, legal restrictions, resource availability, and organisational and managerial traits (Nawi et al., 2016: 332; 2017: 211; Praveen & Khaliq, 2018: 105). Organisations have no power over outside factors like the economy, the market, the government, or technological advancement. However, these obstacles can be minimised, albeit not completely, with proper planning and research.

Hallikas et al. (2021: 330) assert that the difficulty with the present electronic supply chain processes and apps is that they do not completely enable big data analytics and the integration of data from many sources throughout the supply chain. It is important to acknowledge parts of the system where laws and regulations are inconsistent. This basically prohibits the use of the electronic procurement system, which is a significant setback for the government's aspirations to establish an electronic government system (Nawi et al., 2017: 211). Since e-procurement systems totally rely on internet technology and related e-software like ERP and CRM, one of their main concerns is to supply high-quality software. Another important challenge is to give greater internal and external security to the e-procurement system's stream of information and data (Praveen & Khaliq, 2018: 105).

2.12 Reasons Behind Non-Usage of E-Procurement

Afolabi et al. (2019: 3) explain how laws, dependability, cost, and the influence on small businesses, especially the employment of construction stakeholders, are the key barriers to South Africa's use of e-procurement systems in the public sector. One of the difficulties organisations have when implementing e-procurement is the use of currently available software, because the majority of these software packages are incompatible with the organisation's internal technology architecture. Another problem is that it would take a long time to design an organisation's e-procurement system. The system's functionality

and security are issues that prospective adopters are worried about. The availability of supporting infrastructure, such as adequate broadband coverage, is also necessary for the widespread use of e-procurement systems (Nawi et al., 2016: 330, 332). According to Khuan and Raman (2018: 46), internal barriers to e-procurement include a lack of IT system integration with partners, a lack of technological infrastructure on the part of business partners, a lack of internal technology infrastructure and IT staff, a change in how people work, a lack of support from top management, a lack of corporate strategy, and high implementation costs for new technologies.

Anthony (2018: 40) points out that e-procurement is not commonly employed throughout Africa as a whole. Africa's slow e-procurement adoption can be attributed to three main factors:

- a) African countries have taken a long time to build the requisite capacity;
- b) There is a lack of widespread internet connection and information technology infrastructure.
- c) African governments still employ outdated administrative practices.

2.13 Conclusion

This chapter included a review of the literature as well as descriptions of the components and characteristics of e-procurement. The goal of defining e-procurement is to determine its potential efficacy in resolving the DPWIFS's current procurement challenges.

E-procurement involves far more than just an internet store. The system is designed to result in considerable cost reductions and efficiency gains. An e-procurement system enables quicker and more transparent government procurements when compared to conventional procurement methods. Government agencies can use the system to make information about each bid and competitor easily available and relevant.

If all of the definitions are reviewed, it is clear that there are various schools of thought on what exactly e-procurement is. It was determined that adopting and implementing e-procurement does not imply incorporating all of these e-procurement approaches; it

involves using particular e-procurement approaches. Different institutions have used e-procurement in different ways. Some businesses use an entirely paperless, computerised procurement system, while others only use a combination of processes. The next chapter discusses the research design and technique employed in this study, which is set against the background of literature presented in this chapter.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

Chapter 3 follows the literature review in Chapter 2 and summarises the research approach used in this research study. The study philosophy, methodology, techniques, and data collection methods are discussed, as well as the processes used to support the methodologies' validity and reliability, as well as ethical considerations, are discussed in the following subsections. This study examines the efficiency of e-procurement in the DPWIFS, which was mentioned in Chapter 1.

3.2 Research Design

Bryman and Bell (2014: 382) describe a study design as a collection of instructions for gathering and analysing data. The research design employed in this study is a qualitative case study because it focuses on gaining “an in-depth understanding” (Cooper & Schindler, 2011: 160) of the DPWIFS in Free State Province. A case study design is appropriate because it allows the study to gain a better understanding of the complexities and dynamics of adopting an e-procurement system in the DPWIFS. Case studies are also useful for developing and extending ideas as they investigate factors for future statistical testing (Adjei-Bamfo et al., 2020: 747).

Qualitative research involves immersing oneself in a situation and attempting to make sense of it (Tracy, 2019). When scientists are more certain of what they want to test, they might use qualitative research in theory-testing investigations (Myers, 2019). Järvinen and Meyer (2020: 2) point out that qualitative analysis is an analytical interpretation of people's perspectives rather than a depiction of the singular perspectives of the individuals we examine. Focusing on individuals and their experiences, behaviours, and attitudes is the goal of qualitative research (Gill & Baillie, 2018: 669). Järvinen and Meyer (2020: 2) emphasise that qualitative research examines processes as mutually interdependent mechanisms between individuals and their social and physical environments rather than necessarily as stages of growth or as causal links through time. As a result, qualitative research frequently focuses on “how” and “what” questions rather than “why” questions (Gill & Baillie, 2018: 669; Järvinen & Meyer, 2020: 2).

Bryman and Bell (2014: 382) highlight that in the collecting and interpretation of data, qualitative research frequently emphasises words above quantities. It is inductivist, constructionist, and interpretive as a research strategy, but qualitative researchers do not always agree with all three variables. The interpretivism method will be used to approach a qualitative research project. According to Bryman and Bell (2014: 378), in an interpretivist epistemological framework, social scientists must understand the individualised significance of social action. In gathering and analysing data, qualitative research methods emphasise an inductive approach to the relationship between theory and research, placing more emphasis on developing hypotheses than proving them; they reject the practices and norms of the natural scientific model, particularly positivism, in favour of a focus on how individuals interpret their social world; and they see social reality as both constantly changing and dynamic (Bryman & Bell, 2014: 31). Validity is concerned along with the reliability of the findings drawn from a study (Bryman & Bell, 2014: 25).

3.3 Main Steps of Qualitative Research

Figure 3.1 below outlines the main steps in qualitative research.

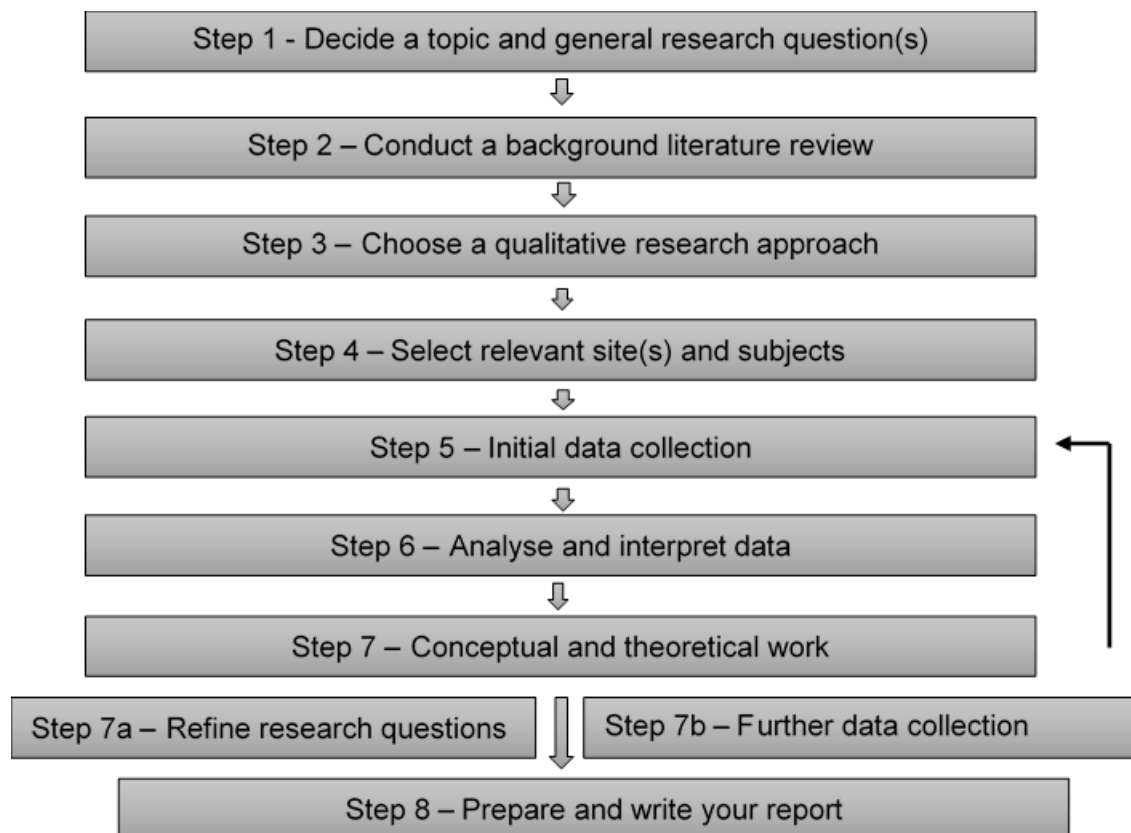


Figure 3.1: The process of qualitative research

Source: Adapted from Bryman & Bell (2014: 41)

3.4 Philosophical Considerations

Since qualitative interviews are linked to the philosophical development of the research paradigms, various factors that depend on the manifestation of research philosophies have determine how interviews are used in qualitative research. The interaction of epistemological and philosophical components of understanding social life also influences the relationship between the researcher, the researched, and the research (Adhabi & Anozie, 2017: 2).

3.4.1 Constructionism

Projects involving qualitative research are approached using a constructionist methodology. This ontological position, which stands in opposition to objectivism and essentialism, holds that social phenomena and their meanings are always produced by social actors (Bryman & Bell, 2014: 375). The constructionist approach sheds light on the

activities that researchers carry out while conducting their investigations. Constructionists closely scrutinise the researcher's behaviour, consider the context of the research, and place the research process within the social, historical, and situational contexts in which it was conducted (Järvinen & Meyer, 2020).

Constructionism focuses on how individuals build knowledge; it examines the accounts people provide of events and topics as well as how they arrive at these accounts (Sekaran & Bougie, 2013: 29). Sekaran and Bougie (2013: 29) highlight that constructionists are especially interested in how people's ideas on the world are influenced by their interactions with others and the context in which those interactions take place. Research methods used by constructionist researchers are usually qualitative and involve focus-group discussions that are unstructured to capture rich data about the contextual particularities of the world under study (Gill & Baillie, 2018: 671). Constructionists are more interested in comprehending a particular example than in applying their conclusions generally (Sekaran & Bougie, 2013: 29).

3.4.2 Pragmatism

According to Sekaran and Bougie (2013: 30), pragmatism is a method in which theories' conceptions and meanings are extrapolated from actual acts and experiences as well as from interactions with the outside world. An unbiased method of researching social issues is known as a pragmatic research paradigm. Pragmatists emphasise the socially constructed nature of research; different researchers may have distinct hypotheses and justifications for what is happening in the world. Pragmatism thus supports pluralism and eclecticism, as they help academics learn more about the world through the use of these many points of view, theories, and ideas. Pragmatists deduce theory from practice and then apply it back to practice in order to achieve intelligent practice (Sekaran & Bougie, 2013: 30).

3.5 Sampling

3.5.1 Population

Bryman and Bell (2014: 381) define a population as the group of units from which a sample will be chosen. The target population for this study are SCM and Finance Directorates as well as other public officials who are directly working with procurement in the DPWIFS. This includes public officials between salary scale levels 5 to 15 from the three budget programmes of the DPWIFS, namely:

- Programme 1 – Administration
- Programme 2 – Public Works and Infrastructure
- Programme 3 – Expanded Public Works (EPWP)

3.5.2 The inclusion and exclusion criteria

The study sample's inclusion and exclusion criteria specify who may be included and who may be excluded.

Inclusion criteria

The following inclusion criteria were applied to the study:

- Public officials between salary scale levels 5 to 15; all genders and all races.
- Between ages 18 to 60 years.
- Public officials with knowledge, experience, and direct involvement in procurement processes.
- Public officials' willing and able to participate in the study.
- Public officials willing to sign the informed consent form.
- Public officials working in the Mangaung regional offices of the DPWIFS.

Exclusion criteria

The following exclusion criteria were applied to the study:

- Public officials from salary scale levels 1 to 4 were excluded from participating in the study because the majority of them are general workers such as cleaners, security officers, and messengers; they are not directly involved in procurement processes.
- Public officials who will refuse to give informed consent to participate in the study.
- Public officials from other regions of the DPWIFS.

The population was the employees of the DPWIFS. The DPWIFS has a total population of 1,303 public officials (DPWIFS, 2021: 106). The public officials of the DPWIFS in the three budget programmes into which the Department is divided make up this total.

Table 3.1 shows the number of public officials employed in the DPWIFS as per the budget structure for the financial year 2021.

Table 3.1: Total number of employees in the DPWIFS

Budget Programme	Number	Percentage
Programme 1: Administration	176	13.5
Programme 2: Public Works & Infrastructure	1,099	84.3
Programme 3: EPWP	28	2.1
Total	1,303	100

Source: Adapted from DPWIFS (2021: 106)

3.5.3 Sampling strategy

Bryman and Bell (2014: 383) define sampling as a subset of the population that is chosen for research. The sample size was 24, and the researcher conducted three focus groups. The researcher conducted face-to-face focus-group discussions consisting of eight participants per group from each of the three budget programmes into which the DPWIFS is divided. For the focus-group discussion to take place at a specific point, a minimum of six or a maximum of eight participants had to make a group.

Focus groups were conducted with interviewers or researchers who aimed to promote conversation among participants regarding subjects decided upon by the researcher (Järvinen & Meyer, 2020: 12). Järvinen and Meyer (2020: 12) indicate that the researcher receives information from what the group says as well as from how participants relate to one another in terms of group hierarchies, turns of speech, and handling of disagreements. It has been suggested that focus-group discussions share elements with both individual interviews and observations. A limited sample was used in the study to

acquire a more in-depth understanding and to work towards theory development (Cooper & Schindler, 2011: 160). This strategy made it easier to conduct open-ended inquiries, which allowed the researcher find unexpected results to use as the basis for further research.

A non-probability sampling strategy was used, as the purpose was not to generalise the data to the whole population or to be representative of the whole population. Non-probability sampling has the main benefit of being easier to implement and typically less expensive than probability sampling. Non-probability sampling is the process of selecting the components that make up the sample using arbitrary criteria. Bryman and Bell (2014: 380) define non-probability sampling as a sample that is not chosen using a random sampling procedure and state that some population units have a higher chance of being chosen than others.

A purposive, convenience sampling approach was followed and this allowed the researcher to manage the sample size, which resulted in improved statistical efficiency. According to Bryman and Bell (2014: 381), purposive sampling is a non-probability, non-random sampling strategy that forbids researchers from generalising their findings to the entire population. The researcher aimed to explore and uncover new information that could be learned from experienced public officials who are specifically involved in the procurement processes of the Department.

Bryman and Bell (2014: 381) further indicate that in purposive sampling, the aim is to intentionally pick cases/participants so that those sampled are relevant to the study topics. According to Bryman and Bell (2014: 375), a convenience sample is one that is chosen because it is readily available to the researcher and is convenient, easy, and relatively inexpensive to access.

The researcher selected participants based on their knowledge, experience, how directly they were involved in the procurement processes, and how convenient it was for them to participate in the study. Participants were selected with care to ensure that their expertise and experience match the study's objectives. The face-to-face focus-group discussions

were continued until theoretical saturation was reached, which meant that no new knowledge or information emerged in repeated cases (Sekaran & Bougie, 2013).

There was no conflict of interest as the researcher was not supervising any team from the SCM unit. There were no salary scale levels 5 to 8 under the researchers' supervision in terms of work and this made it easier for the researcher to select anyone from levels 5 to 15 who was willing to complete the informed consent form. Targeted participants were in higher positions than the one occupied by the researcher, so the researcher was not in a position of power over participants.

Face-to-face focus-group discussion

A focus group is an organised conversation about a certain subject for the aim of research (Goodman & Evans, cited in Gill & Baillie, 2018: 671). A focus group was used as the researcher was trying to understand the factors that affect the non-usage of e-procurement at the DPWIFS.

The main prompt question was dependent on the research objective to be addressed – for example, *what factors affect the effective implementation of e-procurement in the DPWIFS?* Probing questions were asked for clarification.

The focus-group discussions were conducted by the researcher according to pre-designed open-ended questions to answer some of the research questions and objectives that guide this research. The focus-group discussion questions were adjusted to suit the needs of the participants. The following types of discussion questions were asked to participants:

- What is your understanding of e-procurement? *Probing was around the positive and negative factors or reasons provided.*
- What are the advantages of e-procurement system for the Department?
- What are the disadvantages of e-procurement system for the Department?
- What are to your opinion some of the challenges for the implementation of e-procurement in the Department? *Probing was around positive and negative answers provided.*

- What recommendations could you make for the implementation of e-procurement systems? *Probing was around positive and negative answers. This allowed for info around admin and financial implications, control, supply chain visibility, minimising errors etc.*

3.6 Data Collection Methods

Only participants from the DPWIFS stationed at the Mangaung regional office were recruited for the study. The requirements for the study, as well as the study's goal, were communicated to all participants and management.

Qualitative research was used to collect data – specifically a face-to-face focus-group discussion. According to Adhabi and Anozie (2017), an interview is a type of consultation in which the researcher seeks to gain additional information about a subject from the viewpoint of the person being interviewed. The objective of the research discussions is to learn about people's perspectives, experiences, beliefs, and motives on specific topics. Exploring the participant's point of view conveys a deeper, more potent meaning (Adhabi & Anozie, 2017; Nyumba et al., 2018).

Bryman and Bell (2014: 377) define a focus group as a type of group interview involving numerous members, including the moderator/facilitator, that focuses on questions on a specific, tightly pre-defined topic (Gill & Baillie, 2018: 671) and emphasises interaction within the group as well as joint development of meaning. According to Adhabi and Anozie (2017: 4–5), semi-structured group talks are beneficial because they give the researcher enough time to go deeper into the subject.

Volunteers for such discussions should be picked using a consistent approach and be pertinent to the study's subject. The researcher utilised a semi-structured focus-group discussion because it is the most typical type of interview employed by qualitative researchers. Semi-structured group discussions, unlike structured discussions, have no set format and are dependent on how the participants answer the researcher's questions or topics (Adhabi & Anozie, 2017: 4). Adhabi and Anozie (2017: 5) further add that group

discussions are the ideal data collection mechanism for qualitative studies. The researcher used semi-structured, open-ended questions to elicit suitable replies and additional data from the participants during the face-to-face focus-group discussion (Xerri, 2018: 140).

3.7 Recruitment Strategy

A crucial step in focus-group discussion is the recruitment and selection of participants (Nyumba et al., 2018: 29). It is noted, however, that the bulk of the publications under examination do not disclose their participant recruiting and sample processes. Participants were recruited via an email advert to HRM as mandated by the Protection of Personal Information Act no. 4 of 2013 (POPI Act), which gives effect to the constitutional right to privacy by safeguarding personal information when processed by a responsible party. The researcher invited everyone who met the inclusion criteria highlighted under Section 3.5.2 above. HRM of the DPWIFS distributed all the details including the face-to-face focus-group discussion question list and how the focus-group discussion would be conducted. The researcher sampled until eight participants from each of the three budget programmes, creating a sample size is 24. Where more than eight responses were received from each budget programme, the researcher sent informed consent forms to the first eight participants to complete them. An email was be sent to the rest of the participants to thank them for their willingness to take part in this study.

Participants were asked to offer details about their job and skills. They were given advance notice of the face-to-face focus-group discussion to ensure that they were well prepared and understood the purpose of the focus-group discussions. All the participants were taped with an audio recorder and the recordings were then transcribed. Before the discussions were recorded, the participants were asked for their permission. Face-to-face focus-group discussions lasted between 30 to 45 minutes. The researcher compiled a list of semi-structured open-ended questions which included possible probing questions depending on the responses, and they related to the various objectives of e-procurement (Sekaran & Bougie, 2013).

Since all the COVID-19 state of disaster guidelines had been repealed at the time of data collection, almost all public officials were back at work, making it easier for the researcher to set up face-to-face focus-group discussions. The researcher arranged for face-to-face focus-group discussions at a central venue outside of work premises in the Bloemfontein Central Business District to protect the identity and confidentiality of the participants. The face-to-face focus-group discussions took place from 16H30 to 17h30 (i.e., after working hours) to accommodate participants' schedules.

3.8 Data Analysis

Bryman and Bell (2014: 43) emphasise that qualitative data analysis is attempting to uncover natural patterns rather than putting preconceived notions on the data. When performing a research project, one of the processes that must be followed is data analysis. After all of the focus-group discussions are done, the information from the literature review is compared to the focus-group discussion data, and the phenomenon is described using qualitative data analysis (QDA) methodologies. This entails labelling and coding all of the data to recognise similarities and differences, thereby acquiring a comprehensive and nuanced understanding of a certain study problem or perspective from the population involved. A strategy that is unique to the research project must be devised for categorising social situations, verbal or behavioural data, classification and summary of responses, as well as identifying what may have been inferred or indicated (Wongsakul, 2015: 16).

The data were analysed and discussed in terms of e-procurement. The data were collected through the following techniques (Wongsakul, 2015: 16–17):

- Participant observation: a technique used to acquire data about routine behaviours in their natural settings.
- Focus groups with in-depth conversations: often employed when discussing sensitive topics in order to learn more about people's backgrounds, viewpoints, and experiences.

Research questions were given out at three focus group meetings with DPWIFS officials in order to gather data. The data acquired during the literature evaluation will be used to formulate the research questions. The information gathered from all public officials will be kept in its original format and used to establish the primary and secondary objectives. The program that will be used to analyse the data is Excel. The results of the investigation will be presented using straightforward statistical analyses in the form of bar charts, pie charts, and tables. Based on how frequently a particular response has been given from several focus groups, the data will be codified and dominance will be identified. The outcomes of the data that was collected and analysed will be presented graphically.

This section's major goal is to present the researcher's analysis of the data gathered. The reduction of obtained data to a manageable size, the generation of summaries, the detection of trends, and the application of statistical tools are all common steps in this process. Data analysis is a technique for gathering, manipulating, and modelling data in order to highlight pertinent information, make inferences, and support decision making. Data analysis includes multiple qualities and methodologies, including several procedures with a variety of names, in the various commercial, scientific, and social domains. Using a free-flowing text analysis method and direct quotes, the researcher examines trends and patterns in the responses of the participants when working with qualitative data (Chambliss & Schutt, 2018).

Interpreting the research results in relation to the research questions and assessing whether the results are consistent with the research hypotheses and theories were also included in the procedure.

3.9 Ethical Considerations

Ethics are behavioural standards or guiding moral principles that affect how we behave and interact with others (Cooper & Schindler, 2011). Ethics relating to human subjects are broad in scope and are governed by universal human rights principles (Anabo, Elexpuru-Albizuri, & Villardón-Gallego, 2019: 139). Cooper and Schindler (2011) add that participants should have no apprehensions about taking part in a study.

The researcher provided evidence that the study's ethical requirements were followed. Public officials from the DPWIFS were informed of any concerns that could affect their participation in this study. The researcher ensured that the participants' information was treated confidentially and that no information could be shared with anybody other than the researcher. The following ethical considerations, as per the Belmont report, were fully addressed:

3.9.1 Permission obtained (See Appendix 1)

Written permission from the DPWIFS was sought before conducting any focus-group discussions.

3.9.2 Ethical clearance from UFS was obtained (UFS-HSD2022/1636/22)

Ethical clearance from UFS was obtained before proceeding with data collection.

3.9.3 Informed consent

All the participants who participated in the study were made aware of the details of the study. A consent form was provided that will be signed by the participants to show their understanding (Cooper & Schindler, 2011).

3.9.4 Voluntary participation

As part of their informed consent, participants were able to take part without any coercion. No one was persuaded or compelled to participate in the study, and no one was deceived or pressured to do so (Cooper & Schindler, 2011). Consent forms were signed in this regard.

3.9.5 Confidentiality and anonymity

Integrity concerns in research are essential when handling sensitive data about people and safeguarding their anonymity. Working conditions are the same for everyone, even the researcher, and this may get worse if some research study data were to leak. The rights of the participants must be protected. The researcher made sure that all participants remained anonymous and that all data they supplied were handled in the strictest

confidence. The information is only accessible to the researcher (Polonsky & Waller, 2014).

3.9.6 No harm

Participants were certain that they would be safe and that no one would be harmed in any manner. There was no risk of physical harm, psychological harm, emotional harm, shame, or any negative consequences for the respondents. Any risk of damage was addressed (Polonsky & Waller, 2014).

3.9.7 Right to withdraw

There were no repercussions for participants who chose to leave at any moment.

3.9.8 Avoid undue intrusion

As an implication of respect, research questions focused only on the relevant issues based on the aim of the research. The personal lives of participants were respected. No means of identification was made available to anyone, and all participants remained anonymous.

3.10 Demarcation of the Study

The study was conducted at the DPWIFS in Bloemfontein. The sample size was 24 in total in order to gain an in-depth understanding of the study topics (Cooper & Schindler, 2011: 160). This involved choosing the topic of the study, as well as determining the elements that impact how well e-procurement is implemented and the practical limitations.

The research aimed to evaluate the effectiveness of e-procurement in the DPWIFS. The study was conducted at the DPWIFS in the Mangaung region and involved the public officials under the three budget programmes of the Department.

Demarcation also aids the researcher in identifying variables that influence the study's topic. The researcher was able to determine data-gathering procedures and tools after identifying these variables. This research study falls under the SCM of the DPWIFS.

3.11 Conclusion

This chapter describes the research methods that were used by the researcher to achieve the research goals outlined in Chapter 1. The methodology chosen, as well as the technology that was utilised to collect the data are both supported. Analysis, interpretation, and discussion of the data are covered in Chapter 4.

CHAPTER 4: DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter describes the results obtained from the focus-group interview discussions with the different participants at the DPWIFS. The chapter explains the methodology used to answer the five objectives outlined at the beginning of the study to ultimately determine whether or not the Department can adopt and implement e-procurement.

In Chapter 1, the research problem and a summary of the aspects of e-procurement are covered. In Chapter 2, a thorough analysis of the literature is provided, and more detail is given regarding the aspects pertaining directly to e-procurement. The research methodology for the study is covered in Chapter 3.

To respond to the research problems stated in Chapter 1 and based on the characteristics of e-procurement addressed in Chapter 2, an interview schedule was created. To determine whether the adoption and implementation of e-procurement are feasible, the findings of the interviews will be discussed and categorised according to each interview question. The literature review formed the basis for the interview schedule. The questions were created in a way that they were related to the study's objectives. The questions were designed in a semi-structured way, allowing the researcher to go deeper into the answers provided and also allowing specific participants to elaborate further if they felt that it was required.

Forty-minute interview sessions were arranged with the participants in the face-to-face focus groups to allow for a comprehensive session. Prior to the interview, participants were asked if they would be willing to take part in the study and were then informed of its purpose.

As described in Chapters 1 and 3, the sample size was 24, divided according to the three budget programmes of the Department – namely, Administration, Public Works and Infrastructure, and EPWP. The research data were collected during three focus group meetings with officials in each of the three budget programmes of the Department.

Chapter 3 outlined the research questions administered at the face-to-face focus groups. Each focus group had a maximum of eight participants from the three budget programmes. The participants were chosen based on their knowledge, experience, and how directly they were involved in procurement processes.

The researcher briefly went through the study's objectives and the need for interview recording before beginning the interview. All participants were asked to sign a consent form, which also contained this information. The participants were informed that all responses would be kept anonymous and confidential.

The participants were asked questions during the interviews to get more information about how they understood the concept of e-procurement and to give them a chance to discuss recommendations for how it may be adopted and implemented.

Focus-group discussions continued until data saturation was reached, which was after the second group interview – meaning that after the 16 participants were interviewed, no new information was attained. The saturation point was only identified in retrospect after all 24 participants were interviewed.

4.2 Analysis and Interpretation of Biographical Data

Table 4.1 below summarises the 24 participants' biographical information.

Table 4.1: Biographical data

Participant #	Gender	Race	Years of service in DPWIFS	Rank/position	Unit working for
1	Female	Black	11-20 years	Senior manager	ICT
2	Male	White	> 20 years	SCM Practitioner	SCM
3	Male	Black	> 20 years	Assistant Director	SCM
4	Female	Black	0-5 years	Deputy Director	Finance
5	Male	Black	11-20 years	Assistant Director	Internal Audit
6	Female	Black	11-20 years	Chief Audit Executive	Internal Audit
7	Male	Black	11-20 years	Chief Risk Officer	Risk Management
8	Male	Black	6-10 years	Deputy Director	Asset Management
9	Male	Black	6-10 years	Professional Architect	Works Design and Maintenance
10	Male	Coloured	6-10 years	Chief Engineer	Project management Unit (PMU)
11	Male	Black	11-20 years	Senior Manager	Maintenance
12	Male	White	> 20 years	Chief Architect	PMU
13	Female	Coloured	6-10 years	Chief Engineer	Works Design
14	Female	Black	6-10 years	Senior management	PMU
15	Male	Black	> 20 years	Manager	Security Services
16	Male	Black	0-5 years	Senior Manager	PMU
17	Female	Black	11-20 years	Deputy Director	Research, Monitoring and Evaluation (RME)
18	Male	Black	11-20 years	Assistant Director	SCM
19	Female	Black	11-20 years	Assistant Director	Monitoring and Evaluation
20	Male	Black	> 20 years	Deputy Director	SCM
21	Female	Black	0-5 years	Assistant Director	SCM
22	Female	Black	11-20 years	Assistant Director	SCM
23	Female	Black	6-10 years	State Accountant Clerk	Finance
24	Female	Black	> 20 years	Senior Manager	Monitoring and Evaluation

Table 4.1 summarises the biographical data of the 24 participants who were interviewed through focus-group interview discussions. Each category of the biographical data is analysed further and discussed thoroughly using the pie charts below.

4.2.1. Gender

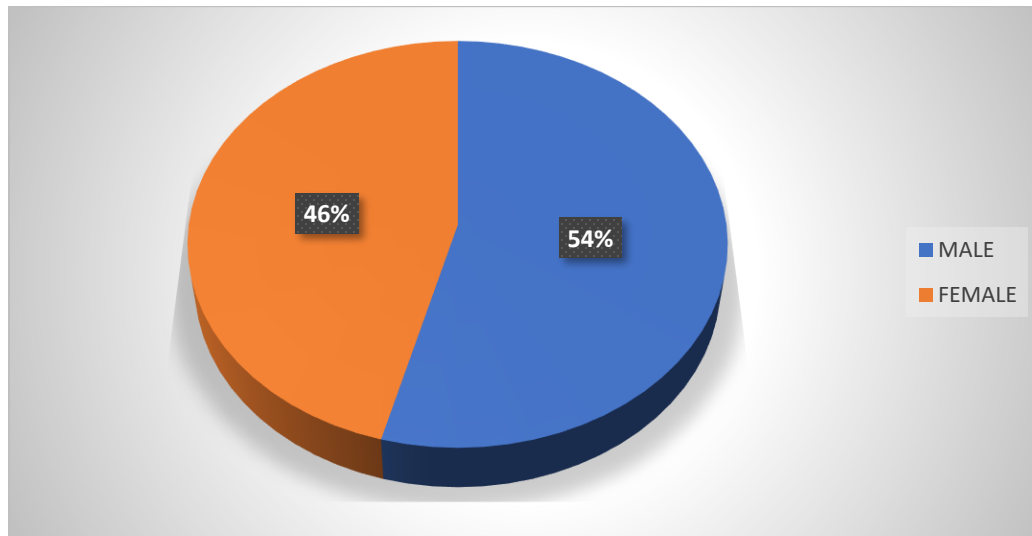


Figure 4.1: Gender of participants.

The results according to Figure 4.2 indicate that there was fairly even participation of both women and men in this study. Of the 24 officials who participated in this study, 13 (54%) were male and 11 (46%) were female. This analysis shows that both men and women were willing to participate in this study. According to this analysis, both men and women have experience and are involved in the procurement process, which highlights the inclusion criterion in Chapter 3 – namely, that the researcher would select public officials with knowledge, experience, direct involvement in procurement processes.

4.2.2. Race

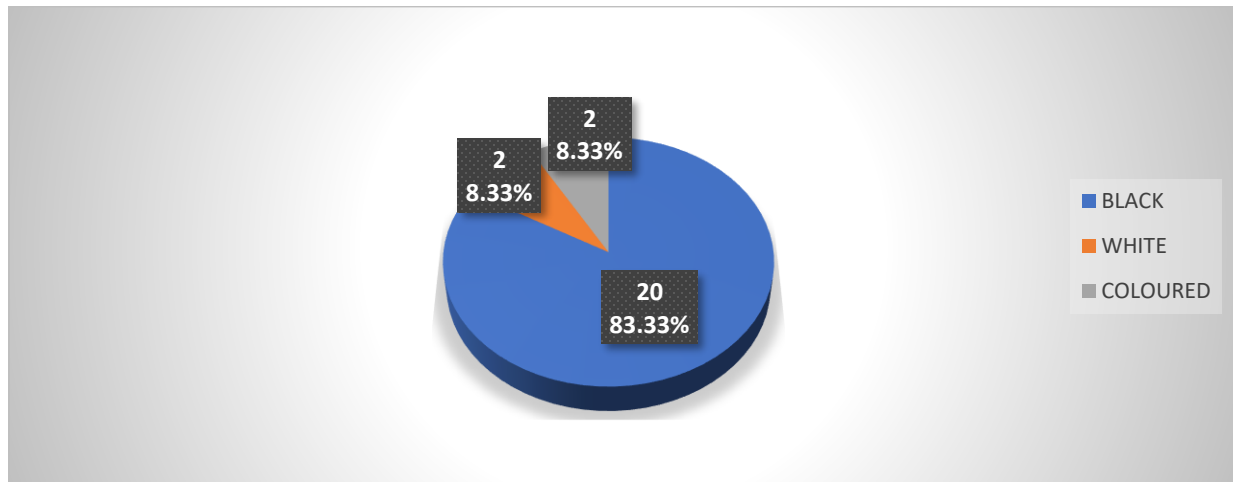


Figure 4.2: Ethnic group of the participants

Figure 4.2 above indicates that there were more black participants (83%), followed by whites and coloureds, each constituting 8.33%. The findings of the study reflect that race did not have a significant effect on the effectiveness of e-procurement.

4.2.3. Years of service in DPWIFS

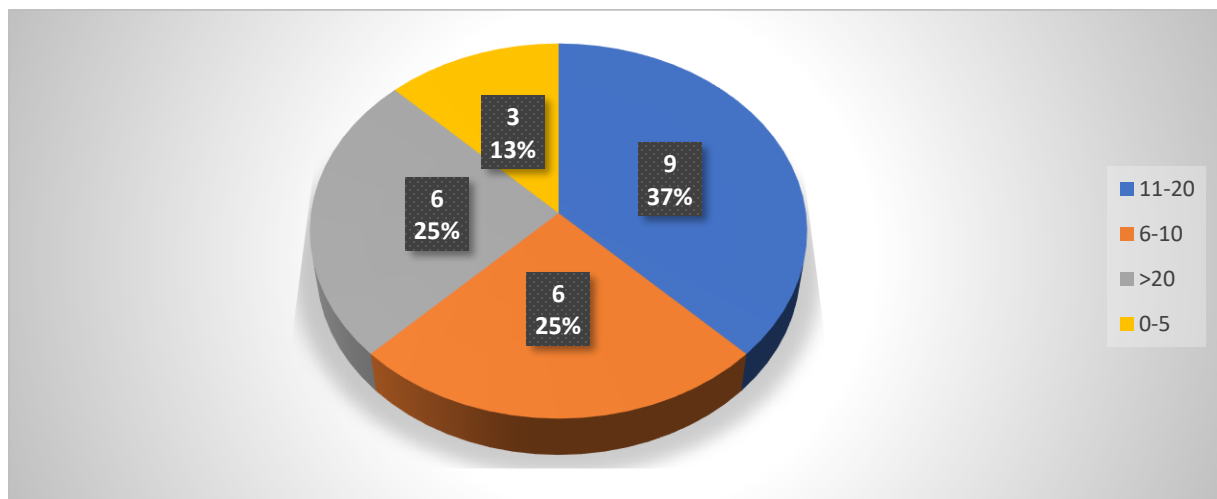


Figure 4.3: Years of service of participants in DPWIFS

The length of time each participant had worked at the DPWIFS varied, with the majority being 11–20 years (37%), followed by 6–10 years and more than 20 years (25% each).

This highlights the inclusion criterion of selecting public officials with knowledge, experience, direct involvement in procurement processes. In this case, the participants who have been working longer for the Department participated, and their knowledge and experience contributed immensely to this study.

4.2.4. Positions of the participants

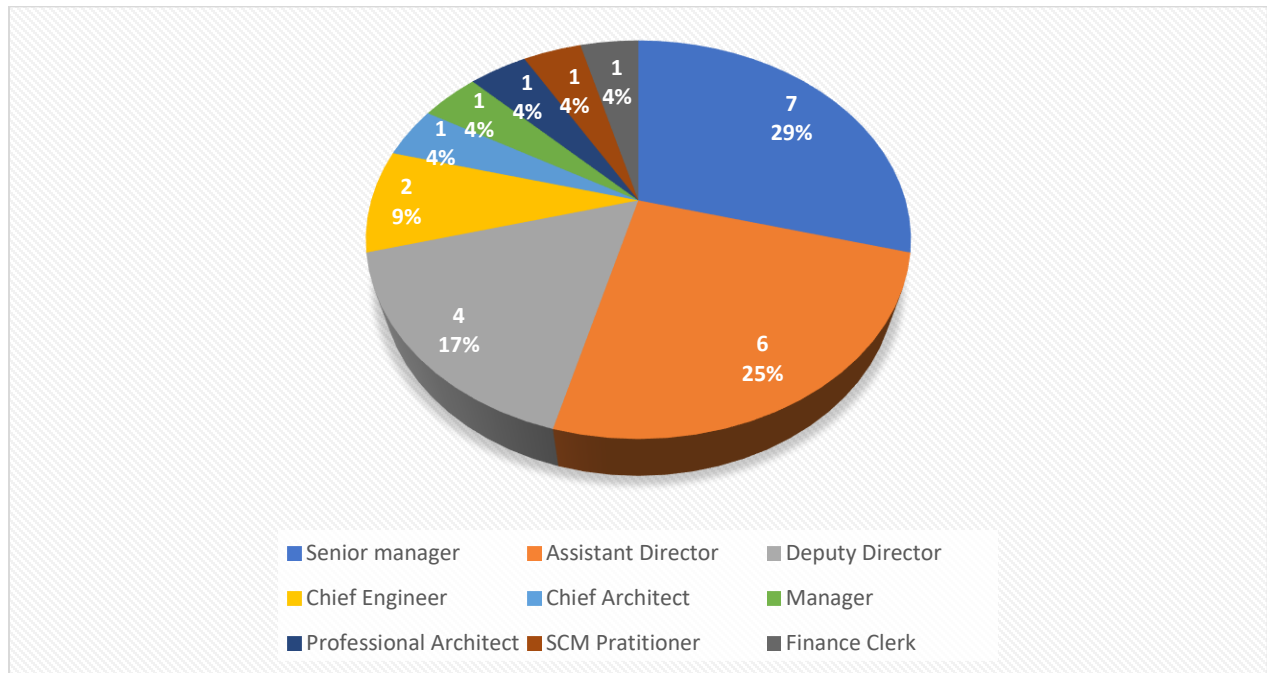


Figure 4.4: Positions of the participants

The results according to Figure 4.4 indicate that the majority of the participants were senior managers (29%), followed by assistant directors and deputy directors (25% and 17%, respectively). This highlights the fact that more experienced officials participated in this study.

4.2.5. Section / unit working for

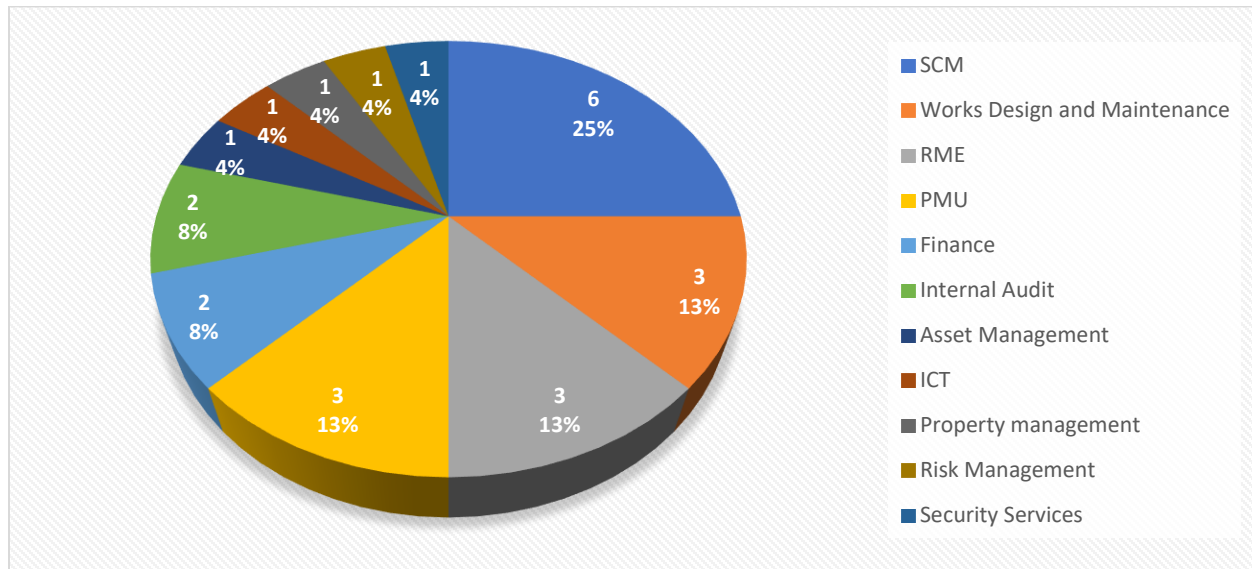


Figure 4.5: Sections where participants work

The results according to Figure 4.5 indicate that SCM officials were the most dominant participants, with 25%, followed by Works Design and Maintenance; Research, Monitoring, and Evaluation (RME); and Project Management Unit (PMU), with 13% each. It is also interesting to mention here that the majority of the participants were from the SCM discipline, which makes it more interesting because this study also falls under the discipline of SCM.

4.3 Analysis and Interpretation of Data

Six interview questions were administered to the participants to stimulate in-depth discussion about the effectiveness of e-procurement and to get their views and opinions on the factors that could help in the adoption and implementation of e-procurement at DPWIFS.

The following six questions were discussed during the three focus groups:

1. What is your understanding of e-procurement?
2. What are the advantages that an e-procurement system can have for the Department?

3. What are the disadvantages that an e-procurement system can have for the Department?
4. What are to your opinions on some of the challenges for the implementation of e-procurement in the Department?
5. What recommendations could you make for the implementation of e-procurement?
6. Is there anything else you would like to discuss about this?

The purpose of the research about these questions was to test whether the participants knew or understood the concept of “e-procurement”, what they considered as advantages for the adoption and implementation of e-procurement, and for them to outline the bottlenecks (disadvantages and challenges) that can impede the adoption and implementation of e-procurement at DPWIFS.

What is your understanding of e-procurement? (Question 1)

Findings

This section focuses on the participants' understanding of what e-procurement is, as demonstrated by quotes from participants. The responses to Question 1 are discussed and ranked in this section.

Half of the participants (50%) indicated that “e-procurement” is the automation of procurement processes through the use of online platforms. Roughly a third of the participants (37.5%) indicated that e-procurement is the electronic procurement of goods and services, while a few (12.5%) responded that e-procurement is the digitisation of procurement processes for goods and services. The following are some of the direct quotes from the participants about e-procurement:

“E-procurement means that the process of procuring is fully automated from the start to the finish.”

“E-procurement is automating your processes of acquisition within the SCM value chain or business process.”

“E-procurement [is] digitisation of procurement processes for goods and services.”

“Involves ordering, placing orders, and making purchases of products and services online.”

“Procurement done electronically or online, via the internet. Less paperwork involved.”

Table 4.2 below summarises the frequency of responses to Question 1 in confirming which definition of e-procurement was mostly answered by the participants.

Table 4.2: Frequency and ranking of responses to Question 1

Responses	Identification of participants no. who indicated the response	Frequency of responses	Percentage	ranking
The automation of procurement processes through the use of online platforms	2, 3, 4, 8, 11, 12, 13, 15, 16, 17, 19 & 23	12	50,00%	1
Electronic procurement of goods and services	6, 7, 9, 10, 14, 18, 20, 22 & 24	9	37,50%	2
Digitisation of procurement processes for goods and services	1, 5 & 21	3	12,50%	3
Total		24	100,00%	

Interpretation

This question was chosen to measure the level of understanding of the participants as it was indicated under Section 2.3.1 of the literature review, where Nawi et al. (2016: 329) describe e-procurement as “the automation of an organisation's procurement activities through the use of web-based applications for the purchase of goods, works, and services for organisations.” Most of the responses by participants aligned with this definition of e-procurement in broader terms. The three most common responses to the definition of e-procurement were the same or almost the same thing. This indicates that the participants knew the definition of the topic, that the chosen participants were pertinent to the study, and that the information they provided could help the researcher

draw accurate conclusions and offer helpful advice on how to embrace and use e-procurement.

What are the advantages that an e-procurement system can have for the Department? (Question 2)

Findings

This section discusses the advantages that an e-procurement system can have for the DPWIFS, as discussed and ranked in Table 4.3.

4.3.2.1 Efficiency and effectiveness of procurement

Most of the participants believe that e-procurement can assist in making procurement more efficient and effective, as everything will be done online. Out of the 24 participants, 20 indicated the efficiency and effectiveness of e-procurement as a procurement system. Participant 1 said:

“It would improve the efficiency and effectiveness of procurement. Timely reporting would be improved. If the e-procurement system is interfaced with the existing payment systems, the 30-day payment to service providers will be adhered to.”

Through e-procurement, DPWIFS may enhance the effectiveness, efficiency, and openness of its procurement procedures, resulting in better outcomes and long-term cost reductions. Participant 5 indicated that:

“E-procurement can help to streamline the procurement process, reducing the time and effort required to manage supplier relationships, source products and services, and process orders, which can lead to greater efficiency and productivity, allowing employees to focus on more strategic tasks.”

4.3.2.2 Cost savings (administration costs)

Half of the participants indicated that e-procurement can save costs for DPWIFS during the procurement processes. These savings include savings on stationery and printing paper. Participant 7 highlighted that using electronic methods eliminates the need to pay for trip expenses like fuel, tolls, and parking to manually submit documents. He said:

“Would save transportation costs for the service providers and contractors in terms of submitting.”

These costs are eliminated when using electronic documents. This lowers the overall cost of administering the tender. Participant 5 highlighted how automation of procurement processes will help DPWIFS massively:

“By automating and optimising the procurement process, the Department can reduce costs associated with manual processing, errors, and fraud. E-procurement can also help the Department identify cost-saving opportunities, such as consolidating suppliers or negotiating better prices”.

Furthermore, using electronic-based documents eliminates the need to make copies when asking suppliers and contractors for quotes or prices. This will also save suppliers from buying documents from the Department.

4.3.2.3 Less paperwork

Implementing paperless procurement methods in e-procurement will support green initiatives and lessen the consequences of climate change. Less usage of paper becomes the third most ranked advantage of having an e-procurement system. It was established that eight out of 24 participants indicated that e-procurement can assist in reducing paper usage at DPWIFS. The participants said that DPWIFS still uses a lot of paper-based procurement procedures. Participant 8 explained that the usage of paper kills the environment and he added:

“Less paper to be used means fewer trees to be chopped down and this would be safer for the environment and address issues of soil erosion.”

4.3.2.4 Elimination of human errors

Eight out of 24 participants indicated that issues around human errors in procurement processes can negatively impact DPWIFS, as this can cost the Department a lot of money should these errors not be realised in time and can end up in litigation. Participant 6 made the point that reducing arithmetic errors in electronic-based tender documents will also

benefit contractors and service providers. Due to the fact that calculations would have been done automatically, there is no need to double check.

“Minimisation of human error because you don’t have as much human involvement in the process.”

Participant 11 felt that the e-procurement system will eliminate human errors by preventing duplicate payments and eliminate non-payment of invoices within the stipulated period of 30 days after the receipt of the invoice, and he said:

“By using volume purchasing, you may manage expenses, avoid duplicate payments and invoice delays, and save money over using conventional paper-based solutions.”

Human involvement in many procurement procedures will decrease with the deployment of e-procurement technology. As a result, this lessens the inefficiencies and inconsistencies related to or connected to human behaviour and error.

4.3.2.5 Improved, accurate, timeous reporting and data analysis

Five out of 24 participants indicated e-procurement will assist in terms of reporting purposes. They highlighted the ready-to-sign reports that are electronically produced. Progress reports can be easily tracked at any time. Participant 5 explained that e-procurement will provide enhanced data analysis and reporting.

“E-procurement systems can provide valuable data insights, enabling departments to analyse spending patterns, track supplier performance, and identify areas for improvement, which can help the Department make data-driven decisions and optimise their procurement strategies over time.”

Participant 3 further highlighted the following:

“Easier to generate accurate reports about procurement activities (monthly, quarterly, biannual, and annual reporting to the users of information, for example, the board of

directors and other stakeholders), who are the community, Provincial Treasury, Auditor-General, business partners and forums, the executive legislature, and legislatures.”

4.3.2.6 Elimination of loss of documents

Five out of the 24 participants said that it is simple to store electronic documents, making them readily available and accessible for reference or benchmarking in the future while working on different projects. Loss of documents affects the credibility of the DPWIFS during an audit by external auditors – particularly by the Auditor-General of South Africa (AGSA). Most participants believe that the use of e-procurement could solve many of these problems related to the loss of source documents, including bid documents, payment batches, POs, and petty cash vouchers. This issue can be resolved with the adoption and implementation of e-procurement. Most participants highlighted this issue, and Participant 4 indicated that:

“e-procurement will reduce the risk of loss of documents used in the procurement process.”

Participant 6 added that:

“In terms of documentation, the risk of missing documentation would be minimised because we would store them in electronic form.”

Losing documents can adversely affect the audit reports of DPWIFS because, during an audit, the figures on the annual financial statements should be supported by evidence from source documents. The solution to that is to have an e-procurement system for the Department. Participant 21 further indicated that:

“Many benefits can be derived from the e-procurement process, unlike the manual process, which has too many errors, inconsistencies, losses of documents, repetition of the same exercise with different outcomes, and many more mishaps.”

4.3.2.7 Invoices paid within 30 days timeframe as per Treasury regulations

Four participants out of 24 indicated that the implementation of e-procurement will assist the DPWIFS to achieve the legislative mandate of paying the invoices from the service providers and contractors within 30 days after receipt. This is always a huge struggle because, in most cases, there are still invoices that are not paid within 30 days. Payment of invoices outside the 30-day period contravenes Treasury Regulation 8.2.3, which states that “unless determined otherwise in a contract or other agreement, all payments due to creditors must be settled **within 30 days from receipt of an invoice** or, in the case of civil claims, from the date of settlement or court judgement.” The prescribed period referred to in Section 38(1)(f) of the PFMA is 30 days. In supporting these legislative requirements, Participant 1 indicated that

“if the e-procurement system is interfaced with the existing payment systems, the 30-day payment of service providers will be adhered to.”

Participant 11 indicated that:

“By using volume purchasing, you may manage expenses, avoid duplicate payments and invoice delays, and save money over using conventional paper-based solutions.”

Participant 17 stated that e-procurement could enable the Department to:

“easily detect irregularities and corruption, for example, exorbitant prices or inflated prices. Prevents delays in payment of suppliers and minimises payment duplication.”

Furthermore, Participant 19 supported the implementation of the e-procurement system, as she felt it would assist in the management of payments and would ensure that no invoices were delayed for payment. She said:

“Faster payment cycles will comply with the invoices paid within a 30-day timeframe, and accurate invoice tracking resolution will be done by the system to avoid any loss or missing invoices.”

These four participants believe that e-procurement will bring a long-term solution to what DPWIFS experienced as a problem. Almost every month, there are one or two invoices that are paid outside the 30-day period. Having this system in the Department will help in tracking invoices to ensure that they are not misplaced.

4.3.2.8 Promotes competition and improves transparency and accountability as the information is easily accessible and available at any time

One of the primary goals to be attained in the procurement process is transparency as per Section 217(1) of the Constitution of South Africa 1996 and Section 38(a)(i) of the PFMA. A few participants (3 out of 24) indicated that the adoption and implementation of e-procurement will assist in improving transparency and accountability during procurement processes. They indicated that information would be easily accessible and readily available at any time. Participant 5 stated the following, which was also supported by Participant 14:

“E-procurement systems can provide greater visibility into the procurement process, enabling the Department to track spending, monitor supplier performance, and enforce compliance with procurement policies and regulations. As a result, there may be less chance of fraud and corruption, and procurement decisions will be made with greater accountability.”

E-procurement will allow officials and service providers to access the system at any time, on any day. Tendering processes will be made easy, and it will be a great benefit for the service providers and contractors as they can access the system from anywhere and submit their invoices for payment from anywhere at any time. The system will work 24/7. The issues around manual submissions of tender documents and invoices by service providers and contractors, whereby they are restricted to submitting during working hours from 07:30 a.m. until 04:00 p.m., will no longer apply, as documents can be submitted electronically at any time. This will reduce costs for suppliers and contractors as well. Participant 22 stated that:

“Management, shareholders, and other internal and external stakeholders have access to the centralised database that contains all the information about purchases.”

4.3.2.9 Reduction of corruption and fraud; all transactions are linked to usernames, passwords, and IP address

Two out of 24 participants indicated that, to minimise tampering with information, the profiles will only be created for the officials working on the e-procurement system. Each user will be required to register with a username and password so that activities performed on the system can be traced and, if there is any tampering or fraud, it can be traced back to the user. This can reduce instances of corruption and fraud, as all transactions are linked to a username and IP address (Participant 20).

Interpretation

The majority of the participants highlighted the above advantages, implying that the procurement processes will be quicker, as everything will be done electronically. The procurement cycles would be shortened and no paperwork will be needed, and it will eliminate human errors. Other participants highlighted the important issues around the elimination of human errors, which will benefit DPWIFS massively. Human errors are costly to the DPWIFS in terms of delaying tendering processes – especially in the case of calculation mistakes. Such mistakes usually relate to scoring points to determine the winning bidder, wrong pre-evaluation of bids that end up excluding eligible bidders from the tendering processes, and mistakes of losing bid documents by misplacing them. Eliminating these mistakes could save DPWIFS in terms of litigation costs as a result of the above.

In terms of transparency and accountability, all transactions may be tracked, and information and documentation are both readily available. To control who has access to the system, all users will have usernames and passwords. All transactions will be linked to usernames and passwords, which can easily curb issues of corruption, fraud, and tampering with the documents. E-procurement enables bidders from every region of the nation to submit a bid, increasing competitiveness, which is to DPWIFS's advantage. Participating in numerous bids will help bidders develop their tendering skills. They will become even more visible in the market as a result of the project tendering in many fields.

This confirms the arguments made by Sithole (2017: 15) regarding the five pillars of procurement, where accountability and reporting are central to the discussion.

Each user will be required to register with a username and password so that activities performed on the system can be traced and, if there is any tampering or fraud, it can be traced back to the user. The service providers and contractors will also be required to create profiles so that irregular activities can be traced. This will make processes transparent.

From the interviews, it is evident that e-procurement can reduce the administration costs for DPWIFS as well as costs associated with the transportation of tender documents for submission by the bidders, which confirms views reflected in the literature review in Section 2.8 that switching to an e-procurement system can save an institution both time and money.

The benefits of using e-procurement are highlighted by Nawi et al. (2016: 331) in Chapter 2, Section 2.7. The advantages of e-procurement are also explained by Patel et al. (2016: 267) under Section 2.8 in Chapter 2. The advantages quoted by different participants show how useful it would be to embrace and execute e-procurement in order to solve many of the problems that DPWIFS is facing.

Table 4.3 below summarises the frequency of responses to Question 2 for the advantages mentioned most often by the participants.

Table 4.3: Frequency and ranking of responses to Question 2

Advantage	Participant number of those who indicated response	Frequency in responses	ranking
Efficiency and effectiveness of procurement	1, 2, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 16, 17, 18, 19, 21, 22, 23 & 24	20	1
Cost savings (administration costs)	2, 5, 7, 8, 11, 12, 14, 15, 17, 21, 22 & 24	12	2
Less paperwork	3, 4, 8, 10, 11, 12, 17 & 24	8	3
Elimination of human errors	4, 6, 7, 10, 11, 17, 18 & 21	8	4
Improved accurate timeous reporting and data analysis	1, 3, 5, 7 & 14	5	5
Elimination of loss of documents	4, 6, 10, 11 & 21	5	6
Invoices paid within 30 days timeframe as per Treasury regulations	1, 11, 17 & 19	4	7
Promotes competition; improves transparency and accountability as the information is easily accessible and available at any time	5, 14 & 22	3	8
Reduction of corruption and fraud; all transactions are linked to usernames, passwords, and IP address	16 & 20	2	9

What are the disadvantages that an e-procurement system can have for the Department? (Question 3)

Findings

This section discusses the disadvantages or barriers that threaten the adoption and implementation of an e-procurement system. They are discussed and ranked in Table 4.4.

4.3.3.1 Data security – cyber-attacks and hacking

Almost half of the participants (11 out of 24) indicated that in order to maintain the effectiveness of the e-procurement system at DPWIFS, information and data security are

of the utmost significance. These participants highlighted that before the implementation of this system, these barriers or threats need to be addressed first. One participant indicated that online security is very important for the protection of confidential information. They indicated that systems can be manipulated by hackers. Participant 5 said:

“E-procurement systems can present security risks if not properly secured, such as the loss of sensitive data, unauthorised access, or cyber-attacks.”

The above response was also supported by Participant 17, who said:

“It may be exposed to system hackers or cyber-attacks if not installed with frequently updated cyber security software (security threats).”

4.3.3.2 Slow internet and poor network

Just over a quarter of the participants (7 out of 24) highlighted the issue of slow internet and a poor network as inhibiting factors for the implementation of e-procurement. Participant 20 indicated that:

“Depending on the network, the procurement process can be affected by intermittent network or slowness of the network.”

This is supported by the responses of the other six participants, who indicated that poor network connectivity and the slow internet can delay the procurement processes and could end up hampering service delivery to the communities.

4.3.3.3 System failure

A quarter of the participants highlighted the issue of system failure. System failure means that the system can crash and lose important information. Few participants indicated issues around system crashes and system failures during procurement processes.

Factors related to this pointed to difficulties that can be experienced by service providers and contractors when they have to access the system to submit their bids and they find

out that the system is down or is not working. This could frustrate them a lot. This was supported by Participant 3, saying that:

“System failure may be a threat to receiving bids in time.”

4.3.3.4 Impact on the workforce or human capital in SCM – could replace or make some functions redundant

Three participants believed that e-procurement can impact the workforce in SCM, as they believe that this system will replace many officials working in SCM because their functions will be redundant. One participant indicated that *“e-procurement will reduce the employment in SCM.”* However, even though officials in SCM will have to be replaced by this system, government employees are rarely retrenched; instead, they are normally rotated to other sections of the Department to work there.

4.3.3.5 Increased complexity

A few participants (two out of 24) highlighted increased complexity as one of the disadvantages that could affect the implementation of e-procurement. Participant 5 supported this by saying:

“E-procurement systems can be complex and require significant training and support to use effectively, which can be a challenge for the Department with limited IT resources, especially if the employees are not comfortable using digital tools.”

Another participant mentioned that e-procurement solutions might occasionally increase complexity and costs, usually as a result of the care needed to comprehend customer requirements (Participant 11).

4.3.3.6 Other critical disadvantages

The following two disadvantages are very critical to this study and were highlighted by one participant each. Although these factors were indicated by only two participants, their significance becomes more evident during the discussion of the findings in Chapter 5. A

recommendation is provided in relation to these disadvantages as well. Participants 9 and 17, respectively, indicated the following disadvantages:

“Time intensive: requires that all external parties make use of the system to be compatible with system requirements.”

“A System that is not user-friendly to bidders as well as officials, lack of technical expertise, knowledge, and access to information technology might hamper participation of small supplier companies in the e-procurement system.”

Interpretation

The following interpretations relate to all the findings on the above disadvantages. The purpose of this questioning was to gauge how well the participants understood the barriers (disadvantages) that led to non-usage of e-procurement, as discussed in Chapter 2, where Das (2021: 1) highlighted disadvantages of e-procurement. Furthermore, this appears to be some of the reasons for non-usage of e-procurement explained by Afolabi et al. (2019: 3) in Section 2.12 of the literature review.

The first point of departure is to ensure that all the barriers and hurdles have been addressed before this system can be implemented. The majority of the participants mentioned data security, such as the risk of hackers attacking the system, leading to valuable and confidential information in the DPWIFS being compromised. In turn, this can hamper service delivery.

Electronic transactions are vulnerable to virus attacks, phishing scams, internet fraud, and hacking. The data that is electronically delivered and stored needs to be backed up. DPWIFS has to perform a feasibility study to ensure maximum security for this system before implementation. This will be a new system to be piloted by DPWIFS and, as such, if it is not properly configured and integrated with the existing systems, it can cause the system to fail, which can lead to fruitless and wasteful expenditures due to the massive funds that would have been invested in it.

The government should support its departments with regards to issues around slow internet and poor network, which can affect the implementation of e-procurement. Slow internet can hamper the processing of information and disadvantage service providers and contractors when they want to submit their bids. It will also affect payments, which can lead to invoices being paid outside the 30-day period, in contravention of Treasury Regulation Section 8.2.3.

If there's a system failure, it means that there will be nothing working. It would even mean that part of SCM will be dysfunctional, as this system will be performing duties that would have been performed by humans.

In terms of the impact on the SCM workforce, no one will lose their jobs, as government is unlikely to retrench employees. Instead, they will be shifted to other sections, as some of the functions in SCM will become redundant. Participants indicated this will cause alarm at SCM, with some officials fearing they will lose their jobs, even if this will not be the case.

Increased complexity will be an added disadvantage because officials, service providers, and contractors will have to become familiar this new way of doing things. They are accustomed to doing things in the traditional way, and some of them are computer illiterate. It will thus be a mammoth task for them to learn the new system. Employees will have to receive extensive training to learn the complex features of the system.

The responses to this question highlight the threats and barriers (disadvantages) that appear to be a major cause for the non-usage of e-procurement. These data answer the following research question in Chapter 1, Section 1.3.1: *What are the main/key reasons for the non-usage of e-procurement and digital procurement platforms in the DPWIFS.*

Table 4.4 below summarises the frequency of responses to Question 3, showing the disadvantages mentioned most frequently by the participants.

Table 4.4: Frequency and ranking of responses to Question 3

Disadvantage	Identification of participants no. who indicated the response	Frequency in responses	ranking
Data security - cyber-attacks & hacking	2, 3, 4, 5, 8, 10, 14, 17, 18, 19 & 23	11	1
Slow internet and poor network	15, 16, 17, 18, 20, 22, 23 & 24	7	2
System failure	3, 4, 10, 14 & 17	5	3
Could have an impact on the workforce or human capital in SCM because it could replace or make some functions redundant	6, 14 & 17	3	4
Increased complexity	5, & 11	2	5

What are, to your opinion, some of the challenges for the implementation of e-procurement in the Department? (Question 4)

Findings

This section discusses the challenges that threaten the adoption and implementation of an e-procurement system. They are discussed and ranked in Table 4.5.

4.3.4.1 Resistance to change (change management)

Almost half of the participants (10 out of 24) indicated that the biggest challenge is resistance to change or adaptation to new technologies. Participant 5 indicated that:

“Implementing e-procurement involves changes in processes and technology, which can be difficult for some employees to adjust to. The employees and suppliers may be reluctant to use new systems and processes, which can slow down the adoption and implementation of e-procurement.”

Officials are reluctant to alter existing and adopt new systems since they are accustomed to their established ways of doing things. This statement was supported by two of the

participants, who indicated that in most institutions, employees fear change and fear technology. Resistance to change is often fuelled by concern about losing one's job.

Service providers and contractors are hesitant to explore and adopt new ways of doing things. This is supported by the response of Participant 11, who said that

“both internal users and even some vendors can create friction and resist the change.”

4.3.4.2 Energy supply (Eskom's load shedding)

Issues around energy supply outages were highlighted by almost half of the participants, as it is also a burning issue in the country as a whole. Load shedding is affecting many business operations around the country, and it is negatively affecting the economy. Each and every business operation and system depends on electricity to function (Participant 2). The issue of the energy supply is now on everyone's mind as a result of load shedding (Participant 3). This challenge around load shedding defeats the legislative requirement of SCM Instruction Note No. 02 of 2021–2022, which states that at least three written price quotations must be obtained from three different suppliers registered on the CSD. This legislative requirement cannot be achieved if electricity is down, as many service providers and contractors won't be able to use the system to submit their bids. This statement is supported by Participant 8:

“When electricity is down, everything stops. Only those with generator and solar system back-ups can still operate.”

Not everyone in the country has a generator and/or a solar system backup, as these tools need extra funds to operate – especially the generator because it needs fuel to function (Participant 16).

Currently, the country is faced with the challenge of energy supply outages, which affect institutions like DPWIFS. By the look of things, this issue of load shedding is far from over.

Participant 20 stated:

“In SA, we are currently facing issues with energy supply. We all know that systems only operate when there is sufficient and reliable energy supply”.

The other participant further indicated that:

“Another challenge is the energy supplier (Eskom). Eskom is not going to be right any time soon; even after 10 years, we'll be crumpling with this problem because we have a problem that is not self-created.”

4.3.4.3 High implementation, IT infrastructure, maintenance, and training costs

Seven out of 24 participants highlighted challenges around various implementation costs, including those associated with IT infrastructure and training officials to work on the new system. IT infrastructure needs installation, maintenance, and continuous upgrades. Participant 1 indicated that building the IT infrastructure capability to sustain an e-procurement system would be costly. The Department would also have to incur costs for the implementation of the system and the training of the employees (Participant 4). Participant 5 further indicated that:

“Implementing e-procurement requires training and education for employees to ensure they are familiar with the new processes and systems, which, though it might be an expensive and time-consuming procedure, but it is essential to the success of the implementation.”

4.3.4.4 Poor integration with existing systems could be a challenge

Six participants highlighted the issue of poor integration with the existing systems. Participants 4 and 5 stated, respectively:

“The e-procurement system would have to integrate with the systems already in place for procurement, for example, LOGIS and BAS, which could be a challenge to the Department.”

“E-procurement systems need to be integrated with National Treasury and other systems such as LOGIS, BAS, CSD, SARS, and CIDB, etc. This can be a complex process that requires careful

planning and execution to ensure that the integration is seamless and all systems work together effectively.”

The advanced use of e-procurement cannot ensure the anticipated outcomes due to potential business capabilities and misalignments. Poor integration and configuration of e-procurement will give poor results, and the system won't serve its purpose of helping DPWIFS achieve its targets and goals.

4.3.4.5 Political interference and influence on tenders

Three participants indicated the challenge of political interference in administrative processes. The issue of politicians trying to influence the tendering decisions for their own personal gain was highlighted by Participant 3:

“Political influence on tenders, unethical behaviour by some officials who are used by politicians (for example, state capture), and tenderpreneurs influencing decision making in the procurement environment due to a lack of ethics by officials involved in procurement activities.”

It is clear that for these types of systems to flourish, politicians should toe the line and know their mandate: they are the political heads of the institutions, and they must not interfere with the administrative processes, as it is not their jurisdiction. Participant 8 further supported this statement by saying:

“The biggest challenge for government is the political factors; it's the biggest challenge for government in transforming and catching up with the rest of e-commerce and the rest of the world.”

4.3.4.6 Lack of buy-in by key decision makers

Lack of buy-in by major decision makers was mentioned by two participants. Participants 1 and 21 made the following statements, respectively:

“Lack of buy-in by major decision makers can be a challenge for the implementation of e-procurement.”

“Before the adoption and implementation of e-procurement, all stakeholders from the inception stage should be included. This will help because everyone will feel important and that their opinion matters.”

4.3.4.7 Poor IT support

Two out of 24 participants indicated that the success of this system relies heavily on ICT support, as it is an IT system. It must be configured by ICT officials, and training and education has to be facilitated by the ICT division. Participant 2 indicated that *“poor IT support can hinder the success of this system”* and was supported by Participant 18, who indicated that *“lack of IT skills from government officials can also hamper the success of this system.”*

4.3.4.8 Other challenges

The following two challenges are also very critical for this study and were highlighted by one participant each. Although these issues were mentioned by only two participants, their importance becomes more evident during the discussion of the findings in Chapter 5. A recommendation is provided in relation to these challenges as well. Participants 2 and 4 indicated the following challenges, respectively:

“Incompetent staff”.

“Issues around proper budgeting, consultations, and approvals for the implementation of the system can take time.”

Interpretation

The purpose of this question was to gauge the participants' degree of comprehension in terms of the challenges as factors affecting the effective implementation of e-procurement at DPWIFS. This relates to Section 2.11, where Patel et al. (2016: 265) highlighted the challenges that can impede the effective implementation of e-procurement.

All transformational attempts are hampered by resistance to new system adoption, which is normal. This can be related to organisations' reluctance to invest in new systems in

which they lack confidence or a track record of performance. The conventional approach is preferred by institutions. When brand-new systems or procedures are implemented, resistance to change is frequently encountered. This is frequently evidenced by the refusal to adopt new processes in favour of how things were previously done. This has a major influence on officials' acceptance of new systems. They have a fear of the unknown because they believe that these systems are going to replace them, but that will not be an issue with the government because staff will not be retrenched but rather shifted to other sections of the Department.

The consequence of unreliable power supply is that DPWIFS will not be able to achieve its objectives and goals of delivering service to communities. This compels DPWIFS to have a backup power supply if they are to implement e-procurement, so that electronic devices can still be used during power outages. The other challenge with this is that there must be a provision of backup power, which will increase the capital costs of maintaining and keeping this system up and running.

The significant capital expenditures for IT infrastructure, which some people refer to as "high implementation costs," will pose challenges for the adoption and implementation of e-procurement. DPWIFS will have to increase the budgets, which means more funds will have to be allocated to this project. Participants also highlighted the challenge of incompetent staff, who need thorough education and training to be able to operate the system. As a result, since staff must be trained on how to adopt and operate these systems, training expenses for government officials should also be budgeted for.

For this system to work efficiently, it has to be configured properly in order for it to be easily integrated with existing systems from the State Information Technology Agency (SITA) as well as other systems like LOGIS, BAS, the CSD, South African Revenue Services (SARS), and the Free State Supplier Management System (FSSMS).

Participants raised big concerns about politicians who want to tamper with the tendering process to influence the final decisions and awards. This will defeat the prescripts of Section 217 of the Constitution, which states that organs of the state must contract for

goods and services following a system that is fair, equitable, transparent, competitive, and cost effective. Political interference is very detrimental to the procurement process, and it must not be allowed.

Participants hinted at the need for the government to pass laws to compel the mandatory use of e-procurement. E-procurement will not be implemented quickly if there is no government enforcement.

ICT is the backbone of electronic systems at DPWIFS, and having them on board will assist in making this system work. Two participants felt that there would be insufficient support from IT, which can cause the e-procurement system to be implemented slowly.

The answers to this question indicate the difficulties or elements that seem to be significant barriers to the successful implementation of e-procurement. These data answer the research question in Chapter 1, Section 1.3.1: *What are the factors affecting the effective implementation of e-procurement in the DPWIFS?*

Table 4.5 below summarises the frequency of responses to Question 3 for the challenges mentioned most frequently by the participants.

Table 4.5: Frequency and ranking of responses to Question 4

Challenge	Identification of participants no. who indicated the response	Frequency in responses	Ranking
Resistance to change (change management)	2, 3, 4, 5, 8, 10, 14, 17, 18, 19 & 23	10	1
Energy supply (load shedding)	2, 3, 4, 8, 9, 12, 14, 16, 20 & 23	10	2
High implementation cost, IT infrastructure costs, maintenance costs of the system; and costs associated with training of officials - extra budgets for the Department	15, 16, 17, 18, 20, 22, 23 & 24	7	3
Poor integration with existing systems (e.g., LOGIS and BAS) could be a challenge for the Department	3, 4, 10, 14 & 17	6	4
Political interference / influence on tenders	5, & 11	3	5
Lack of buy-in by key decision makers	1 & 21	2	6
Poor IT support	2 & 18	2	7

What recommendations could you make for the implementation of e-procurement? (Question 5)

Findings

Almost all the participants indicated some recommendations or suggestions that they felt would assist in making the management of DPWIFS consider the adoption and implementation of the e-procurement system. These responses also provide justification for the final recommendations of this study.

As a result of the repetition in responses, not all the recommendations or suggestions will be listed below. The following points were mentioned by two participants each, and they are listed in chronological order from the first group to the third group (24 participants in total).

1. The system should produce a report to all competitors concerned about who succeeded in meeting the requirements of a tender.
2. The system should generate the appointment letter for a quotation to the winning bidder and the letters to the unsuccessful competitors.
3. Choose a solution that is flexible, scalable, and aligned with the Department's specific needs and requirements.
4. Communicate the benefits of e-procurement to all stakeholders, including employees, suppliers, and customers. This will help the Department build support for the implementation and encourage the adoption of the new system.
5. Outsource the entire e-procurement system to an SOE – similar to SARS collecting money on behalf of the Treasury. By so doing, there will be flexibility, because procurement will then be covered by different laws, like the Companies Act.
6. Change in organisational culture.
7. It is recommended that the government of South Africa enhance its internet connectivity and encourage and train its officials on IT-related subjects.
8. Identify needs and gather feedback from all the stakeholders, then use this valuable information to choose the right procurement software.
9. Consider the needs of existing and future suppliers to retain productive and mutually beneficial relationships and improve collaboration.
10. Introduce change in phases (i.e., rollout should be done in stages).
11. Ensure that the benefits of having this system are going to outweigh the costs.

Interpretation

All participants indicated that, in order to be successful in adopting and implementing the e-procurement system in DPWIFS, the above points should be addressed, and each of the recommendations and suggestions should be thoroughly analysed before the e-procurement system can be introduced.

One participant indicated that the DPWIFS wants to have good systems but does not have the strategies to sustain and maintain them. Two electronic systems that were implemented by DPWIFS were mentioned as examples the Reapatala (we pay) invoice tracking system, which was introduced in 2017, and the e-submission system, which was

introduced just before the COVID-19 pandemic. The Reapatala system assisted with the tracking of invoices from the suppliers to the chief users until the invoice was paid within 30 days of receipt, while e-submission was for the electronic signing and approving of submissions by senior managers and heads of department. This e-submission system helped a lot during COVID-19, as movement was restricted, and it was easy for work to continue as some documents could be signed electronically when the officials were not at work. This participant stated that it was not known where these systems ended, as they are no longer available at DPWIFS.

It is very important that all the blind spots are addressed and all the bottlenecks are resolved before this system can be implemented.

Is there anything else you would like to discuss about this? (Question 6)

Findings

Factors mentioned by participants as to what else they would like to discuss pertaining to e-procurement appear to be additional recommendations that DPWIFS should take cognisance of if the e-procurement system is adopted and implemented. Those factors include the following:

- i. This would assist in reducing fraud and corruption. It would also contribute towards a green environment due to less reliance on the usage of paper.
- ii. The e-procurement system should be introduced by Provincial Treasury centrally and be implemented similarly to the CSD.
- iii. The system may also be recommended as an extension to the existing CSD system.
- iv. As we move to the Fourth Industrial Revolution (4IR), we need one centralised procurement system in government to expedite the procurement processes that will enhance service delivery.
- v. The system should be configured accurately to give best results.
- vi. The government departments, especially DPWIFS, should have by now embraced the 4IR with the move to e-portals. All processes and applications should have moved to electronic means. The 4IR is no longer in the future, but

right here, right now. We need to embrace it and change our culture to fit in, otherwise, we will be left in the dark ages.

- vii. A robust e-procurement system must incorporate budgets because they are a must for every organisation. Budget calculations are, regrettably, still performed manually or using antiquated spreadsheet software. There is no means to enforce authorisation for over-budget purchases and even a single mistaken keystroke can result in problems.
- viii. It is cost effective to implement e-procurement; therefore many officials will lose their work in the process.
- ix. All government departments must ensure that there is an updated legal framework to guide e-procurement processes before implementation.
- x. For the government to perform well and advance in ICT, particularly e-procurement, it needs to collaborate with institutes of higher learning and potential sources of supply in the market to be at the same level.
- xi. South African SMMEs, for example, are still struggling with technology. Some don't even own smartphones, notebooks, or tablets due to poverty and historic background. However, everything is possible and doable.
- xii. Government should try by all means to go paperless. This will help in terms of costs and the environment.

Interpretation

Half of the participants responded to this question. The majority of the participants' desire to see this system implemented, but several points were made that the researcher could incorporate into recommendations or suggestions that need to be considered before this system is adopted and implemented. Another positive response is that some participants believe that e-procurement will assist in reducing fraud and corruption and reduce the administration costs associated with printing and paper.

The above points are directly linked to the possibility of this system being implemented successfully, given the various inputs and recommendation are considered and addressed.

4.4 Conclusion

This chapter analysed the advantages (benefits) that the adoption and implementation of e-procurement can bring to DPWIFS. The chapter also analysed the barriers (disadvantages and challenges) that will need to be looked at and addressed before the adoption and implementation of e-procurement. The findings in this chapter mostly confirm what was found in the literature review discussed in Chapter 2.

The participants indicated the advantages and benefits that can be derived from using this system. The following are some of the major advantages (benefits) that were provided by the participants: efficiency and effectiveness of procurement, cost savings (administration costs), less paperwork, the elimination of human errors, improved accuracy and timeliness of reporting and data analysis, elimination of document loss, promotion of competition, transparency and accountability, and reduction of corruption and fraud. These advantages (benefits) were rated and scored based on how frequently participants mentioned them. The highlighted benefits show that the participants are positive about the adoption and implementation of this system.

The major areas of concern are the barriers (disadvantages and challenges). The following are the major disadvantages: data security (e.g., cyber-attacks and hacking), slow internet and a poor network, system failure, impact on the workforce or human capital in SCM because it could replace or make some functions redundant, and increased complexity. The major challenges are the following: resistance to change (change management), energy supply (load shedding), high implementation cost, poor integration with existing systems, political interference, lack of buy-in, and poor IT support.

The disadvantages and challenges have also been scored and ranked in accordance with how frequently the participants mentioned them. The participants indicated that they support the implementation of this system as it will bring more benefits; however, the highlighted bottlenecks and barriers also need to be addressed before the system can be implemented.

When proposing solutions or recommendations to address the reasons behind inadequate use of e-procurement at DPWIFS, the two major barriers – namely, the disadvantages and challenges of e-procurement – need to be targeted. The conclusions and recommendations of the study are discussed in the next chapter.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter presents the conclusions and recommendations of the study about the findings on the key reasons (disadvantages) underlying the non-usage of e-procurement and digital procurement platforms in the DPWIFS and the factors (challenges) that affect the effective implementation of e-procurement within the DPWIFS. In this final chapter, the researcher will make recommendations aimed at the adoption and implementation of e-procurement in the DPWIFS.

The section below presents the objectives of the study, a summary of the previous chapters, as well as the findings. Furthermore, recommendations and the limitations of the study are discussed. The final section gives the conclusion of the study.

5.2. Conclusions

5.2.1. Research objectives of the study

The primary research objective of the study was:

- To evaluate the effectiveness of e-procurement in the DPWIFS.

The secondary research objectives of this study were:

- To provide an overview of the literature on the adoption and implementation of e-procurement.
- To determine the main reasons for the non-usage of e-procurement and digital procurement platforms in the DPWIFS.
- To determine the factors that affect the effective implementation of e-procurement within the DPWIFS.
- To identify strategies that can be employed to enhance the usage of e-procurement in the DPWIFS.

5.2.2. Summary of the chapters

5.2.2.1 Chapter 1: Research proposal and problem statement

The current study was aimed at investigating the main/key reasons for the non-usage of e-procurement and digital procurement platforms in the DPWIFS and the factors that affect the effective implementation of e-procurement within the DPWIFS. Chapter 1 discussed the research background, research problem, research questions and objectives, and preliminary literature review. The background defines e-procurement. The research problem is that the usage of obsolete paper-based procurement processes is still prevalent in the DPWIFS and these are no longer effective. Traditional paper-based procurement methods have many weaknesses such as bureaucracy and lack of transparency. Effective implementation of e-procurement can help solve the challenges of corruption and inefficiencies in the public sector which, in turn, will enhance the efficiency of operations, reduce costs, and reduce the time taken to complete tasks.

5.2.2.2 Chapter 2: Literature review

Chapter 2 discussed procurement in general and defined what e-procurement is. This chapter reviewed the theoretical and empirical literature from past studies on the subject of e-procurement adoption and implementation. The chapter highlighted the legislative framework for South African public procurement. It also defined e-procurement and concluded that many definitions of e-procurement exist.

The study adopted the definition by Nawi et al. (2016: 329), which describes e-procurement as the automation of an organisation's procurement activities through the use of web-based applications for the purchase of goods, works, and services for organisations. Chapter 2 discussed the following components of e-procurement: e-informing, e-tendering, e-auctioning, vendor management, catalogue management, e-purchasing, e-ordering, e-invoicing, and e-contract management. The chapter discussed the following benefits of e-procurement: minimisation of administration expenses, cost savings, increased contract fulfilment, quality bidding, efficient procurement timelines, reduced financial and technological hazards, and increased supplier competitiveness. The following advantages of e-procurement were also discussed: cost reduction,

improved communication, reduced corruption, complete integration of organisational processes, improved decision making, and time savings. The following challenges were highlighted: resistance of end-users to change, lack of system integration, standardisation issues, and inconsistencies in government policies and legislation. The chapter further discussed the following reasons for the non-usage of e-procurement, which answered the objectives of the study: institutional policies, software packages that are incompatible with the organisation's internal technology infrastructure, an e-procurement system that would take a long time to be designed, a lack of utility and security, a lack of IT system integration with partners, the insufficient technological infrastructure of business partners, insufficient in-house technology infrastructure and IT personnel, a lack of top management support, and high implementation costs.

5.2.2.3 Chapter 3: Research methods

Chapter 3 of the study dealt with the research methodology. The research design employed in the study was a qualitative case study. A non-probability sampling strategy was used in which a purposive, convenience sampling approach was followed to draw the sample. This technique prevents the researcher from generalising to a population. The sample size of the study was 24 participants, who were divided into three focus groups of eight participants each. The data collection instrument was an open-ended question and discussion guide to give the researcher adequate time to dig further into the subject.

5.2.2.4 Chapter 4: Data analysis and interpretation

The research findings were presented based on the focus-group discussions, where the questions were discussed among eight participants per group. With regards to demographics, both women and men participated in the study. More blacks (83%) participated in the study. The most common time period in service was 11–20 years (37% of participants). More senior managers (29%) participated in the study. The focus-group question discussions included the participants' definitions of e-procurement, the advantages that e-procurement can bring to DPWIFS, the disadvantages and challenges that could be experienced when using e-procurement, and the recommendations that the participants had for the implementation of e-procurement.

The objectives of the study were discussed in Chapter 2. The first secondary objective – *to provide an overview of the literature on the adoption and implementation of e-procurement* – was discussed in detail in Chapter 2. Section 2.12 specifically discussed the reasons for the non-usage of e-procurement and digital procurement platforms, which was the second secondary objective. The third secondary objective was *to determine the factors that affect the effective implementation of e-procurement within the DPWIFS*, which was discussed in Sections 2.9 and 2.11.

5.2.3. Summary of the findings

The following are the main findings of the study:

Finding 1: Data security

Information is not secured against external threats like cyberattacks and hackers. Hackers frequently target the global web. This indicates that there is a risk of virus assaults, phishing scams, internet fraud, and hacking of electronic transactions. The data that are saved and delivered electronically need to be backed up. The security of information provided and received electronically raises serious concerns. Unauthorised reading and the ease with which data or documents might be supplied to the incorrect person are additional concerns. The recipient's electronic equipment could be harmed by viruses that have infiltrated some of the information.

Finding 2: System failure

System errors can cause delays in procuring goods and services. System failure is caused by poor and slow internet, system crashes, and loss of information. When there's a system failure, it means that there will be nothing working. It would even mean that part of SCM will be dysfunctional as this system will be performing duties that would have been performed by humans.

Finding 3: Increased complexity

E-procurement solutions frequently increase complexity and cost, mainly as a result of the care needed to comprehend user requirements. Officials, service providers, and

contractors will be exposed to a new way of doing things, and the new systems come with complicated features that might be a challenge to many system users. Things are done the traditional way, and it will be a mammoth task for system users to learn the new system, especially given the fact that some of them are computer illiterate.

Finding 4: Time intensive

All external parties making use of the system will need to be able to meet system requirements. For the system users to learn and understand the e-procurement system, more time will be needed to educate and train them to ensure that they understand it thoroughly.

Finding 5: System that is not user-friendly to bidders as well as officials

Lack of technical expertise, knowledge, and access to information technology might hamper the participation of small supplier companies in the e-procurement system. A system that is not user-friendly becomes a challenge since it cannot be efficiently operated by most. It will likely appear to be a difficult system to use.

Finding 6: Resistance to change (4IR)

It is normal for people to oppose adopting new systems, and this affects all transformation efforts. This is due to organisations' fear of the unknown, which prevents them from investing in new systems in which they lack faith or a track record of effectiveness. Institutions favour the conventional approach. When brand-new systems or procedures are implemented, resistance to change is frequently felt. This is often demonstrated by refusal to adopt new processes in favour of how things were previously done. This has a significant impact on how well-received new systems are by officials. They are afraid of the future because they think these technologies will replace them. Bidders will be hesitant to adopt new techniques because they are accustomed to getting information on tender notifications through conventional channels.

Finding 7: Poor energy supply (load shedding)

The country is faced with the challenges of power outages due to load shedding, which affect many businesses' operations. This will also affect the electronic systems because

they cannot operate without electricity, which will cause delays in the procurement processes

Finding 8: High implementation cost

The majority of institutions cannot afford the high installation and upkeep expenses of e-procurement technology and systems. The ongoing software updates, which are expensive, make the situation worse. High IT infrastructure costs, maintenance costs, and costs associated with the training of officials will be involved, and this will require extra budget allocations for the successful implementation of the system.

Finding 9: Poor integration with existing systems

If the system is poorly integrated with the existing systems like LOGIS, BAS, CSD, and SITA, it could be a challenge for the Department. If the system is not properly configured and customised for the existing systems, this can result in delays in procurement processes.

Finding 10: Lack of buy-in by key decision makers

For this system to be successfully implemented, there must be buy-in and support from the main decision makers and stakeholders. The government should have buy-in for supporting the departments with funds for the successful implementation of e-procurement systems. Without support from the government, this system will not be successful.

Finding 11: Incompetent staff

The system will be complex and might need officials who are computer literate and who can efficiently operate complex electronic systems. Incompetent staff can be a challenge in the sense that there might be mistakes and errors, which can cost the Department money. Incompetent staff can tarnish the credibility of information from DPWIFS.

5.3. Recommendations

The following recommendations emanate from the findings of this study:

Recommendation 1 (Finding 1):

- i. DPWIFS should implement robust security measures to protect against data breaches and cyber-attacks. The implementation of robust measures may include regular security audits and employee training on data security best practices.
- ii. DPWIFS should invest in a strong synchronised security solution which is a combination of security system firewalls, antivirus software, and encryption for sharing information in real-time to protect, block, and respond to threats automatically. Synchronised security ensures immediate coordination to prevent internal and external attacks on the system by responding automatically to prevent and resolve incidents.

Recommendation 2 (Finding 2):

DPWIFS should invest in strong back-ups in case something goes wrong with the system, so that information can still be recovered. DPWIFS must invest in the latest software to mitigate the system errors which can cause delays in procurement processes.

Recommendation 3 (Finding 3):

DPWIFS must benchmark to get the best practices from other departments that are already utilising e-procurement. There needs to be business continuity in case the system is down/crashes. Value-added networks (VANs), a distinctive technology that connects buyers and sellers and provides real-time information, are required to support this system in order to prevent needless complexity in product design and to ultimately reduce costs.

Recommendation 4 (Finding 4):

- i. DPWIFS should monitor and evaluate the performance of the e-procurement system on an ongoing basis. This will help the Department to identify any areas for improvement and ensure that the system is delivering the expected benefits.
- ii. DPWIFS should conduct a thorough needs analysis to identify the Department's specific procurement requirements. This will help the Department to identify the key features and functions that the e-procurement system should have.

Recommendation 5 (Finding 5):

- i. DPWIFS should undertake stakeholder education and thorough training. Early involvement of every relevant stakeholder will assist in gathering crucial user input and system improvement recommendations.
- ii. Colleagues, vendors, and suppliers will face less difficulties as they adjust to the new system if there is thorough training and relevant information is provided through videos, manuals, and information addressing frequently asked questions.

Recommendation 6 (Finding 6):

- i. DPWIFS is to communicate the new e-procurement implementation methodology and the impact thereof to management to ensure their buy-in for these changes. This will assist in getting management's support in convincing officials about the benefits this system can bring and promote an understanding of e-procurement and the advantages of adopting and using it.
- ii. DWIFS should communicate the benefits of e-procurement to all stakeholders, including employees, suppliers, and customers. This will help DPWIFS to build support for the implementation and encourage the adoption of the new system.
- iii. DPWIFS must ensure that computer and internet training is offered to both management and junior employees, as some of them are not computer literate and hence resistant to electronic systems and new technologies.
- iv. DPWIFS needs to follow emerging trends in procurement and use them to increase productivity and efficiency.

Recommendation 7 (Finding 7):

- i. The development of less expensive alternative energy sources is required to supplement electrical grid power sources. When there are power outages, these backup power sources could be used.
- ii. DPWIFS should invest in alternative power sources or back-ups like generators and solar panel systems to counter issues of lack of energy and power outages (load shedding).

Recommendation 8 (Finding 8):

- i. DPWIFS should apply for extra funding from the National Treasury for this system to be implemented as an addition under ICT infrastructure projects.
- ii. DPWIFS should provide comprehensive training and support to employees and suppliers to ensure that they are familiar with the new e-procurement systems. This training should include quarterly workshops and seminars. Training is to be arranged by the ICT Department.

Recommendation 9 (Finding 9):

- i. DPWIFS must first conduct a feasibility study before this system is adopted and implemented, and all the bottlenecks should be addressed before the implementation. Implementation must be configured in such a way that the DPWIFS will achieve value for money.
- ii. DPWIFS must ensure the ICT Department, SITA, and the National Treasury work together to make this system a success. The National Treasury, where most government systems are centralised, must support departments with enough budget allocation for the creation and maintenance of this system.
- iii. The system should have an interface with other existing transversal and financial systems for reporting (LOGIS, BAS, and CSD). The system must be audited regularly by internal and external auditors to ensure the smooth operation of the system and to ensure that no irregularities are taking place.

Recommendation 10 (Finding 10):

DPWIFS should get buy-in and support from key decision makers by clearly defining the goals and objectives of the e-procurement system – including cost savings, increased efficiency, and improved supplier management – to ensure that the implementation is focused and aligned with the Department's overall strategy.

Recommendation 11 (Finding 11):

DPWIFS should provide proper training by a relevant expert in the field and provide jobs to individuals as per their level of progress. DPWIFS should proceed with the proper assessment involving all personnel and their criteria and create an implementation plan

that involves all supply chain employees as well as the end-users to ensure that proper and sufficient training is provided.

5.4. Limitations of the Study

The main limitation of this research is that it is confined to the Free State Provincial Department of Public Works and Infrastructure (DPWIFS). The findings of the research will only be relevant to DPWIFS; however, these findings may be extended to other Free State Provincial Government (FSPG) departments because all the Free State government systems are centralised at Free State Provincial Treasury (FSPT). Consequently, although this study is focused on the DPWIFS, implementing its recommendations has to be done through FSPT and, as such, they will have to be implemented for all FSPG departments. The other limitation is that only DPWIFS officials participated in the study. It would have been preferable to recruit participants from all the FSPG departments to participate in order to get in-depth views over a large spectrum about the adoption and implementation of e-procurement.

Future research could examine the conceptual framework based on a different or broader population, given that the sample selected was from DPWIFS only. A small sample limited and biased views, therefore the population should ideally be expanded to all FSPG departments.

5.5. Conclusion

It is evident that the adoption and implementation of e-procurement would bring more benefits and advantages than disadvantages for the DPWIFS. Ensuring that the highlighted recommendations are properly implemented before implementation will assist in closing the gaps and bottlenecks that might be encountered in adopting and implementing this system.

Adoption and implementation of this system will benefit DPWIFS in many ways, including cost savings; less paper usage; elimination of human errors; adherence to the timeframe of invoices being paid within 30 days timeframe; improved, accurate, timeous reporting;

improvement of transparency and accountability; elimination of political interference, as everything will be done electronically and each user will be required to register with a username and password so that activities performed on the system can be traced; quality bidding; timely execution; reduced administrative burden; decreased financial and technological hazards; and ultimately increased supplier competitiveness.

The study recommends that DPWIFS invest more in ICT infrastructure for the better implementation of e-procurement, as described in this study, because if there is not enough budget allocated the recommendations of this study cannot be successfully implemented.

The study further recommends that, in order to prevent an internal conflict that could have a negative impact, there should be clear rules governing the behaviour of all stakeholders involved in the organisation to ensure the successful adoption and implementation of e-procurement.

LIST OF REFERENCES

- Adhabi, E. A. R., & Anozie, C. B. L. (2017). Literature review for the type of interview in qualitative research. *International Journal of Education*, 9(3), 1–12.
- Adjei-Bamfo, P., Domfeh, K. A., Bawole, J. N., Ahenkan, A., Maloreh-Nyamekye, T., Adjei-Bamfo, S., & Darkwah, S. A. (2020). An e-government framework for assessing readiness for public sector e-procurement in a lower-middle income country. *Information Technology for Development*, 26(4), 742–761.
- Afolabi, A., Ibem, E., Aduwo, E., & Tunji-Olayeni, P. (2020). Digitizing the grey areas in the Nigerian public procurement system using e-Procurement technologies. *International Journal of Construction Management*, 22(12), 1–10.
- Afolabi, A., Ibem, E., Aduwo, E., Tunji-Olayeni, P., & Oluwunmi, O. (2019). Critical success factors (CSFs) for e-procurement adoption in the Nigerian construction industry. *Buildings*, 9(2), 47.
- Aman, A., & Kasimin, H. (2011). E-procurement implementation: A case of Malaysia government. *Transforming Government: People, Process and Policy*, 5(4), 330–344.
- Anabo, I. F., Elekpuru-Albizuri, I., & Villardón-Gallego, L. (2019). Revisiting the Belmont Report's ethical principles in internet-mediated research: Perspectives from disciplinary associations in the social sciences. *Ethics and Information Technology*, 21(2), 137–149.
- Angrian, B., & Sahroni, T. R. (2019). Development of vendor management and eProcurement systems using android platform. *IOP Conference Series: Materials Science and Engineering*, 528, 1–9.
- Anthony, A. (2018). The use of e-procurement in South African public procurement law: Challenges and prospects. *Law, Democracy & Development*, 22(1), 39–4.

- Anthony, A. (2019). Re-categorising public procurement in South Africa: Construction works as a special case. *Potchefstroom Electronic Law Journal*, 22, 1–21.
- Republic of South Africa . 2020. Auditor-General South Africa. *Audit report 2019–20 – Free State Provincial Department of Public Works and Infrastructure*. AGSA.
- Auditor-General of South Africa. (2021). *Audit report 2020–21 – Free State Provincial Department of Public Works and Infrastructure*. AGSA.
- Awati, R., & Pratt, M. K. (2021b, September). *Definition: e-procurement (supplier exchange)*.
- Bag, S., Wood, L. C., Mangla, S. K., & Luthra, S. (2020). Procurement 4.0 and its implications on business process performance in a circular economy. *Resources, Conservation and Recycling*, 152, 1–14.
- Bakarr, A. (2020). *An assessment of the effects of e-procurement on performance* (1st ed.). Scholars' Press.
- Belisari, S., Binci, D., & Appolloni, A. (2020). E-procurement adoption: A case study about the role of two Italian advisory services. *Sustainability (Switzerland)*, 12(18), 1–18.
- Bhasin, H. (2023, February 21). What is e-procurement? Advantages and disadvantages. *Marketing 91*, 21 February 2023.
- Bienhaus, F., & Haddud, A. (2018). Procurement 4.0: Factors influencing the digitisation of procurement and supply chains. *Business Process Management Journal*, 24(4), 965–984.
- Bryman, A., & Bell, E. (2014). *Research methodology: Business & management context* (3rd ed.). Oxford University Press.

Chambliss, D. F., & Schutt, R. K. (2018). *Making sense of the social world: Methods of investigation*. (6th ed.). Sage Publications.

Chartered Institute of Procurement and Supply Management. (2022). *The definitions of procurement and supply chain management*. CIPS Australia.

Cooper, D., & Schindler, P. (2011). *Business research methods*. McGraw-Hill.

Das, D. D. (2021, July 23). *The advantages and disadvantages of e-procurement*. *Dragon Sourcing*, 23 July 2021.

Republic of South Africa. 2020. Free State Provincial Government. Department of Public Works and Infrastructure *Annual Report 2020*.

Department of Public Works and Infrastructure Free State. (2021). *Annual Report 2021*.

DevelopmentAid. (2020, October 9). *E-procurement in the development sector - getting aid online*. *DevelopmentAid Editorials*, 9 October 2020.

De Sousa Jabbour, A. B. L., Jabbour, C. J. C., Hingley, M., Vilalta-Perdomo, E. L., Ramsden, G., & Twigg, D. (2020). Sustainability of supply chains in the wake of the coronavirus (COVID-19/SARS-CoV-2) pandemic: Lessons and trends. *Modern Supply Chain Research and Applications*, 2(3), 117–122.

Dhull, S., & Narwal, M. S. (2016). Drivers and barriers in green supply chain management adaptation: A state-of-art review. *Uncertain Supply Chain Management*, 4(2016), 61–76.

Fourie, D., & Malan, C. (2020). Public procurement in the South African economy: Addressing the systemic issues. *Sustainability*, 12(20), 1–23.

Gill, P., & Baillie, J. (2018). Interviews and focus groups in qualitative research: An update for the digital age. *British Dental Journal*, 225(7), 668–672.

- Hallikas, J., Immonen, M., & Brax, S. (2021). Digitalizing procurement: The impact of data analytics on supply chain performance. *Supply Chain Management: An International Journal*, 26(5), 629–646.
- Ilhan, N., & Rahim, M. M. (2017). Benefits of e-procurement systems implementation: Experience of an Australian Municipal Council. In R. Shakya (Ed.), *Digital governance and e-government principles applied to public procurement* (pp. 249-266). IGI Global.
- Ivanov, D. (2020). Predicting the impacts of epidemic outbreaks on global supply chains: A simulation-based analysis on the coronavirus outbreak (COVID-19/ SARS-CoV-2) case. *Transportation Research Part E: Logistics and Transportation Review*, 136, 101922.
- Jandrell, S. (2018, April 19). What are the benefits of e-procurement? *Fraxion*, 19 April 2018.
- Järvinen, M., & Meyer, N. M. (2020). *Qualitative analysis: Eight approaches for the social sciences* (1st ed.). SAGE Publications.
- Kennedy, K. B. (2017). *Effects of e-procurement adoption on procurement performance of Kenya electricity generating company*. Kisii University.
- Khalil, C. A., & Waly, A. F. (2015). *Challenges and obstacles facing tenderers adopting e-tendering in the public sector of the construction industry in Egypt*. Proceedings of ICSC15: The Canadian Society for Civil Engineering 5th International/11th Construction Specialty Conference, University of British Columbia, Vancouver, Canada. June 7-10.
- Khuan, L. S., & Raman, S. R. (2018). *Emerging technologies for supply chain management*. WOU Press.
- Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B.,

- Bamberger, P., Bapuji, H., Bhave, D. P., Choi, V. K., Creary, S. J., Demerouti, E., Flynn, F. J., Gelfand, M. J., Greer, L. L., Johns, G., Kesebir, S., Klein, P. G., Lee, S. Y., . . . Vugt, M. (2021). COVID-19 and the workplace: Implications, issues, and insights for future research and action. *American Psychological Association*, 76(1), 63–77.
- Korir, S., Afande, F. O., & Maina, M. P. (2015). Constraints to effective implementation of e-procurement in the public sector: A survey of selected government ministries in Kenya . *Journal of Information Engineering and Applications*, 5(4), 59–78.
- Kosmol, T., Reimann, F., & Kaufmann, L. (2019). You'll never walk alone: Why we need a supply chain practice view on digital procurement. *Journal of Purchasing and Supply Management*, 25(4), 100553.
- Kumar, N., & Ganguly, K. K. (2021). External diffusion of B2B e-procurement and firm financial performance: Role of information transparency and supply chain coordination. *Journal of Enterprise Information Management*, 34(4), 1037–1060.
- Mafini, C., Dhurup, M., & Madzimore, J. (2020). E-procurement, supplier integration and supply chain performance in small and medium enterprises in South Africa. *South African Journal of Business Management* , 51(1), a1838.
- Magubane, K. (2017, September 27). SIU has a stack of reports to release on maladministration at SOEs. *Business Day*, 27 September 2017.
- Mahdillou, H., & Akbary, J. (2014). *E-procurement adoption, its benefits and costs*. University of Boras.
- Makoba, N., Nyamagere, G., & Eliufoo, H. (2017). E-procurement risks and mitigation: The case for Tanzania construction companies. *International Journal of Construction Engineering and Management*, 6(4), 180–186.
- Mikuriya, K. (2020). *Mapping tradetech: Trade in the Fourth Industrial Revolution*.

Insight Report. World Economic Forum.

Myers, M. (2019). *Qualitative research in business and management* (3rd ed.). SAGE Publications.

National Department of Treasury. (2020). *Office of the Procurement Officer*.

Nawi, M. N. M., Deraman, R., Bamgbade, J. A., Zulhumadi, F., & Riazi, S. R. M. (2017). E-procurement in Malaysian Construction Industry: Benefits and challenges in implementation. *International Journal of Supply Chain Management*, 6(1), 209–213.

Nawi, M. N. M., Roslan, S., Salleh, N. A., Zulhumadi, F., & Harun, A. N. (2016). The Benefits and Challenges of E-procurement Implementation: A case study of Malaysian company. *International Journal of Economics and Financial Issues*, 6(S7), 329–332.

Ngeno, K., & Kinoti, J. (2017). Effect of e-procurement on effective supply chain management process in energy sector in Kenya. *International Journal of Supply Chain Management*, 2(3), 18–37.

Nyumba, T., Wilson, K., Derrick, C. J., & Mukherjee, N. (2018). The use of focus-group discussion methodology: Insights from two decades of application in conservation. *Methods in Ecology and Evolution*, 9(1), 20–32.

Otundo, R. M. (2021). Automating procurement (e-procurement) and its benefits during the COVID-19 pandemic. *SSRN Electronic Journal*.

Patel, P., Kumar, S., & Khajuria, R. (2016). A study to identify factors that affect e-procurement implementation. *International Journal of Science Technology & Engineering*, 2(09), 264–268.

Pattanayak, D., & Punyatoya, P. (2020). Effect of supply chain technology internalization and e-procurement on supply chain performance. *Business Process*

Management Journal, 26(6), 1425–1442.

Perera, S., Nanayakkara, S., & Weerasuriya, T. (2021). Blockchain: The next stage of digital procurement in construction. *Academia Letters*.

Polonsky, M. J., & Waller, D. S. (2014). *Designing and managing a research project: A business student's guide* (3rd ed.). Sage Publications.

Praveen, N., & Khaliq, M. (2018). A general study for role of the quality in the e-procurement process. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, 3(1), 102–106.

Public Finance Management Act No. 1, 1999.

Purchasing & Procurement Center. (2021). *e-procurement-trends*

Ramkumar, M., Schoenherr, T., & Jenamani, M. (2016). Risk assessment of outsourcing e-procurement services: Integrating SWOT analysis with a modified ANP-based fuzzy inference system. *Production Planning & Control*, 27(14), 1171–1190.

Republic of South Africa. 1996. Constitution of the Republic of South Africa, 1996. Pretoria. Government Printers. Republic of South Africa. 2002. Electronic Communications and Transactions Act, 2002 (Act 25 of 2002). Pretoria. Government Printers.

Rukuni, T. F., Maziriri, E. T., & Mulaudzi, H. (2020). Assessing electronic procurement at a state-owned enterprise in South Africa. *Journal of Contemporary Management*, 17(2), 393–415.

Salamba, J. (2021). *The effect of using e-procurement during the covid-19 pandemic on the profitability of small and medium enterprises in Ilala district, Dar Es Salaam, Tanzania*. College of Business Education.

- Sekaran, U., & Bougie, R. (2013). *Research methods for business: A skill-building approach* (6th ed.). Wiley.
- Sithole, R. A. (2017). *Implementation of e-procurement by the Gauteng Department of Infrastructure Development and its impact on the development of small and medium construction firms*. University of the Witwatersrand.
- Duplicated.Toroitich, J. K., Mburugu, K. N., & Waweru, L. (2017). Influence of employee competence on the implementation of electronic procurement in the selected county governments in Kenya. *International Academic Journal of Human Resource and Business Administration*, 2(3), 242–254.
- Tracy, S. J. (2019). *Qualitative research methods: Collecting evidence, crafting analysis, communicating impact* (2nd ed.). John Wiley & Sons.
- Wolor, C. W., Solikhah, Susita, D., & Martono, S. (2020). How to maintain employee motivation amid the Covid-19 virus pandemic. *International Journal of Economics and Business Administration*, 8(4), 78–86.
- Wongsakul, S. (2015). *A case study on factors influencing e-procurement system implementation*. Mahidol University.
- Xerri, D. (2018). The use of interviews and focus groups in teacher research. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 91(3), 140–146.

Appendix 1: Research Study Permission Obtained

RESEARCH STUDY PERMISSION	 public works & infrastructure Department of Public Works & Infrastructure FREE STATE PROVINCE
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OFFICE OF THE HUMAN RESOURCES MANAGEMENT

Contact Person: Mr. Stan Diakos	Date: 25 March 2022
E-mail: diakoss@fsworks.gov.za	Tel: 051 492 3811 / 082 339 8481 Fax: 051
Our Ref.: Research study permission	Your Ref.:

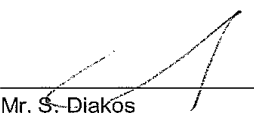
To whom it may concern:

RESEARCH STUDY

The purpose of this letter is to grant Mr. M. Kolobe permission to conduct research at Free State Department of Public Works and Infrastructure. The study titled, "**Effectiveness of e-Procurement at the Free State Provincial Department of Public Works and Infrastructure.**" It entails the adoption and implementation of e-Procurement within the organisation by way of a conducting interviews after which a strategy will be developed.

I do hereby grant permission for Mr. M. Kolobe to conduct the research study at the Free State Provincial Department of Public Works and Infrastructure.

Yours sincerely,



Mr. S. Diakos

Head: Human Resources Management

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Appendix 2: Focus-Group Discussion Guide

SECTION A: BIOGRAPHIC INFORMATION

This section will be dealt with during the introduction stage.

1. How many years have you worked for the DPWIFS?

0-5 years	6-10 years	11-20 years	> 20 years

2. What position do you hold in the institution?.....

3. What unit/department do you work for?.....

SECTION B: OPEN-ENDED QUESTION DISCUSSION GUIDE

Qualitative research face-to-face focus group question list on e-procurement

1. What is your understanding of e-procurement?
2. What are the advantages that an e-procurement system can have for the Department?
3. What are the disadvantages that an e-procurement system can have for the Department?

4. What are to your opinion some of the challenges for the implementation of e-procurement in the Department?
5. What recommendations could you make for the implementation of e-procurement?
6. Is there anything else you would like to discuss about this?