The digital transformation of the democratic election process:
Benefits and challenges

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

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Johannesburg

March 2022

ABSTRACT

Information Communication Technology (ICT) has been recognised as a key enabler for the transformation of government service delivery objectives. The adoption of technological innovation by government institutions ultimately leads to significant improvements in the lives of broader society. There are compelling deliberations for and against the digital transformation of electoral process. Electronic-voting (e-voting) has been successfully adopted in counties like Brazil and India however research also illustrate Ireland and Netherland has subsequently cancelled e-voting initiates. This study explores the acceptance of technology by utilizing the unified theory of acceptance and use of technology (UTAUT). This study amplify the UTAUT model by adding two additional constructs trust in technology (TT) and security expectancy (SE). The study secondary emphasis was to ascertain the correlation between predictor variables and behavioural intent (BI) to adopt e-voting .The outcome established there exist a significant coefficient path between the independent and dependent variable for effort expectancy (EE), social influence (SI), security expectancy (SE), and trust in technology (TT). The outcomes for performance expectancy (PE) does not illustrate significant coefficient correlation. A quantitative research approach was undertaken by using a cross-sectional research design. A fully structured closed questionnaire was developed from existing literature and distributed to participants via the internet. The information was collected from 140 participants which were further calculated by means of regression techniques, which supported this study research hypotheses. The study further recommends future research take into consideration the influence of the digital divide on the adoption of e-voting in the South Africa context. Establish a task team that is led by industry leaders who have successfully led transformation processes. This could be achieved through the creation of information-sharing sessions with broader society about the challenges and opportunities that the digital transformation process presents. Voter education drives could also offer experiential campaigns that illustrate the

benefits of e-voting and how society can benefit from the transformation process.

KEYWORDS

Digital Transformation, Electronic Voting (e-voting), Independent Electoral Commission, Security Expectancy, Trust in Technology, Effort Expectancy, Performance Expectancy, Social Influence (UTAUT)

DECLARATION

I, Hendrick Scheepers, declare that this research report entitled "*The digital transformation of the democratic election process: Benefits and challenges"* is my own work. I have acknowledged, attributed, and referenced all ideas sourced elsewhere. I am hereby submitting for fulfilment of the requirements of the degree of Master of BCA01 Master of Management at the University of the Witwatersrand, Johannesburg. I have not submitted this report before for any other degree or examination to any other institution.

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ACKNOWLEDGEMENTS

I would like to express my sincere gratitude and appreciation to my research supervisor: **Dr Manessah Alagbaoso,** your patience and insightfulness during our initial engagement really set the pace for a constructive and robust relationship. Your guidance and constrictive feedback throughout this process was highly appreciated.

Lastly, to my wife, your constant support and encouragement throughout this journey. Thank you for everything that you've done for me. You cannot imagine how much strength your support has given me during this difficult time. Thank you for your thoughtfulness and your words of encouragement. This achievement would not have been possible without you. Thank you.

LIST OF ABBREVIATIONS AND ACRONYMS

AVE	Average Variance Extracted
BI	Behavioural Intention
CR	Composite Reliability
CRM	Customer Relationship Management
DMM	Digital Maturity Model
DOS	Denial-of-Service
DT	Digital Transformation
EE	Effort Expectancy
EPRS	European Parliamentary Research Service
FC	Facilitating Conditions
G2C	Government-to-Citizens
HANIS	Home Affairs National Identification System
ICASA	Independent Communications Authority of South Africa
ICT	Information Communication Technology
IDEA	Institute for Democracy and Electoral Assistance
IEC	Independent Electoral Commission
IT	Information Technology
KPI	Key Performance Indicator
LGE	Local Government Election
PE	Performance Expectancy

SALGA	South Africa Local Government Agency
SARS	South African Revenue Service
SE	Security Expectancy
SEM	Structural Equation Modelling
SI	Social Influence
TAM	Technology Acceptance Model
TT	Trust in Technology
USA	United States of America
UTAUT	Unified Theory of Acceptance and Use of Technology
WWW	World Wide Web

CHAPTER 1. INTRODUCTION

The cornerstone of any thriving democracy is the right of its citizens to participate in democratic election processes that are free and fair. There is a strong association between voting and democratic process. Modern society uses the electoral process as a key instrument for holding elected representatives accountable. Representatives are elected to implement the demands and aspirations of society. Electoral processes are very fragile and are subjected to multiple challenges, such as declining voter participation, process inefficiencies and alleged fraudulent activities.

The Covid-19 pandemic has transformed society's daily dynamics and its effects will be apparent for years to come. The Covid-19 pandemic and the ever-changing global dynamics are compelling reasons for electoral institutions and governments to find alternative channels for collaborating with their electorates. These include the identification of new channels of communication that allow for remote interactions. The pandemic has exponentially driven the digital age. However, while the electoral process is considered a key fundamental for society, South Africa still uses the outdated system of paper ballots. One of the outdated components of the South African process is the physical casting of votes, which has the effect of undermining the electoral process and ultimately has a direct impact on the integrity of the outcomes of the democratic process. The physical electoral process during a pandemic highlights the need for the digital transformation of the democratic electoral process. The digital transformation of the democratic election process will improve operational efficiencies by accurately managing the voters' rolls and counting process, effectively storing voter information, and implementing technologies that accurately validate and authenticate voters with the aim of proactively decreasing the opportunity for fraudulent activities (IDEA, 2016).

1.1 Purpose of the study

This research is to investigate the benefits and challenges that are associated with the digital transformation of the democratic electoral process.

Furthermore, the research aims to analyse successful digital transformation process in Europe and South Asia that have leveraged the digital transformation of the democratic electoral process and how lessons and research from these case studies can be applied in the South African context.

1.2 Background of the study

E-voting and machine counting were introduced in 1973 in the United States of America (USA) and have been widely adopted in Asian and Latin American countries for their efficiency and accurate counting (Russell & Zamfir, 2018).

Countries where the electoral process has been transformed (Russell & Zamfir, 2018) are:

- Philippines: machine counting since 2010
- Mongolia: machine counting since 2010
- Namibia: machine counting since 2014
- Iran: voting machines in 2017
- Argentina: e-voting machines in 2017
- Iraq: machines for first time in 2018
- Russia: 10% of polling stations equipped with voting machines in 2018

Countries that tested e-voting but never implemented it (Russell & Zamfir, 2018) were:

- Paraguay: In the early 2000s the electoral commission borrowed voting machines from Brazil to pilot the process. In 2008 it returned to paper ballots.

- Germany: E-voting was piloted between 2004 and 2006 for the local elections. The e-voting process was cancelled by the Constitutional Court owing to transparency challenges**.**

- Norway: E-voting was piloted between 2011 and 2013. The implementation was stopped owing to public perceptions about online security.

- Bulgaria: The electoral commission planned to implement e-voting for the 2017 voting, but the process was cancelled because of challenges with the delivery of key equipment.
- Bangladesh: Voting machines were implemented for the 2018 national elections but were ultimately scaled down to limited regional districts.

E-voting has had its fair share of successful enrolments and unsuccessful process after the initial pilot phases were discontinued. Various countries are currently conducting pilot tests to ascertain the feasibility of implementing e-voting. A small country such as Estonia, which has been a driving force for e-voting, has been piloting e-voting since 2003, from local to national elections (Kiayias, 2010). The Estonian National Digital Identity Card forms the backbone of its Information Technology (IT) architecture and infrastructure to validate and authenticate voters. Brazil and India Electoral Commission have digitally transform their electoral process, while Germany and the Netherlands Electoral Commission have deactivated e-voting and have moved back to paper balloting. Thus, e-voting has drawn mixed responses, from adoption, to non-adoption, and later total abandonment of the system (Petitpas, et al.,2021).

E-government in the South African context

Information Communication Technology (ICT) has been recognised as a key enabler for transformation of government service delivery objectives. The effective deployment of ICT can assist with bridging the digital divide between those who have access to digital technology and those who do not and can create a socially inclusive information society (Farelo & Morris, 2021). The digital divide creates challenges for developing nations and sets up a barrier to providing universal access to government information services. The government-to-citizen (G2C) communication link, which makes use of ICT, includes activities where government

makes provision to offer citizens online access to government information and services. G2C enables citizens to download documentation, complete government transactions, renew driver licences and passports, and finalise tax applications (Chaushi et al., 2015).

The South African government has made significant progress in streamlining business process and developing a sustainable process for universal access to information and services. The adoption of ICT has enabled government to strengthen process, improve accountability and deliver services in a transparent manner (Farelo & Morris, 2021). The Batho Pele (a Sotho-Tswana term that means "People First") principles were used in the creation of a policy framework aimed at transforming the government services delivery philosophy from the traditional apartheid system to a more inclusive system that would enable society to hold public servants accountable for service delivery. Batho Pele advocates nine principles to guide public servants: setting service standards; increasing access to information; consultation with citizens; ensuring courtesy; openness and transparency; value for money; redress; and providing information (Visser & Twinomurinzi, 2008).

The adoption of technological innovation by government's institutions ultimately leads to significant improvements in the lives of society members. There are compelling instances that illustrate the benefits of digital transformations. The South African Revenue Service (SARS), for example, has implemented multiple digital innovations, which have transformed the user omni-channel experience, improving the ability of SARS to engage efficiently with society in a digital manner, eliminate paper, and significantly and effectively manage its risks (Ramoriting, 2022).

E-government can be describe as the adoption of ICT to encourage a more effective and efficient manner of governance that simplifies access to government information and services and offers quality services in a more transparent and accountable manner (Visser & Twinomurinzi, 2008). E-government has evolved further than electronic service delivery in its government transformation journey to create a more inclusive and participatory governance model that is based on partnerships to improve operational efficiencies.

E-participation forms part of an institutional transformation and is used to enable effective communication and engagement with society. It involves the effective use of ICT by civil society, political parties, interest groups and government within any political process to engage with a mass audience.

E-democracy applications are used to consult, engage with and provide information to society through using ICT during a political process (Visser & Twinomurinzi, 2008). Electoral process forms an integral part of any evolving and thriving democratic society. Sustaining a democratic process requires a good governance framework that creates an environment that enables the electorate to participate in a process that is free of interference, free of influence and managed in an efficient manner (Achieng & Ruhode, 2013). The voter participation rate is a key barometer for measuring societal satisfaction levels with elected officials. Participation in the electoral process signifies a key opportunity to measure the influence of ICT for political means by adopting e-voting to create an additional participation channel (Green & Schwam-Baird, 2016).

Electronic Voting (E-voting) can be broadly describe as the adoption of technologies and automated means for online registration, real time validation, electronically casting voting and efficient transmission of electoral results during the electoral process. In South Africa context, e-voting can be considered as an evolving tool for advancing the democratic process, cultivating faith in democratic process, promoting the credibility of the management of the Independent Electoral Commission (IEC) and increasing the overall operational efficiency of the entire electoral process (IDEA, 2016). Countries that have adopted e-voting have consequently seen an increase in voter participation, a reduction in operational cost, improved accessibility and faster tabulation of election results (Jaiswal & Kar, 2018).

There are various key considerations for electronic voting (e-voting) or the digital transformation of the electoral process as indicated by Elewa et al. (2015):

- **Authenticity:** An e-voting system should enable only eligible voters to participate.
- **Anonymity**: The system should be able to validate a user in real time to avoid the user duplicating votes or committing identity fraud.

- **Auditability:** It should offer the full ability to verify that votes are properly recorded.
- **Convenience:** It should enable voters to cast their votes from anywhere that offers comfort and convenience.
- **Flexibility:** It should offer interoperability for the seamless flow of information between various systems.
- **Integrity:** It should prevent votes from being modified or deleted.
- **Reliability:** It should offer functionality that makes provision for business continuity process in the event that there are any system failures.
- **Uniqueness**: It should offer effective monitoring and management of information flow.
- **Transparency:** Voters should be able to understand the overall system.
- **Secrecy:** Votes should be secret, and a voter must not have a record of voting choices.
- **Verifiability:** It should provide the ability to validate the accuracy of a count and to determine proactively if the process has been compromised.
- **Universal access:** It should afford all voters the right and ability to vote using the system.

In South Africa, the IEC has been assigned the responsibility of transforming the electoral process and identifying a complementary method to support its existing physical ballots. Since the dawn of the South African democracy, voting has been cast by secret ballot. The system has been openly criticised, however, for its perceived inefficiency, manual counting process, vote rigging and interference during the voting process. The Municipal Electoral Act 27 of 2000 grants the Electoral Commission the right to prescribe a method of voting. The South African Parliament has tasked the IEC with investigating the feasibility of digitally transforming the election process (Achieng & Ruhode, 2013).

The digital transformation of the democratic electoral process offers multiple benefits across all stages of the process, starting with voter registrations throughout

the process to actual computing of the ballots and transmission of the overall outcomes, as outlined below.

Voter registration process: Accuracy of the voters' roll is essential for the entire process, ensuring that only eligible voters are registered on the roll. Smart technologies can be used to extract data from national population data centres and validate and authenticate eligible voters. In addition, an online application can be developed where voters can register proactively (Russell & Zamfir, 2018).

Identity verification: Electoral staff have the responsibility of physically validating actual voters' details against the voters' roll. Biometric technologies that validate a voter's identification card against updated voter registration are available. These technologies can form part of the verification process to validate user data against the Home Affairs National Identification System (HANIS).

Vote casting: Voter illiteracy has increased the rate of spoiled ballots, where voters are unable to follow the instructions on the electoral ballot. The implementation of user-friendly technologies where the voter needs merely to press a button next to his or her preferred party logo or representative facial image can overcome this problem. Electronic technologies can be programmed to register only the first correctly cast vote, to avoid duplications (Russell & Zamfir, 2018).

Vote counting: Technology has the potential to improve the accuracy and efficiency of counting. Electronic counting creates efficient turnaround times, reduces the need for human intervention and has proven to be very cost effective (Russell & Zamfir, 2018).

Tabulation and transmission of results: This involves processing and reporting the results of the votes counted by a polling station to the main polling location. The physical collection and calculation of results from different polling stations nationwide are ineffective. The use of digital technologies to transmit the results electronically by computer offers the electorate consistent accurate information when each new polling station has finalised the necessary auditing process (Russell & Zamfir, 2018).

Support services: These are enhanced with the establishment of a communication centre that distributes validated information and offers technical support via multiple electronic networks, including call centres, email and chat bots (IDEA, 2016).

1.3 Research problem

The World Development Report of 2016 (IDEA, 2016) illustrates that the global average for voter turnout has been in steady decline over the last 25 years, with the average decreasing by more than 10%. The Institute for Democracy and Electoral Assistance (IDEA) records that voter turnout was initially low in post-communist countries; however, in the last decade both post-communist and established European democracies have seen a steady decline (IDEA, 2016).

Studies indicate a systematic shift in the historical socio-demographic factors: the very elderly and the youth are found to be the least interested in voting; men are more active than women; the educated in society are very active while people from lower income structures are less active; and people from rural areas are less likely to vote (Trechsel et al., 2016).

Since the inception of the democratic electoral process in South Africa, a decline in voter participation has been seen. The last comparison shows an 8% decline from the 2014 to 2019 elections (Grauvogel, 2016).

The November 2021 Local Government Elections (LGEs) illustrate a further loss of faith in the democratic process, recording the lowest voter turnout since the dawn of South Africa's democracy with only 46% of the voter listed on the voter roll of 26 million voters participating in these LGEs (Runciman et al., 2021).

Nonparticipation in the 2021 LGEs was largely driven by a combination of administrative and individual barriers. Factors leading to the decline are very complex, from administrative barriers and voters failing to register during the voters' registration weekend to technical challenges with online registration process and logistical challenges at voting stations. In addition, individual disengagement and disillusionment with service delivery and with promises from political leaders that never materialised, along with the increase in unemployment levels, had a negative

effect on the participation rate. These factors led to an overall decreasing confidence in the democratic process and high levels of mistrust that government will deliver according to the mandates assigned to it by society (Runciman et al., 2021).

Globally, declining voter participation is a clear sign of the need for urgent structural reform. Lower voter turnout rates do not reflect that societies are becoming less active in politics. On the contrary, forms of social activism, mass protest, civil unrest, mass movements and the use of social media to undermine governments' efforts are increasing. These have created a perfect storm for governments and electoral institutions to consider adopting alternative means to engage with society effectively. Government and legislators need to embrace the opportunity by repositioning themselves to re-engage society with the adoption of a transformation process that allows the populace to regain the trust of representatives of government and electoral institutions (IDEA, 2016).

Democratic electoral processes are part of the dynamic administrative processes for the establishment of democratic governments. As such, these processes are constantly confronted by sophisticated threats with the clear purpose of undermining public trust and system integrity. The emergence of cyber threat in the face of old infrastructure and technology further points to the usefulness of embracing the opportunity of digital transformation of the democratic electoral process.

Digitally transforming the democratic electoral process will enable the use of technology to online registration, real-time validate against the voters roll; enable voters to cast their votes; and provide speed and accuracy during the counting process. Transformation of the electoral process will alleviate some of the following challenges during the electoral process:

- Logistical challenges
- Increasing operation cost
- Remote locations with unstable access roads
- Challenges with access for people with disability
- Delayed result tabulation
- Access to real time results
- Minimize human Interference

For e-voting to be successful, it will have to make provision for the marginalised sections of community, provide greater transparency and improve the overall integrity of the electoral process. A key measure for determining the success of an election process is legislative compliance, with emphasis on whether the vote is free and fair, and without interference.

Literature reveals that offering voters an additional voting method will not necessarily have a positive impact on their participation (Petitpas et al., 2021). Voters with a strong belief in democratic processes will continue to vote irrespective of the additional method, while voters that have lost faith in the current democratic process will continue to abstain from voting (Petitpas,et al., 2021). A digitally transformed election process may not only benefit the continued participation of the willing voters but may also encourage greater participation and the embracing of the process by the voters that are currently unwilling.

Scholarly articles in favour of e-voting are focused on outcomes and implications specific to a particular country or region, and lack empirical data for other countries, including South Africa. This gap presents an opportunity for this research to explore the benefits and challenges associated with a digitally transformed election process and how this can be applied in the South African context.

1.4 Research objectives

The objective of this research study was to determine factors that will influence user behavioural intention towards the adoption of e voting.

The following research objectives were recognised for the study.

Research Objective 1

To determine the factors that will influence the voter's acceptance of e-voting

This part of the study ascertains the elements that effect the acceptance of e-voting in South Africa.

Research Objective 2

To determine the benefits associated with the digital transformation of the democratic electoral process

The second part of the study ascertains the benefits associated with the digital transformation of the electoral process in South Africa.

Research Objective 3

To determine the challenges associated with the digital transformation of the democratic electoral process

The third part of the study ascertains the challenges associated with the digital transformation of the electoral process in South Africa.

To accomplish the objectives of this study, a quantitative research methodology were used, applying a cross-sectional research design. The analysis provided insights on how the factors will influence user behavioural intention towards the adoption of e voting.

1.4.1 Research Questions and Hypotheses

The following research questions and hypotheses would guide the data collection aimed at addressing the problem statement and research objectives

Question 1: What are the factors that will influence the adoption of e-voting?

- Security expectancy (SE) has a positive influence on behavioural intention to use E voting***.***
- Trust in technology expectancy (TT) has a positive influence on behavioural intention to use E voting.
- Performance expectancy (PE) has a positive influence on behavioural intention to use E voting.
- Effort expectancy (EE) has a positive influence on behavioural intention to use E voting.
- Social influence (SI) has a positive influence on behavioural intention to use E voting.

Question 2: What are the benefits associated with the digital transformation of the democratic electoral process?

- Trust in technology (TT) has a positive influence on behavioural intention to use E voting
- Performance expectancy (PE) has a positive influence on behavioural intention to use E voting

Question 3: What the challenges associated with the digital transformation of the democratic electoral process?

- Security expectancy (SE) has a negative influence on behavioural intention to use E voting
- Trust in Technology (TT) has a negative influence on behavioural intention to use E voting

1.5 Significance of the study

To make a significant contribution, a research study should primarily address the empirical and other gaps identified in a research area that create a research problem. Hence, for the current study, it is important to articulate the significant contribution to knowledge of the digital transformation of the democratic election process by focusing particularly on the South African context.

Literature worldwide illustrates that the digital transformation of the democratic election process has no quantifiable effects on voter participation rates (Petitpas, et al.,2021). Studies in favour of e-voting focus on the outcomes and implications specific to a particular country or region, and lack empirical data for other countries, including South Africa. This gap creates an opportunity to analyse the outcome specifically in relation to how South Africans will respond to the digital transformation of the democratic election process.

Investing in digital innovations has transformed the engagement models of industries and societies (Sawy et al., 2016). The convergence of industry and technology promotes the creation of a Blue Oceans Market (Armstrong & Lee, 2021) and has the ability to bring separate user experiences and industries together. The

digital transformation of the electoral process will affect societal attitudes and conduct regarding the electoral process. The benefits and challenges associated with the digital transformation of the electoral process need further investigation in terms of how it will impact society in the South African context.

The digital transformation of the democratic election process in South Africa will create a complementary voting method that will potentially enable citizens to cast votes from a remote location by using electronic devices such as a computer laptop or mobile device. Transformation of the electoral process will potentially provide efficiency in the casting and counting of votes and improve accessibility for voters that are faced with socio-economic challenges, long travelling distances, health complications or work commitments.

1.6 Delimitations of the study

The study is limited to voters in the age category of 18 years and above in South Africa. The primary focus of this study is limited towards factors that will influence user behavioural intention to adopt e voting as a supplementary method to partake in the democratic process and benefits and challenges of transforming the electoral process in the South African context.

This study focused on eligible voters and excluded the the IEC, legislators and the executive that will significantly influence the transformation of the electoral process.

1.7 Definition of terms

The key terms used in this research report are defined below.

Blue Ocean Market can be broadly defined as the creation of new products or solution where there is currently no demand or competition for the product or solution in the market.

E-democracy "the use of ICT by governments to create equality, improve operational efficiency and improve access to government services" (G. David Garson, 2006)

E-government	the adoption of ICT tools which encourage good governance, with the development of an effective and efficient service delivery framework that simplifies access to government information and services and offers quality services in a more transparent and accountable manner(G. David Garson, 2006)
E-participation	the part of an institutional transformation that enables the institution to communicate and engage with society effectively. It involves the effective use of ICT tools by civil society, political parties, interest groups and government within any political process to engage with a mass audience.
Electronic voting	the adoption of technologies and automation ability to validate voters in real time, improve accuracy during counting process and the use of electronic devices to cast remote votes during the electoral process. On-site e-voting is managed by government representatives with e-voting machines at the polling station. Remote e-voting is not physically supervised but is conducted with mobile devices via sms and with computers via the internet,
Election	a formal process that enable individual to vote for a political party or representative
On-line voting	(e-voting) offers the user the possibility of casting an online vote, without physically visiting an actual voting station, through the use of a mobile device, computer or tablet from a place chosen by the user
Voting	the opportunity for the voter to freely express choices between registered candidates known to the public. Voting is the most important act in the protection of our democracy.

1.8 Assumption

It was assumed that eligible participants would have a good enough understanding of the benefits and challenges of digital transformation of the electoral process to be able to participate meaningfully in the study. There are various technical limitations associated with quantitative online questionnaires, participants are not given the opportunity to offer alternative views or provide additional clarification points. Extending the study beyond the context of the university would enlarge the sample group and offer diverse views.

1.9 Chapter outline

Chapter 1 articulates the overall view of the research study along with the purpose of the study, background, the research problem and the research questions addressed by the study.

Chapter 2 presents the literature reviewed to establish the theoretical background of digital transformation in civil processes, with an emphasis on the democratic election process. This chapter also reviews selected case studies from around the world where digital transformation has been applied to the democratic election process.

Chapter 3 presents the research methodology that was used to answer the research questions of this study.

Chapter 4 presents the results obtained from the investigation of the data collected and analysed.

Chapter 5 presents a discussion of the findings, in relation to the research questions drawn up for this study.

Chapter 6 presents the conclusions drawn from the study and recommendations for the IEC and South African government. It provides an overview of the limitations of this study and suggests areas for upcoming research studies.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature reviewed to establish the theoretical and organising frameworks of digital transformation in civil processes, with an emphasis on the democratic election process. This chapter also reviews selected case studies from around the world where digital transformation has been applied to the democratic election process. An overview of the literature reviewed is provided in Figure 2.1.

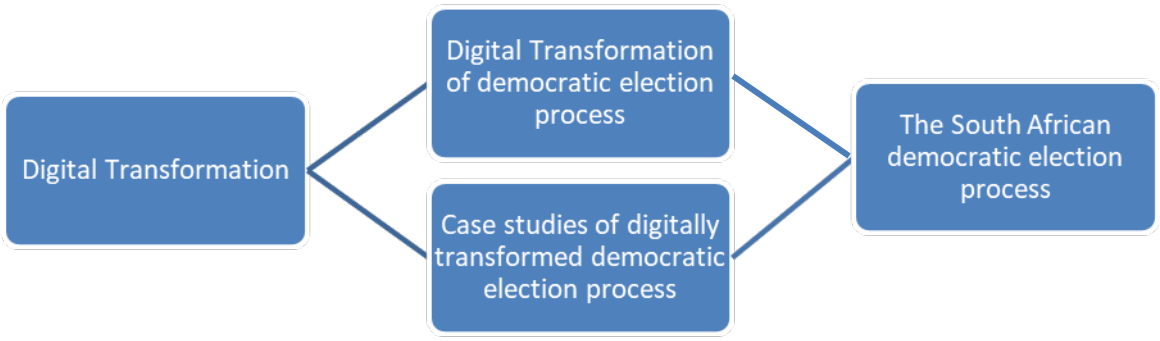

Figure 2.1: Overview of the Literature Review

2.2 Background of the discussion

The digital transformation of the electoral process aims to enable government and electoral institutions to achieve their strategic objectives, in the presence of profound technological change. In the current debate, the digital transformation of the electoral process has adversaries and admirers. Adversaries tend to highlight the security concern of cybersecurity crimes, while admirers point to industries that have successfully transformed such as the banking sectors, which have adopted smart technologies to validate and authenticate customers in real time (Vial, 2021).

2.2.1 The Digital Transformation Compass Framework

Digital transformation has the potential to unlock new innovative opportunities that enable institutions to create competitive advantage and sustainable business differentiators across the value chain (Lyytine, 2003). The adoption of digitally innovative processes leads to disruptive behaviour that enables cross-boundary interaction and industry transformation. This, in turn, has the effect of transforming the engagement model used by industries and societies (Sawy et al., 2016). The convergence of industry with technology can lead to the creation of Blue Ocean Markets (Armstrong et al., 2021) and can bring separate user experiences and industries together. The adoption of digital innovation has methodically changed the way that products and services are consumed, and institutions need to adopt digital innovations proactively to respond to new innovative opportunities and threats that will directly influence existing process (Westerman et al., 2014).

Digital transformation means the adoption of a significant digital transformation in the landscape so as to fulfil the user functionality and online security (Remane, 2017). With the amalgamation of various digital technologies we are witnessing industries that making profound modifications within their existing operational models and moving towards the digital era by accepting emerging disruptive technologies to improve operational efficiencies (Remane, 2017). In this digital world, societies are changing at a faster rate and undergoing sustainable development to have the options to recognize and adjust to the volatile environment. Societies/ User are therefore constantly confronted with decisions to embrace ’digital’ as an extension of their integral day to day functions, its therefore imperative to investigate the benefits and challenges of the adoption new technologies. This research will provide constructive insight and findings into to the adoption of e voting technologies. The user behaviour intention is a critical part of the overall purpose of this of this study, therefore the investigating the benefits and challenges of the Digital Transformation of the electrotoral process. The Digital Compass Framework (Westerman et al., 2014,) magnify the user considerations of the digital transformation process. The framework signifies a strategy how the society paves its way through a period of significant change because of the current evolving business transformation. The model focuses on the different phases of transformation, with creating awareness for the need to transform; building the

capacity to fulfil the vision; making provision for investment to support the transformation process; and sustaining the change with the necessary incentive scheme for fulfilling the vision.

2.2.2 Unified theory of acceptance and use of technology (UTAUT)

The key objective when it comes to democratic elections process in developing countries like South Africa, trust in the electoral process and the underlying technology are key enablers. The main significance of this research is to provide a model that can explain voter's behaviour intention towards the use e voting.

The Powell et al. (2012) investigated E-voting intent: a comparison between the young and the elderly voters. The main purpose of the study was to investigate factors that can affect a voter's intent to vote online. The results of Powell et al. (2012) findings shows that performance expectancy, effort expectancy, social influence, trust in the internet, and computer anxiety has significant effect on voters intention to use online voting, while trust in the government was insignificant.
The Choi and Kim (2012) investigated voter intention to use e-voting technologies. The study examines how users' perceptions of security principles, technology acceptance, election type, and political ideology affect their intentions to use e-voting systems. The study reveals that perceived usefulness, perceived ease of use, accuracy, and confidentiality have direct and indirect impacts on intention to use e-voting.The UTAUT framework consists of four main concepts Effort Expectancy (EE), Facilitating Conditions (FC), Performance Expectancy (PE) and Social Influence (SI). These main concepts are independent variables that influence the dependent variables of usage behaviour and behavioural intentions. Past experience, gender and voluntary use facilitate the effects of the four key factors related to user intention to use technology based on the usage experience. The UTAUT theory reflects that three key factors (performance expectation, effort expectation and social effect) are direct factors of behavioural intention to use technology, whereas the facilitating conditions are a direct factor for use behaviour based on experience.

In this current study, the researcher adopts UTAUT to understand the user's behavioural intention (BI) in the use of i-voting system by examining variables like performance expectancy (PE), effort expectancy (EF), facilitating conditions (FC) and social influence (SI) and integrated with trust constructs

2.3 Theoretical framework

In developing a theoretical framework for the study, the aims of the election process and agents involved in the process were considered. As digital transformation of the electoral process is aimed at enabling governments and their electoral institutions to achieve their strategic objectives and organisational purpose, it needs to deliver business outcomes rather than technological outcomes (Vial, 2021).

The following theoretical frameworks were considered for this study:

- (Westerman et al., 2014) Digital Transformation Compass was deemed an appropriate theoretical framework for assessing the potential benefits and challenges of the digital transformation of the democratic electoral process.
- (Venkatesh et al., 2003) Unified Theory of Acceptance and Use of Technology (UTAUT) theoretical structure underpins the theory for this study. UTAUT is a key instrument used by researchers to measure elements that impact user attitudes towards the adoption of (ICT), a key factor in this research.

2.3.1 The Digital Transformation Compass (Westerman et al., 2014)

The Digital Transformation Compass Framework consists of four sections that take a digital investment and mobilising the organisation to sustaining the digital transition. Each of these sections involves particular actions, as shown in Figure 2.2 below. These actions are described below the figure in relation to the digital transformation of an electoral process.

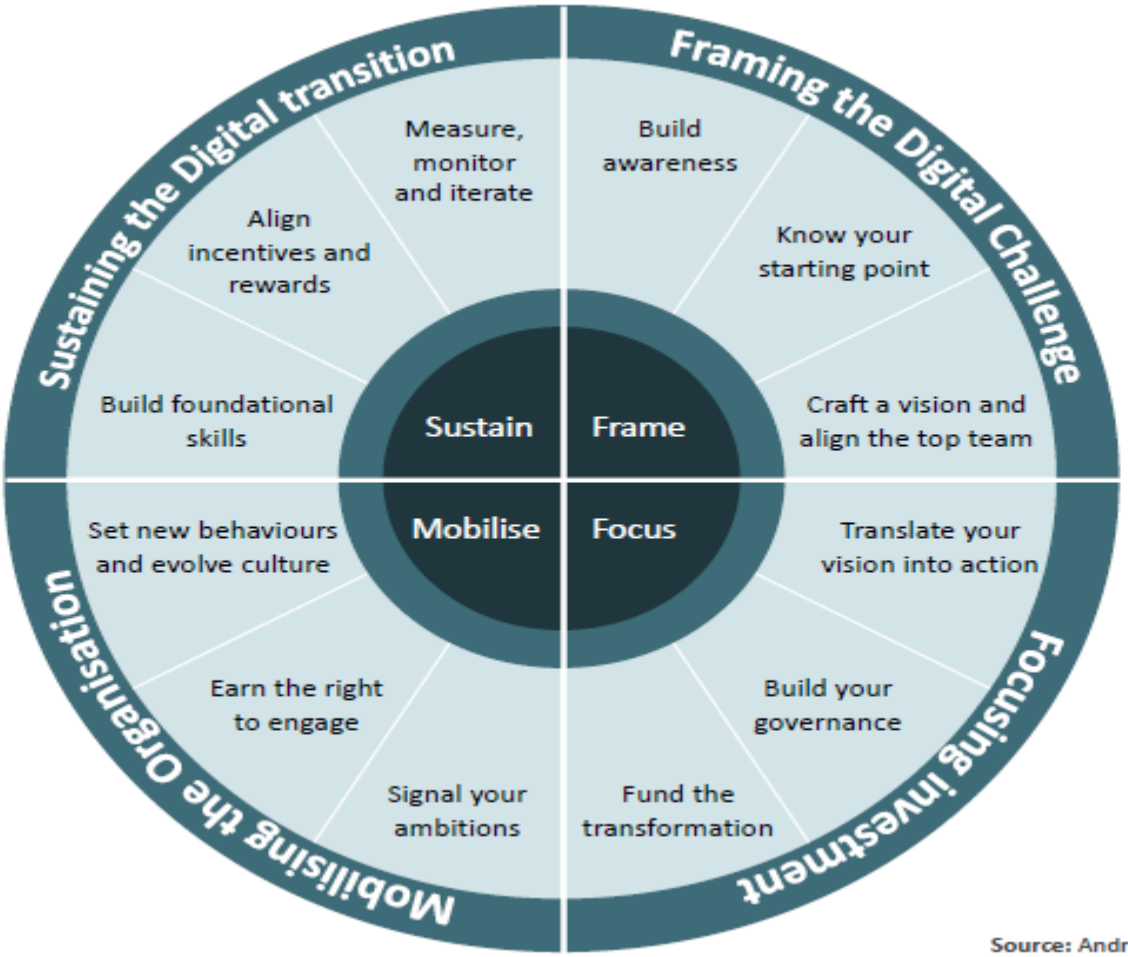

Figure 2.2: Digital Transformation Compass Framework (Westerman et al., 2014)

Frame the digital challenge

The biggest challenge to any transformation process is the lack of engagement from key stakeholders (Nonkqubela Jordan-Dyani, 2020). For the digital transformation of the South African electoral voting process, there must be emotional and intellectual awareness on the part of the IEC, legislators and the executive of the opportunities and challenges that the transformation process will present. Creating a climate for change involves beginning by establishing a sense of urgency through initiating conversations about how industry and society have successfully adopted transformation and the value creation that was derived from the process. To achieve this, the following processes are required.

- Build awareness: To build awareness the transformation agenda needs to be set and a task team established that is led by industry leaders who have successfully led transformation processes in the past. An information-sharing session needs to be set up with the broader society about the challenges and opportunities that the digital transformation process presents. At the same time an experiential campaign that illustrates how society can benefit from the digital transformation process can be run (Kotter, 2014).
- Understand your starting point: This involves determining the digital maturity levels of the institution by using digital tools and establishing the levels of digital and leadership capability. Discovery questions can be used to determine how low or high the South African industry measures on the digital maturity scale. The usage level of digital technologies can be determined to obtain a better understanding of the society and industry. Relevant questions include: What is the level of automation of core processes? What is the usage level of digital channels to communicate critical messages? Are means available to use digital tools to communicate effectively with society?
- Craft your transformative vision: For this a vision and strategy need to be developed that are clearly understood and can persuade stakeholders to become part of the change process. The vision should be communicated frequently and embedded within all initiatives of the institution (Westerman, et,al, 2014). It should also be differentiated as it will compete with all the other day-to-day communication within the institution. Ensure that the strategy and vision are specific, measurable, attainable, realistic and timely. Industry and society should be aligned in their understanding of the vision.

Focus investment

This involves transforming the vision into deliverables, building accountability and obtaining the relevant funding to implement the transformation process. A delivery action plan should be built with clear funding limitations. The funding should be authorised and the spending prioritised to drive the transformation agenda. A key performance indicator (KPI) matrix needs to be developed to measure performance against set deliverables. These processes are elaborated on below.

- Build a delivery roadmap: A roadmap should be designed with clear deliverables and built to include all stakeholders. An engagement model builds cohesive change that helps with the implementation process. It is useful to identify quick wins that illustrate that the process is starting to deliver results. The process should make provision for multiple iterations and self-correction. Clear rewards need to be offered for each deliverable.
- Build governance: A governance structure needs to be established to drive the transformation process, with clear coordination measures for the distribution of funding and key resources across the institution to fulfil the transformation agenda. It is necessary to create a climate of urgency and establish a standard adoption of process and procedure across the institution (Kotter, 2014).
- Demand for the money: A suitable funding model must be developed. The initial investment is key to set the agenda and enable the process to be scalable. The formation of a public / private partnership will drive the funding initiatives. A supply chain partnership initiative with the private sector should be formed with clear objectives and defined discount structures for IT equipment and infrastructure.

Mobilise the organisation

The organisation's new ambitions should be clearly signalled with a suitable message and the creation of an enabling and engaging model. The organisational climate should be open and engaging.

- Signal your ambitions: A message about the new imagined transformation process should be provided and this should be clear and unambiguous. A digital officer should be appointed to lead the transformation process and a digital channel should be created to communicate with key stakeholders, with digital tools such as social media, webcast, twitter and blogs to convey the envisage benefits. A consistent message needs to be sent out to avoid any confusion (Kotter, 2014).
- Earn the right to engage: The institution needs to lead by example where leaders adopt the philosophy "be the change you want to see". It should illustrate the benefits of the transformation process. The institution should be

empowered with digital tools that improve day-to-day activities and should appoint digital ambassadors that will drive the transformation process. The digital ambassadors can be used to illustrate the benefits of the transformation process. Success motivates, so wins should be communicated and celebrated.

- Set the new behaviours for the organisation: Digital technologies should be used to assist with the effective flow of information across all communication channels. The adoption of new ways of working, with the use of digital technologies, for daily routine tasks can be encouraged, with the acceptance of technology rather than deployment of technologies promoted. It is important to create a transformative culture, where continuous learning takes place, failure is tolerated and collective learning is encouraged (Armstrong, Lee, 2021). The new ways of working should be institutionalised, with the necessary support offered for the adoption of technologies and systems.

Sustain the transformation

Sustaining the digital transition involves creating resilience to avoid transformation fatigue and producing a climate that enables the workforce to contribute effectively to the overall institutional broader objective.

The transformation is sustained by building internal capabilities as follows.

- Build foundational capabilities: A digital maturity assessment will help to identify gaps and the development programmes required to address the gaps. Investment in skills development programmes and building internal capabilities is needed. The organisation should buy specialist skills, make provision for effective on-the-job training and transfer skills where necessary. Investing in digital training courses will fast track the transformation process. The adoption rate of new technologies must be leveraged, with the institution investing in reverse mentoring programmes where millennials assist senior personnel with the adoption of technologies (Meyer, 2011). Investment should be made in a digital platform that creates a bridge to society.
- Align reward structures to transformation goals: The institution should develop unambiguous KPIs that are aligned to incentives and rewards. The need for peer-to-peer recognition will contribute to the overall success of an

engaged institution. Institutions whose goals and objectives are aligned to reward systems perform more effectively (Westerman, et, al, 2014).

- Measure and monitor: Without a measuring system, the organisation is unlikely to be able to control its digital transformation. A strategic scorecard should be implemented to monitor and track performance against set objectives. There must be an ongoing review of the key objectives to align with broader institutional goals and objectives.

The Westerman model focuses on the different phases of transformation, with creating awareness for the need to transform; building the capacity to fulfil the vision; making provision for investment to support the transformation process; and sustaining the change with the necessary incentive scheme for fulfilling the vision. The IEC has been assigned the task of investigating the feasibility of digitally transforming the electoral process. As a key focus of the electoral process is to create a model for engaging with society to ascertain how this transformation will affect the IEC, the external environment and the marketplace.

2.3.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

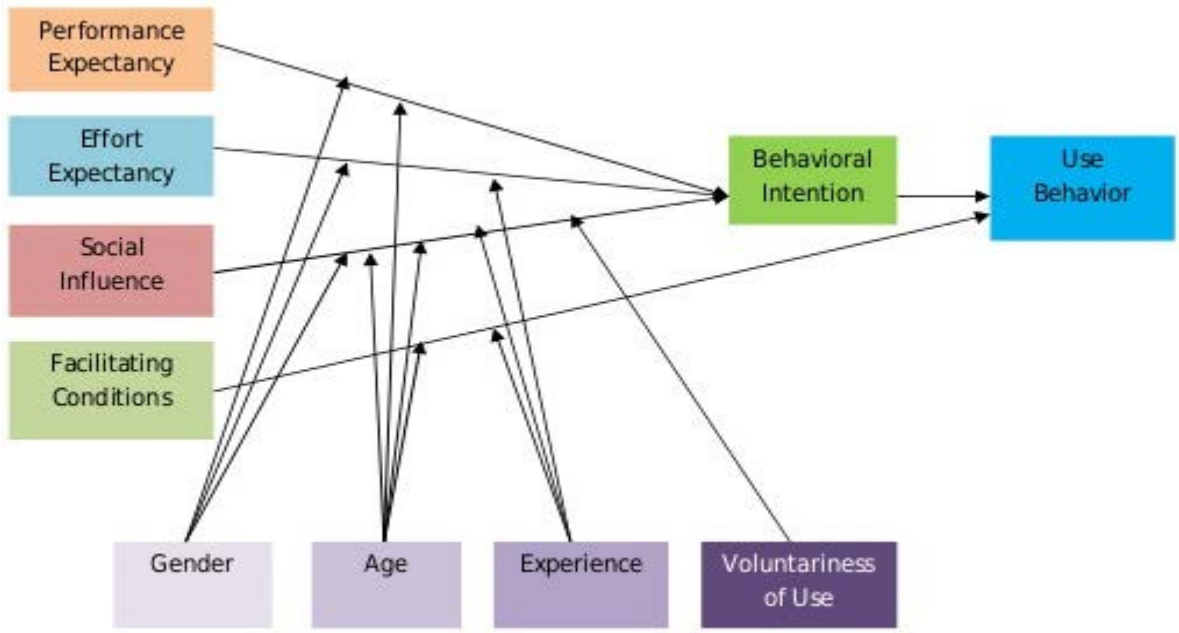

Figure 2.3: Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT (Venkatesh et al., 2003) theoretical framework supports this study. As the UTAUT framework have been used as an instrument by researchers to determine user attitudes towards the adoption of ICT in the context of government adoption of ICT tools (Williams et al., 2014), it was considered the most appropriate theoretical framework for this research.

Venkatesh et al. (2012) later suggested the UTAUT2 model, which further describes technology adoption based on a consumer framework. UTAUT2 includes consumer habit, hedonic incentive and price value as supplementary elements of technology acceptance. However, as this study's key focus is the adoption of technology for the fulfilment of democratic process, without the user having to pay a fee for utilisation of the system, the additional factors of UTAUT2 will not be applicable to this research. The most appropriate academic framework for this study is the UTAUT model. The hypotheses were developed on the basis of the framework. In addition to the four main concepts of the model, two others were considered as relevant to the current study. These are security risk expectancy and trust in technology.

Trust in Technology is key factor in determine user technology related views and behavioural intention to adopt new technology (Faisal et al.,2016). There is a common notion that say there is no moral agency in technology, therefore trust in technology illustrate the capabilities of technology and not its motives. Previous research studies by (Yurong et al., 2007) and Agbesi, (2020) have illustrated that user behavioural intent to adopt technology is influenced by trust in technology. Trust in technology is therefore an essential aspects that will impact voter behavioural intent to adopt e-voting and which have a direct impact on the voter participation rates (Faisal et al., 2016).

Security Expectancy is another factor that influence user adoption behaviour to use new technology. Studies by (Choi, et al.,2012) and (Yurong et al.,2007) have illustrated that confidentiality and accuracy are key aspects that influence user behavioural intent to adopt new technology. If user perceive e-voting solution as a reliable system that offer enhance security and confidentiality, the adoption rate of the system will be higher. It can therefore be interpreted that security expectancy can influence user behavioural intention to adopt e-voting.

Security risk expectancy: The extent to which a voter recognizes that the usage of technology for any online transaction or procedure will be secure and safe. Research by (Choi, et al., 2012) and (Yurong et al., 2007) illustrates that the user's perceived expectation that effective management of confidential personal information and accuracy of technology performance will take place will improve the user's behavioural intent to accept technology for the fulfilment of the electoral process. Any perceived uncertainty with technology will have a direct impact on the user adoption rate. If the user perceives that there is a risk that technology will not achieve its desired outcome, the level of adoption will be significant lower. Research by Elewa (2015) study reveals that an increase in cyber security attacks on government institutions will lower users' level of trust in the adoption of technology for the fulfilment of the democratic process. System vulnerabilities and security breaches influence user behavioural intention against the adoption of technology. The perceived security expectancy by users has a direct impact on their trust in technology, which influences their behavioural intentions of adoption (Jaiswal & Kar, 2018). Security expectancy was included as an additional variable, previous research by Choi, et al.,(2012) confirmed that security expectancy has substantial impact on user behavioural intentions to adopt technology for the fulfilment of democratic process and the following hypothesis was drawn up for this study.

H1: Security expectancy will have a substantial influence on behavioural intent to utilize e-voting systems

Trust in technology: The degree to which a user trusts that new technology will perform the activity in accordance with the user's expectations. Research by Chiang (2009) illustrates that behavioural intentions to adopt technology are influenced by the perceived trust in technology. If the user perceives that new technology has assisted government to transform its agenda to offer services in a convenient and efficient manner, this will have a direct influence on the acceptance of ITC tools for the transformation of the electoral process. Trust in the IEC as a reputable institute with the credibility to manage free and fair elections will have a direct influence on the acceptance of technology for the transformation of the democratic electoral process. Trust in technology was thus included as an additional variable that has a substantial effect on user behavioural intentions to cast votes with the assistance of

technology, which may influence users' participation in the democratic electoral process.

H2: Trust in technology will have a substantial influence on behavioural intent to utilize e-voting systems

Performance expectancy: The extent to which a user trusts that the adoption of new technology will improve operational efficiency and functionality of a specific task" (Venkatesh et al., 2003). Performance expectancy is a positively influenced behavioural intention based on age and gender. The adoption rate will improve according to the perceived effectiveness and improvement of the user performance while using the new system. Studies have illustrated that e-voting solutions have positively transformed user voting experience by enabling users to use technology to register on the voter rolls and conveniently cast votes in an efficient manner (Carter & Campbell, 2011). Users are able to participate in the democratic electoral process which offer flexibility and convenience to the electorate. Performance expectancy was included as a variable with a significant impact on user behavioural intentions to cast votes with the assistance of technology.

H3: Performance Expectancy will have a substantial influence on behavioural intent to utilize e-voting systems.

Effort expectancy: The extent to which ease of usage is associated with the adoption of new technology" (Venkatesh et al., 2003). Effort expectancy assumes that user acceptance is influence by the apparent effortlessness of usage of the innovative technology. Effort expectancy positively influences behavioural intention by age, experience and gender and in the current study concerns the user observation of the amount of work required to adopt the innovative voting system. If a lower effort is required from the user to complete the voting process, this will have a beneficial influence on the user's adoption rate. A higher adoption rate of smart technologies has proven to have a direct influence on the acceptance of new technologies to fulfil daily tasks. Thus, the following hypothesis was drawn up.

H4: Effort Expectancy will have a substantial influence on behavioural intent to utilize e-voting systems

Social influence: This involves “the extent to which social views from other users will influence the adoption of a new voting system” (Venkatesh et al., 2003). Social influence has a positive effect on behavioural intent by age, experience, gender and the voluntary usage of a system. Factors like personal experience, family influence and peers will directly influence the acceptance of new technologies. The adoption rate will improve once the user recognises that there is a strong social pressure to adopt any new innovative technology. A user will adopt a new e-voting solution on the basis of their observation that visiting a traditional voting station to fulfil the traditional voting requirement is perceived to be outdated and not progressive. According to Meyer (2011), the adoption of technology for the fulfilment of democratic process will be led by younger users, who are more acquainted with the use of technology for the fulfilment of basic daily tasks, while senior users have low trust levels in the ability of technology to fulfil daily tasks. The following hypothesis was drawn up.

H5: Social influence will have a substantial influence on behavioural intent to utilize e-voting systems

Behavioural usage: This is the extent to which the user makes practical use of new technology. Venkatesh et al., (2003) discovered that there is a direct and valid association between behavioural usage and behavioural intentions within the UTAUT model.

For this study the two supplementary independent variables, security expectancy and trust in technology were added as they were anticipated to improve the overall study aspects that influence the adoption and use of new apparatuses for the electoral process. These two factors were added to assist this study in achieving a more comprehensive view on the adoption and usage of technology for the transformation of democratic electoral process. The additional variables are essential for investigation given the challenges around e- voting.

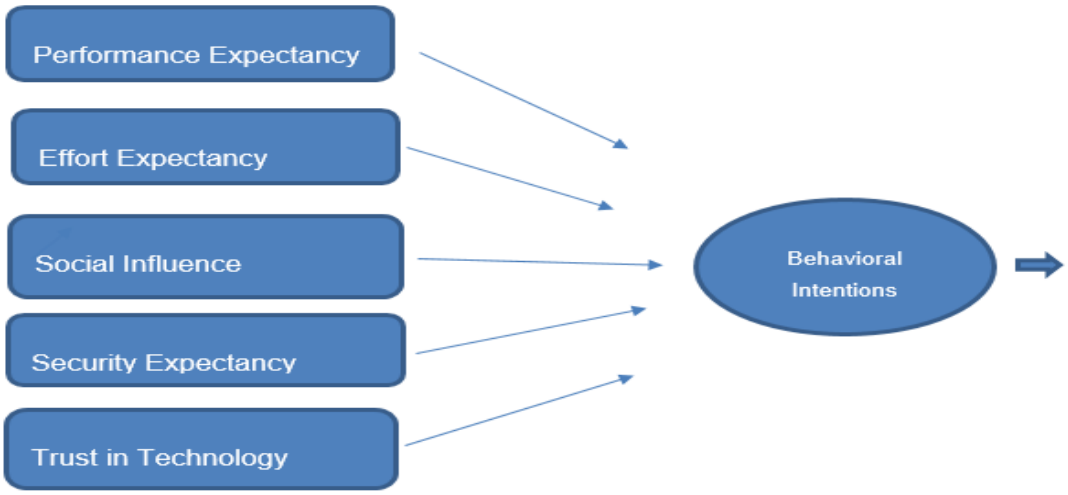

Figure 2.4: Suggested Research Model for this Study

Table 2.1: Explanation of Each Construct

Construct	Description
Performance Expectancy (PE)	The level to which the voter perceives e-voting as a useful tool
Effort Expectancy (EE)	The degree of effortlessness of usage related with e-voting
Social Influence (SI)	The degree to which voter recognizes the importance of external influence in determining to use e-voting
Behavioural Intention (BI)	The level to which an individual has framed an intention to use e-voting
Trust in Technology (TT)	The level to which the voter recognises a specific technology's competence
Security Expectancy (SE)	The level to which the voter perceives e-voting to be accurate and confidential

Table 2.2: Summary of the Hypotheses for this Study

Hypotheses	Description
H1	Security expectancy (SE) has a positive influence on behavioural intention to use e voting.

H2	Trust in technology expectancy (TT) has a positive influence on behavioural intention to use e voting.
H3	Performance expectancy (PE) has a positive influence on behavioural intention to use e voting.
H4	Effort expectancy (EE) has a positive influence on behavioural intention to use e voting.
H5	Social influence (SI) has a positive influence on behavioural intention to use e voting.

2.3.3 The Acceptance of new technologies

The acceptance of digital innovations has several advantages for institutions. It provides institutions with the ability to use digital technologies that leverage modern infrastructure. One such example is cloud computing, which promotes scalability, accuracy, efficiency and speed (Gustafsson, 2018). The use of digital innovations also enables institutions to create value for their shareholders by producing new enhanced services and/or products (Armstrong et al, 2021).

For an institution to adopt digital transformation fully, its digital strategy must be clearly communicated to all stakeholders; the workforce must be prepared, with staff afforded the opportunity to enhance their digital skills; and the institutional culture transformed. A working environment needs to be created that is sustainable and that enables stakeholders to contribute effectively towards the institution's broader organisational vision.(Rogers, 2016)

According to Meyer (2011), the process in which digital innovations are diffused into society indicates that individuals adopt new innovations at different stages of the transformation process. Institutions that recruit younger employees show a higher adoption rate of new technologies than those that employ older staff (Meyer, 2011). Early adopters will drive the adoption process. In terms of demographic segmentation, 13.5% of early adopters are aged 25 to 34 and 26% aged 18 to 24. Figure 2.5 shows the adoption rate of new technological innovations within the early and mainstream markets.

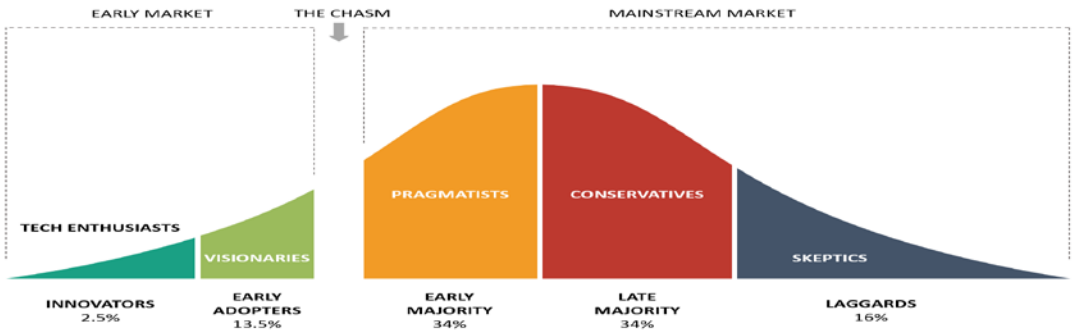

Figure 2.5: Adoption Rate of New Technological Innovations (Meyer, 2011)

2.4 Case studies of digitally transformed electoral process

2.4.1 Successful transformation

Brazil has digitally transformed its electoral process, with e-voting used since 1996 and biometric technologies effectively implemented to assist with voter validation and authentication since 2012. The Brazil Electoral Commission has made funding available for continuous improvement of overall system security, by implementing an annual hacking competition to ascertain if the system requires any additional security features. The Brazil Electoral Commission offers all registered parties access to vote counting machines to conduct an independent auditing process (Kiayias, 2010).

India conducted pilots with e-voting from 1982 and the digital transformation of the Indian electoral process was effectively adopted in 2000. This transformation involved the use of an e-voting machine, which is a standalone device with a programmable one-time-password chip. The device consists of two parts: controlling units and balloting units. The balloting units enable the voters to move to the next button to identify the applicable candidate or party logo. The controlling units are operated by the polling officer and enable voters to cast their votes by selecting the applicable candidates and confirming that correct nomination. If the wrong button is pressed, a voter has the option to remedy the selection. Once the vote is confirmed, the balloting units switch off (Kiayias, 2010).

Indonesia, with the fifth-largest population in the world, adopted biometric technologies in 2019 to register and validate the approximately 190 million people that made up its electorate. A centralised database was created to validate voter information during the registration process and technology used to improve the accuracy of the voters' register. E-voting and machine voting have improved voting efficacy and prevented human interference during the voting process (Pratama & Salabi, 2020).

2.4.2 Unsuccessful transformation

The Irish Electoral Commission endeavoured to introduce e-voting in 2004 for the national and local elections. During the implementation process, there were indicators that society was not ready for the adoption of e-voting as an additional voting method. More than 50 billion euro were invested in IT infrastructure and public experiential campaigns. Weeks before the election was due to start, the process was stopped owing to public opposition. The following concerns were cited: lack of system traceability, concerns about data integrity and fears that the system was open to external manipulation (Zelić & Stahl, 2005).

E-voting was introduced during the 2006 local elections for the Amsterdam region as the last municipality in the Netherlands to do this, the vast majority of municipalities in the Netherlands having adopted e-voting some time before. In the same year an opposition group formed with the campaign "We do not Trust Voting Computers". The opposition group cited concerns around the lack of system auditability and accused government of outsourcing the elections to equipment manufacturers. The Netherlands' electoral commission appointed an independent security task team to investigate these claims. The investigation revealed that memory chips in the voting machines could be replaced, which allowed the results to be manipulated. Further security vulnerabilities were raised, such as the potential for cybersecurity attack and the lack of data integrity. Electronic voting was officially cancelled on 1 October 2007 by the District Court of Amsterdam and on 21 October the 1997 regulation that approved voting machines was withdrawn by Parliament (Goldsmith & Ruthrauff, 2013).

France adopted an e-voting system for citizens abroad in 2012. However, after reports that the USA election results of 2016 had been compromised, in 2017 the French electoral commission announced the prohibition of Internet voting technology for voters abroad, owing to the increased risk of cyberattack (Pratama & Salabi, 2020).

2.4.3 Analysis of Successful and unsuccessful transformation process

Table 2.3: Analysis of E-voting success in Brazil India, and Indonesia

Country	Year Implemented	Success Factor	Challenges
Brazil	1996	• Reduction of electoral fraud • Empowering illiterate voters • Reduction of invalid votes • Political parties access to source codes for auditing • Reliability of the machines by using paper-trail machines to produce paper-trail	Questions about security of the voting machines
India	1999	• Simplicity of voting machine (EVM) • Speed of vote counts • Reduction of invalid ballots	• Perception of election irregularities • Security vulnerability • Perception of lack of transparency • Cost of the e-voting machines • Illiteracy • Unfamiliarity with Technology
Indonesian	2019	Widespread internet penetration • A legal structure that addresses internet voting issues • An identification system that allows for digital authentication of the voter • A political culture that is supportive of internet voting	• Cyber-attack vulnerability

Table 2.4: Analysis of E-voting Failures in Ireland, Netherlands, Paraguay and Germany

Country	Year Adopted	Year Abandoned	Reason of failure
Netherlands	1994	2007	• Concerns about lack of transparency due to secrecy • of the source code and evaluation reports • Lack of verifiability of the machines • Lack of trust
Germany	1998	2009	• Concerns about constitutionality of the use of voting machines. • Concerns about the possibility of hacking the voting • system (Security) • Lack of transparency
Paraguay	2001	2008	• Opposition political parties opposed the use of e-voting machines preferring paper voting
Ireland	2002	2009	• Concerns about the accuracy of the voting system. • Concerns about possible violations of the vote secrecy caused by: i. the beeping of the voting machine ii. plans to publish full details of all votes cast • Concerns about trust due to the absence of a voter verified audit trail

2.5 Benefits and challenges of a digitally transformed electoral process

2.5.1 Benefits associated with the digital transformation of the democratic electoral process

Digital transformation has the potential to enable the South African government and IEC to achieve their strategic objectives and organisational purpose in the presence of profound technological change. The digital transformation of the democratic electoral process offers multiple benefits across all stages of the process, starting with voter registration and continuing to the actual counting of the ballots.

Benefits include the following:

- Voter registration process: For this process, smart technologies can be used to extract data from national population data centres and validate and authenticate eligible voters, along with the development of an online application where voters can proactively register (Wolf, 2017).
- Identity verification: Biometric technologies can be implemented to validate a voter's identification card against current voter registration, with a verification process to validate the user data against the HANIS (Ophelius, 2017) .
- Vote casting: User-friendly technologies can be implemented that enable the voter merely to press a button next to his or her preferred party logo or representative facial image. Electronic technologies can be programmed to accept the correctly cast vote once only (Russell & Zamfir, 2018).
- Vote counting: Technology can be used to improve the accuracy and efficiency of counting. Electronic counting provides efficiency in turnaround times, reduces the scope of human interventions and has proven to be very cost effective (Russell & Zamfir, 2018).
- Tabulation and transmission of results: Digital technologies can be used to transmit the results electronically by computer, which offers the electorate consistent accurate information when a new polling station has finalised the necessary auditing process (Russell & Zamfir, 2018).
- Support services: Communication centres can be set up to distribute validated information and offer technical support through multiple electronic networks, including call centres, email and chat bots (Westerman et al, , 2014).

The adoption of ICT and infrastructure has enabled institutions to render services and provide information to society with the use of electronic communications. Since the evolution of the World Wide Web (WWW) and ICT, institutions have radically transformed their engagement models into more inclusive services delivery models. Institutions have adopted ICT tools to address the ever-growing needs of consumers and to be able to adapt continuously to new emergent challenges. Furthermore, institutions have seen opportunities for value creation, value adding to service delivery and expansion of digital ecosystems (Mphindi, 2008). The adoption of ICT has been a key enabler in driving down operational cost and improving operational efficiencies. A key ICT innovation has been the acceptance ICT tools to drive down

operational cost and improve operational efficiencies. Countries like India and Bil and India that have adopted e-voting systems have illustrated that embracing innovation ICT has made their electoral processes more efficient and secure (Jaiswal & Kar, 2018). E-voting is somewhat different from traditional manual paper-based voting. Firstly, e-voting is not limited to a geographical location: the system enables voters that have access to a mobile device or computers with internet access to cast a vote from any suitable location. Secondly, e-voting systems require that voters have some technical ability to operate a computer or smart device. Thirdly, unlike in traditional voting, where the voter is authenticated with proof of an identification document, with e-voting the voter is authenticated in real time with smart biometric tools. E-voting offers technical efficiency and operational efficacy in comparison to traditional manual paper voting (Carter & Campbell, 2011). E-voting can be seen as being more innovative than its predecessors, manual voting and can be interpreted as beneficial on the basis of the user's trust in technology (TT) and performance expectancy (PE). The following hypothesis was drawn up for this study.

Table 2.5: Hypotheses related to Benefits of the Digital Transformation of the Electoral Process

Hypotheses	Description
H2 a	Trust in technology (TT) has a positive influence on behavioural intention to use e voting
H3 a	Performance expectancy (PE) has a positive influence on behavioural intention to use e voting

2.5.2 Positive influence of digital transformation on the voter participation rate

A qualitative research study conducted in Estonia by Kiayias (2010) illustrated that most candidates understood that e-voting would have a significant impact on voter participations rates during the electoral process. E-voting enables voters to cast their votes without having to visit an actual voting station (Kiayias, 2010). The evolvement of e-voting systems may motivate society to partake in democratic

process that restore participation rates in the democratic process, with the question asked: “If citizens will not come to the polls, why not bring the polls closer to the citizens?” Where a large percentage of a country’s population has access to the technology required to participate in e-voting, such as in the USA, where 83.8% of households have access to the internet, the digital transformation of the electoral process may improve voter participation rates (Warkentin et al., 2018).

The hypothesis that internet connectivity automatically means that households will participate in online elections is erroneous, however. A variety of other social implications need to be considered, such as zero rating the services and offering quality assurance systems that ensure personal information will be safe and secure.

2.5.3 Challenges associated with the digital transformation of the democratic electoral process

Notwithstanding all the possible benefits of digitally transforming the electoral process, any information asymmetry related to security and trust in technology will performance as potential barriers to the acceptance of e-voting.

Challenges include the following:

- Denial of services: There has been an increase in denial-of-service (DOS) attacks on government institutions. These are cyberattacks on institutional infrastructure by multiplying automated requests at high frequency, with the aim of overloading the system or the control of capabilities (Elewa, et al., 2015).
- Malicious payloads: These software configurations are programmed to harm personal devices, and this suggests that e-voting can enact a great security risk. Malicious payloads can involve the use of trojan horses, worms or viruses that can harm the integrity of secret voting (Elewa et al., 2015)
- Spoofing: Sites that are designed to imitate certain web pages by appearing to have similarities to the original website can redirect the voter browser to a malicious web server. Such web pages can be used for phishing attacks to obtain voters’ personal information such as passwords or pins that are required for them to vote (Elewa et al., 2015).

- Man-in-the-middle attacks: These involve the deployment of fraudulent servers that mask themselves as the official servers by altering access to the original servers. To protect official servers against man-in-the-middle attacks, a digital signature must be developed and applied to the ballot to ensure that the verification of the voter submitting the ballot is correct (Elewa et al., 2015).
- Integration cost: There is a high cost associated with integrating legacy systems with new technologies, including the cost of improving inadequate human resource capacity to procure and implement complex IT systems. Annual maintenance and support fees create an opportunity for rent seeking, which is a deterrent for the adoption of new technologies (Wolf, 2017).
- Business contingency processes: These are needed to deal with infrastructure-related challenges, such as the inconsistent supply of electricity. The ability of Eskom, which is the main supplier of electricity to the South African population, to provide consistent electricity has been in steady decline since 2015 (Calitz, & Wright, 2021).
- Affordable Internet access: The Independent Communications Authority of South Africa (ICASA) has once again delayed the start of the highly anticipated spectrum auction. The regulator last allocated spectrum to Vodacom and MTN in 2004 and 2005 respectively Faster and affordable Internet access is essential for the development of universal access to e-commerce and e-government services.

Essex (2017) illustrated how electoral officials can manipulate the elections outcomes and gain access to voter's personal confidential information. Breaching privacy laws and legislative compliance will negatively influence the voter's behavioural intention to accept of new technologies. Personal devices and home computers have been identified as the weakest link in the e voting process. Personal devices vulnerable to a variety of cyber security attacks (Elewa et al., 2015).

Digital transformation of the electoral process offers a variety of prospective advantages that are attractive; however, the security expectancy (SE) and trust in technology (TT) provide challenges. The following hypothesis was drawn up for this study.

Table 2.6: Hypotheses related to Transformation Challenges in the Electoral Process

Hypotheses	Description
H1 b	Security expectancy (SE) has a negative influence on behavioural intention to use e voting
H4 b	Trust in Technology (TT) has a negative influence on behavioural intention to use e voting.

2.5.4 Trust and credibility associated with the digital transformation of the democratic electoral process

Voter trust is especially important in the digital transformation of the electoral process, as identity theft would enable third-party access to sensitive voting information. Breaching the principle of secrecy and confidentiality. If there are any additional social complexity issues with online applications, people have been found to abstain from online voting (Russell & Zamfir, 2018).

Trust is a key factor in driving active participation. To improve the credibility of the South African electoral process, the IEC will have to illustrate that the process is free from any external interference and the integrity of the process is uncompromised. Identification of suitable smart technologies to assist with verification and authentication before any votes are cast will be important (Russell & Zamfir, 2018).

2.6 Organising framework

The following research organising framework guides the conduct of this study. The aim is to leverage existing theory base and case studies of both successful and unsuccessful execution of e-voting to determine outcomes that are applicable in the South African context.

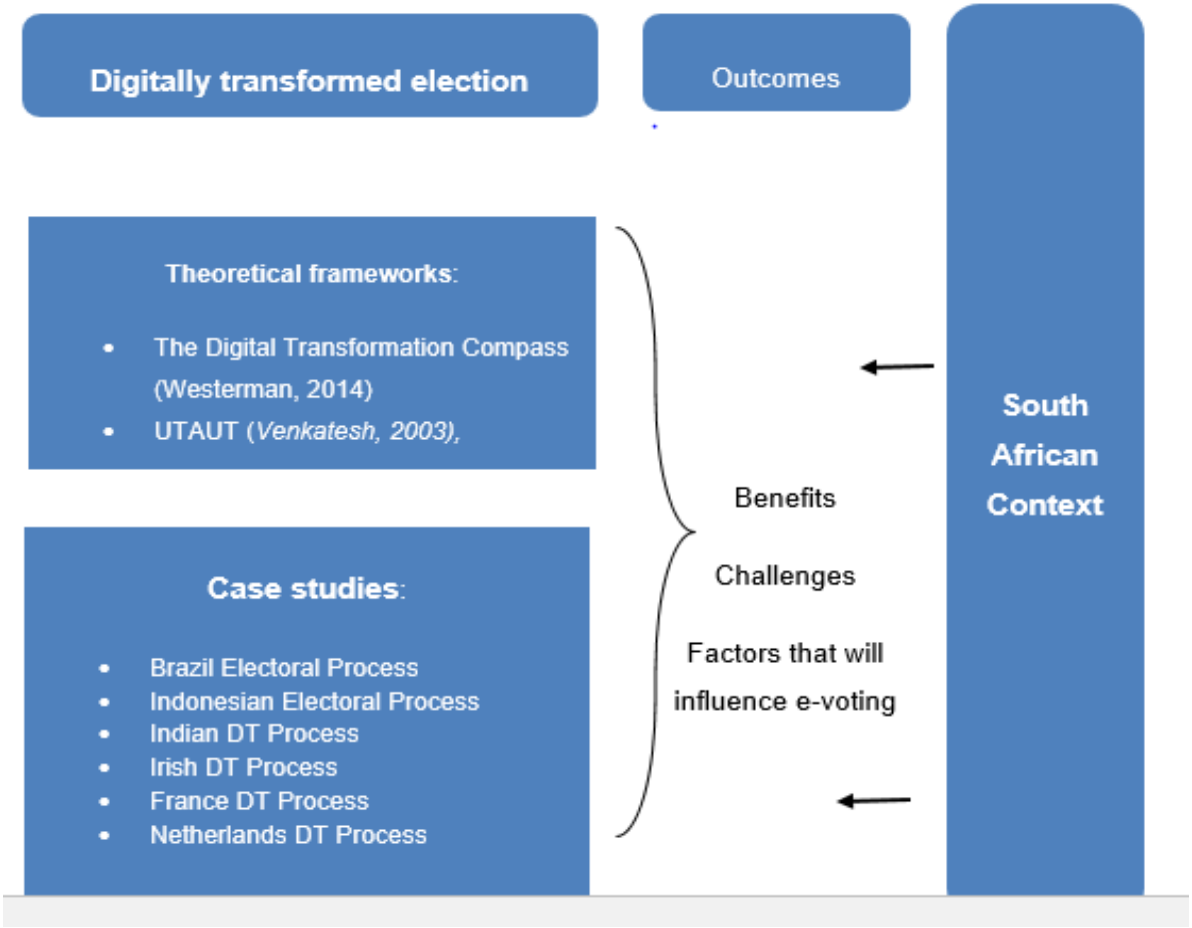

Figure 2.5: Organising Framework

Adoption of the digital transformation of the democratic election process

Globally, online voter participation during the 2005 to 2014 electoral process grew by 28%. Canada, Brazil and France have tested e-voting on a very narrow scale and the results have illustrated an increase in voter participation (Warkentin et al., 2018). However, the referendum for the Zurich federal election did not yield positive results regarding e-voting. The final outcome of the Zurich referendum conclude was that e-voting offers convenience over the traditional ballot voting. Norway implemented e-voting, with biometric tools to validate voter identity, in 2011 but subsequently deactivated it in 2013. Public distrust in the data security was cited as the reason for the deactivation (Vassil et al., 2016).

The introduction of a process such as e-voting that complements traditional voting practice will have to go beyond convenience to persuade the IEC to adopt a new

electronic process. Key factors such as security, integrity and inclusiveness will have to be top of mind.

South African context

South Africa's current population is estimated at 60 million (UNDESA, 2015) The country is divided into nine provinces with an estimated 20 000 voting stations. The IEC is responsible the administration of the election process. Since the dawn of the South African democracy, voting has been cast by secret ballot. The system has been openly criticised for its perceived inefficiency, manual counting process, vote rigging and interference during the voting process (Andrew & Josephine, 2019). Printing, distribution and storage of ballot papers have proven to be very expensive. Issues associated with the allocation of human resources for the capturing of data on legacy systems further highlight the challenge. Paper-based voting is time consuming and is associated with following challenges.

- Long queues caused by a shortage of ballots or human resources
- Human errors during the data-capturing process
- Ballots disappearing from polling stations
- Inconsistent trading hours as a result of no or late delivery of ballots
- Increased number of spoiled votes, which become invalid ballots
- Extension of the ballot owing to the increasing number of new political parties
- The need for the ballot to make provision for all 11 official languages

Currently, the IEC has been assigned the responsibility of transforming the electoral process and identifying a complementary method to support its existing physical ballots (Dhlamini, 2020).

Estonia's use of e-voting at local elections showed a moderate success. Estonia's first online voting was conducted in 2005, with elections that enabled voters to use the internet to cast electronic votes remotely. Voter turnout increased from 58% in 2003 to 61.9% in 2007, to 63.5% in 2011, and 64.2% in 2015 (Kiayias, 2010). The voter participation rate for the national and local in South Asia and Europe have illustrated a significant increased after e-voting was adopted. A key consideration in

the adoption of e-voting was to streamline the process and offer the voter flexibility and convenience during the electoral process. (Vassil et al., 2016). As Estonia has a voting population 1.3 million, the South African electoral process would require smart technologies that are scalable to ensure that the vote was inclusive of the entire active voting population on the voter register (Russell & Zamfir, 2018).

Recent studies have illustrated that effective management of information asymmetry improves the adoption level of and trust in technology (Mavlanova et al., 2012). Failure to adequately manage any uncertainties and information asymmetry leads to the so-called “market for lemons”, which will negatively influence voters’ behavioural intention to accept new innovative solutions. Trust has a direct impact on usage perceptions, which can negatively impact the behavioural intent to accept e-voting (Agbesi, 2020).

2.7 Conclusion of the literature review

This chapter provides the details of the literature reviewed, with the aim of adequately addressing the research objectives for this study.

The first research objective being to explore the factors that are likely to influence a voter’s adoption of e-voting in South Africa. The correlation between a voter’s behavioural intentions and related factors such as security expectancy, trust in technology, performance expectancy, effort expectancy and social influence were explored following use of the UTAUT framework.

The second research objective is to explore the benefits associated with the digital transformation of the democratic electoral process in South Africa. To do this case studies of various countries that have approached the digital transformation of their electoral systems were explored. Brazil and India have successfully adopted e-voting, while Ireland and the Netherlands have deactivated e-voting and have deactivated the e-voting solutions and have moved back to paper balloting. Thus, e-voting has drawn mixed responses, from adoption, to non-adoption, and later total abandonment of the system (Petitpas et al., 2021).

The third research objective is to explore the challenges associated with the digital transformation of the democratic electoral process in South Africa.

The literature reviewed included cases from European and South Asian contexts and thereafter the South Africa market. The literature review was aimed at gaining a better insight into how the South Asian and European market managed the transformation process and how the process would impact the South African society if the systems were to be adopted.

CHAPTER 3. RESEARCH METHODOLOGY

This chapter discusses in detail the research design and methodology used for this study. The logical stance of existing literature and the research problem were used to identify the most relevant options in selecting the methodology. More precisely, the chapter provides a clear guideline about why a quantitative approach was chosen as the most appropriate for this research.

3.1 Research approach

The research approach discusses the procedure of data gathering, data examination and interpreting information in the context of the research problem by applying the research methods to obtain possible answers to research questions.

The process must contain certain characteristics and as far as possible, be controlled, rigorous, systematic, valid and verifiable, empirical and critical (Apuke, 2017). The research strategy will typically follow three distinct forms; namely, quantitative, qualitative and mixed methods approach, which is described as a combination of both a quantitative and qualitative research (Apuke, 2017).

The data-collection process must include characteristics that are controlled and managed in a systematic manner to ensure that the process is verifiable and valid. There are different types of research methodologies: the qualitative, quantitative and mixed-method approaches, with the mixed-method approach a mixture of the qualitative and quantitative approaches (Apuke, 2017).

The most applicable research methodology for the study was considered to be the quantitative approach. This method focuses on quantifying the data-collection and analysis of the information. It is a process that uses a logical approach to testing theories that are formed by the researcher with positivist viewpoints. Through this process measurable information is collected that can be transformed into statistical information that provides patterns and that ensures the legitimacy and consistency of the study. Quantitative study methods have been extensively used in previous research studies for the acceptance of technologies (Leedy et al. (2010).

Elewa et al. (2015) piloted a study in which they investigated the challenges of e-voting. They adopted a quantitative research approach to understand the various factors that affect user's behavioural intents to accept e-voting technologies. This study signify that key predictive variables had a substantial influence on the behavioural intent to accept e-voting. In light of this finding, a quantitative approach was selected for the current study, as it aimed to investigate the benefits and challenges related with the digital transformation of the democratic electoral process and the factors that might affect this transformation.

3.2 Research paradigm

A research paradigm is a system process of the researcher's thoughts, following which new, reliable knowledge about the research object is obtained. Can be defined as a wide structure encompassing perception, beliefs, and awareness of different theories and practices used to carry out systematic research. There are four main styles of research philosophies, the positivist research viewpoint, interpretivist research viewpoint, pragmatist research viewpoint, and realistic research viewpoint. The research philosophy consist of ontology epistemology methodology and methods. The methodological selection relates to the philosophical position of the researcher and the analysed social science phenomenon (Cohen et al., 2014).

- **Positivist research philosophy.** Can be describe as an objective analyst which is the researcher views are distances from personal values and works independently.
- **The interpretivist research philosophy.** Can be describe as a subjective analyst where the researcher personal views form part of the analysis.
- **Pragmatist research philosophy .**Can be describe as an assessment that is based of factual information.
- **Realistic research philosophy.** Is based on the principles of positivist and interpretivist research philosophies. Realistic research philosophy is based on assumptions that are necessary for the perception of subjective nature of the human.

The pragmatic philosophy was found to be suitable for this study. The pragmatic philosophy key focus is based on factual information (Kumar, 2019), by generating measurable data that is transformed through statistical analysis to uncover patterns, validity and reliability within the research study (Gliner et al., 2000). The pragmatic philosophy has been extensively and effectively utilised in prior studies (Choi, et al.,2012) and (Yurong et al., 2007) which investigated the adoption of new technologies and user behavioural intentions.

3.3 Research design

The research design of a study can be defined as the technical plan that is designed by the researcher. The technical plan is structured and formulated in accordance with the overall goals and aims of this study to ensure that all data collected adds to the accuracy, reliability and validity of the study. The research design further elaborates on how the research is to be performed and identifies key factors that need to be managed to ensure that the results are achieved in a systematic manner. There are various types of research designs: comparative designs, case studies, cross-sectional designs, experimental designs and longitudinal designs (Van Wyk, 2015).

A cross-sectional design was chosen for this study. This design is best used for social sciences and is particularly suited for studies that aim to identify problems or human behavioural intentions or to use the data obtained a comprehensive view of the research problem. The deployment of a cross-sectional method has been proven to be very effective and cost effective for bigger and wider sample groups (Trechsel et al., 2016).

Trechsel et al. (2016) conducted research on the benefits and challenges of e-voting for the European Union and applied a quantitative method combined with a cross-sectional method to investigate these factors. With the use of the cross-sectional method, the study was able to ascertain voter behavioural intentions toward e-voting. For this reason, a cross-sectional method was identified for this research study, with its aim of investigating the benefits and challenges related with the digital transformation of the electoral process.

The aim of this research is to add to the current discourse about the benefits and challenges of digitally transforming the democratic electoral process. A quantitative methods framework was used for objectively reviewing and further validating the information derived from existing literature on the benefits and challenges of the digital transformation of the democratic electoral process. The quantitative study was used to test the accuracy of the views of participants regarding this information.

To achieve the aim and objectives of this research, the quantitative study aimed to response the following research questions.

Research Question 1

What are the factors that will influence the voter's adoption of e-voting?

Research Question 2

What are the benefits associated with the digital transformation of the democratic electoral process?

Research Question 3

What are the challenges associated with the digital transformation of the democratic electoral process?

All the questions were linked to the UTAUT instrument, which formed the theoretical framework of the study. The findings in relation to the questions are set out in Chapter 4, with a discussion of the findings presented in Chapter 5.

A consistency matrix (Appendix A) provides an overview of how the research questions were designed to support the study**.**

3.4 Data-collection methods

Data collection is a process within a research study; it specifically relates to the process of information collection from variety of suitable sources to discovery answers applicable to the situation or the research problem. These methods are chosen to aid the process of collecting information from suitable sources that are applicable to the research problem. The data-collection process enables the

researcher to assess their hypotheses against the collected data. Primary source data can be collected via interviews, observations and questionnaires, with the questionnaire and structured interview schedule being quantitative data-collection methods.

An online survey assessment provided the opportunity to assess and analyse voters' perceived views about the digital transformation of the democratic electoral process. Electronic tools were used to assist with data collection and the development of a clear process and procedures.

To achieve the purposes and objectives for this study, a quantifiable research approach was carry out by using a cross-sectional research design. A fully structured closed questionnaire was formulated from existing literature and distributed to respondents via online applications. The data collected was processed and analysed against the research questions and their associated hypotheses to provide understandings into user behavioural intentions behavioural intentions to adopt e voting.

The data gathering and research tool for this study consisted of research questions that have been utilised in similar research studies by (Chiang, 2009), Carter and Campbell (2011), Jaiswal, et al., (2018) and Agbesi (2020) which were modified for this research study.

A quantitative questionnaire was developed using the Qualtrics software application. A (URL) link was issued to the participants through a cluster of mail address, and the LinkedIn and WhatsApp applications. Participants were informed of the objectives of the survey.

All participants were offered the same set of questions in the online survey. The Likert-scale model was applied to structure the respondent's answers to the options. Participants responded to each declaration using a seven-point Likert-type rule, where 1 = "strongly disagree" and 7 = "strongly agree". The responses were summed up to produce a score for the measures.

A structured data-collection instrument was used for the collection of information. The online questionnaire is an effective research instrument for collecting and standardising data for further analysis.

3.5 Population and sample

The study was open to all eligible South Africans over the age of 18. The quantitative online questionnaire was shared with participants that had access to the Internet via computer or mobile applications. The majority of the participants were members of Wits University cohorts. University students, irrespective of age, were considered the appropriate sample group because they would be future voters that would probably use the system if the process was successfully transformed.

3.5.1 Sample and sampling method

The sample chosen was a quantitative sample of eligible South African voters from the Wits University student cohorts in the 18–36 age group.

The study aimed to reach a minimum of 130 participants and ultimately obtained a sample of 140 responses. The sample size was calculated using the Tinsley and Kass (1979) calculation, which states that a minimum of 5 and a maximum of 10 participants per variable will provide a reliable dataset. The study questionnaire instrument had a total of 24 variables as shown in Appendix B.

The snowballing sampling method was used to improve the participation rate. This method entailed the nomination of a key group, referred to as the “primary group”, which nominated secondary sources to participate in the study.

3.6 Data analysis and interpretation

Data analysis and interpretation of the collected information is a crucial part of the research study (Apuke, 2017). Data analysis enable the researcher to assess the collected data. It further requires the understanding of data collected with the use of exploratory technics and consistent assessment to determine trends and relationships between the factors or patterns (Trechsel et al. (2016).

3.6.1 Data and information processing

The data analysis can describe as the process of data classification, investigation and validation of the raw data that were as collected for the purpose of the study.

Data is transformed into meaningful information through three processes: the entry process, data coding process; and the data cleaning process.

Phase 1. Information Entry Process: The Qualtrics application enabled the research participants to provide the required inputs seamlessly. These were then automatically recorded and stored. The information was automatically uploaded onto the application for formatting and information data-manipulation purposes.

Phase 2. Information Coding Process: Following this process involved transforming the collected information into a meaningful dataset by coding the collected information. Coding enabled the researcher to develop a method to ensure that the information was reliably and systematically obtained from the data source. The information was then verified and assigned a numerical value for further analysis. The Qualtrics application enabled the researcher to set pre-code information with the assistance of the Likert Scales (1 “strongly disagree” to 7 “strongly agree”).

Phase 3. Information Cleaning Process: This process involved inspecting the information for completeness, validating the information and ensuring that it was reliable. A total of 178 participants finished the online survey. During the validation process, it was discovered that a total of 38 participants had not fully completed the questionnaire, with missing information and partially completed questionnaires. After the information cleaning process had been conducted, the final sample for this study was 140.

3.6.2 Quantitative methods used for data analysis

The SPSS 20.0 software was used to analyse and interpret the data. A clear procedure for information coding was established to expedite the data analysis. The SPSS 20.0 software was used to extract data from the questionnaire responses. Character symbols and numeric data were assigned to pre-coded responses. Upon completion of the analysis, statistical analysis was used as the next step. Statistics

and graphical analysis were used to investigate the data, explore the correlation between the variables and assess their overall impact on each factor.

The statistical analysis was performed using multiple phases:

Phase 1: This phase involved determining the data validity and reliability. In this phase a correlation analysis was performed to determine the significant correlations between the independent variables and the outcome (dependent) variable (Behavioural Intentions).The UTAUT framework consists of four main concepts as illustrated in Fig 2.3 above Performance Expectancy (PE), Effort Expectancy (EE), Trust in Technology (TT), Social Influence (SI) and Security Expectancy (SE) These main concepts are independent variable that influence the dependent variables of use behaviour and behavioural intentions.

Phase 2: In this phase, factor investigation was performed to alter the large variables into a smaller number of factors. Cluster analysis was performed to group the participants according to their responses.

Phase 3: Here multivariate assessment was performed along with several linear regression valuation to validate the hypotheses of the study.

Phase 4: In the last phase, multiple linear regression assessment were performed to determine the correlation among the dependent and independent variables and further validate the outcomes of the regression analysis.

3.7 Limitations of the study

A key constraint for online quantitative assessment relates to socio-economic challenges experienced by underprivileged students. The digital divide is a potential barrier to universal access to internet connectivity. The possibility exists that some participants would start the assessment but not be able to complete it owing to poor network connectivity and depletion of data. Access to personal devices such as

smart phones or personal computers presents another potential barrier. During the information cleaning process, it was identified that 38 respondents had to be removed from the sample as a large amount of data was missing or their assessment was only partially completed. Without free internet access and personal devices, a key segment of the society was excluded from this study.

The time assigned for the completion and submission of the online quantitative questionnaire was set from 15 November 2021 until 05 December 2021.

There are various technical limitations associated with quantitative online questionnaires, such as that participants are not given the opportunity to offer alternative views or provide additional clarification points. Extending the study beyond the context of the university would enlarge the sample group and include more diverse views.

3.8 Validity and reliability

The objective of determining validity and reliability of the study is fundamentally important to confirm that the data collected is reliable, replicable, and accurate. The confirmation of reliability and validity are preconditions to reassure the quality and integrity of a measurement instrument (Kimberlin &. Winterstein, 2008).

3.8.1 Validity of the study

This study made use of face and construct validity to guarantee research quality, appropriateness and correctness of the data as these were the most suitable. In order to ensure face validity, the data collection instrument was reviewed under supervision. A pilot questionnaire was prepared for a small sample of 12 participants. The participants were offered the opportunity to ask clarification questions and for validation of their understanding. Certain words were modified in response to the comments made by the participants.

The quantitative questionnaire used for the study was adopted from earlier studies and customised for the purpose of this study. This was undertaken with objective of ensuring the reliability and validity of the constructs.

Literature related to the digital transformation of the democratic electoral process and to data collection assisted with the development of valid measuring instruments for the study. Similar research projects that used the same assessment methods, such as regression analysis, reliability analysis and factor analysis, were consulted. The benefits of reviewing these methods were that it allowed the researcher to identify whether there were any errors in the analysis, any inconsistent information or any variables that would make the study invalid.

The implementation of a sample test before the release of the main study ensured that the data-collection methodology was consistent and complied with the prescribed guidelines. The key constructs identified were checked with the academic supervisor of the study to establish that all key constructs were included, and the measuring instruments were relevant and practical.

This research tested two types of construct validity which include The Average Variance Extracted (AVE) and Composite Reliability (CR) The Average Variance Extracted (AVE) and Composite Reliability (CR) were used for testing the internal consistency and validity of the information collected. The study revealed that Cronbach's alpha (CA) and CR values were better than 0.7 while the AVE value were greater than 0.5, which is considered acceptable (Hair et al., 1988). Therefore, this study made use of the CR and AVE methods to define the internal validity of the information and warrant that the factors were measured consistently and free from random errors.

3.8.2 Reliability of the study

Reliability can be described as a key fundamental that ensures that the research instruments are able to deliver similar results if the study is repeated by other researchers. Ursachi et al. (2015) further describe reliability as a research instrument that brings consistency and stability to a study.

Cronbach's alpha is an assessment method that is used to determine internal consistency and reliability, determining how interrelated a set of items is within a group. It assists in measuring the scales of reliability of a study. As the average of interrelated item correlation grows, Cronbach's alpha grows as well (holding the

number of items constant). An acceptable rule of thumb is a score of 0.6–0.7, which shows a suitable degree of consistency, and 0.8 or better a very suitable level. A score of higher than 0.95 may not be interpreted as significantly superior, however, as it may be a warning of redundancy within the study (Ursachi et al., 2015).

The Likert scale items were subjected to the internal reliability test, by the researcher computing the AVE of each construct.

To ascertain the reliability of the study, similar research projects that used the same assessment methods were also investigated to help identify any errors in the analysis, information inconsistency and variables that would make the study unreliable.

3.9 Demographic profile of the participants

In terms of matching the national population with previous studies, participants selected were students and the South African population at large. University students were selected as they were more likely to have admission to the Internet, a smart phone and/or computer and were more likely to be computer literate.

The following criteria were considered important:

Age: Participants had to be adults (over 18 years old).
Gender: To establish the influence of gender on voter behaviour intention towards e-voting.
Education: To establish the influence of education on behaviour intention towards e-voting.

3.10 Ethical considerations

The objectives of this study was to investigate the benefits and challenges related with the digital transformation of the democratic electoral process. As such, all participants were duly advised that any information they shared would remain confidential and the information they provided would not be disclosed to any unauthorized parties.

The method used to collect information from the respective participants was performed with the assistance of the Qualtrics application. The questionnaire was standardised and anonymous. Clear guidelines about the research were shared with all participants. It was explained that their participation in the study was voluntary and that they had the option of withdrawing from the process without any consequences. The participant were also informed that no personal information was required from them apart from specific demographic information regarding gender, age, education and past experience with manual voting and that all the information that they provided would comply with the Wits University ethics statutory guidelines.

The questionnaire began by soliciting informed consent from the participants, advising the participants that all information collected would be used for the primary objective of this research and all information collected would be encrypted and stored according to regulations from the University. The participant consent form is attached as Appendix C and the ethics clearance certificate from the Wits Business School Ethics Committee is attached as Appendix D.

CHAPTER 4. PRESENTATION OF RESULTS

This chapter presents the outcomes of the quantitative research conducted for this study. The quantitative results are based on the outputs related to Research Questions 1, 2 and 3.

Sample of the demographic and voter experience: Descriptive statistics analysis

Reliability and validity assessment of the instruments was conducted as follows:

- Average Variance Extracted (AVE) and Composite Reliability (CR) and were used for testing the internal consistency and validity of the study.
- Pearson Correlation was used for testing the constructs for consistency validity of the study.
- Cronbach's alpha was used as an assessment for testing the internal consistency reliability of the study.
- Kaiser-Meyer-Olkin (KMO) was used to the sampling suitability and the Bartlett's test of sphericity were performed to measure the validity.
- Explanatory Factor Analysis (EFA) assessment performed to measure to warrant construct reliability and validity.

After it was established that each instrument of the construct measure was valid and reliable, the researcher further investigated the impact of the path coefficients of each path for each construct.

For Research Questions 1, 2 and 3 process and the results of the measurement scales, multiple linear regression (Anova and Coefficient models) was used to determine the correlation between the independent variables and the dependent variable.

4.1 Demographic information

The survey was disseminated to the target sample of eligible voters. This section discusses the demographic information provided by the questionnaire respondents. The participants' demographic information is summarised in Table 4.1 below.

Table 4.1: Demographic Information

Measure	Item	Frequency =*f*	Percent % = cf	Cumulative percent
Gender	*Female* *Male*	*79* *61*	*56.4* *43.6*	*56.4* *100.0*
Total		***140***	***100.0***	
Age	*<20* *21–35* *>36*	*22* *90* *27*	*15.71* *65.00* *19.29*	*15.71* *84.29* *100.00*
Total		***140***	***100.0***	
Qualifications	*Senior Certificate* *Graduate* *Post-Graduate*	*23* *87* *30*	*16.4* *62.2* *21.4*	*16.4* *83.6* *100.0*
Total		***140***	***100.0***	

4.1.1 Gender

The gender distribution in the final coded and cleaned sample of 140 participants indicated that 56.4% (*f* = 79) of the participants were females while 43.6% (*f* = 61) were males.

4.1.2 Age

The sample characteristics for age illustrate that the age group <20 was at 17.7% (*f* = 22), while the highest number of participants were in the 21–35 age group at 64.3% (*f* = 90). The least represented age group was >36 at 18.0% (*f* = 23).

4.1.3 Qualification levels

At 62.1% (*f* = 87), graduates made up the most significant part of the sample group, followed by those who held post-graduate qualifications at 21.4% (*f* =30) of the

sample. Only 16.4% (*f*=27) of the sample group had senior certificates as their highest qualification.

4.2 Past voter experience (closed questions)

The participants were asked closed questions to determine their past voter experience. The results are set out in Table 4.2 and explained below.

Table 4.2: Voter Experience

Questions (1-3)	***=f***	***Yes cf %***	***f***	***No cf %***	***Cumulative per cent***
Have you voted before	***114***	***81%***	***26***	***19%***	***100%***
Have you experience any challenges with manual voting	***104***	***74%***	***36***	***26%***	***100%***
Do you have any knowledge of E-voting	***61***	***43%***	***79***	***57%***	***100%***

In terms of past voting experience, 81% (*f*=114) of the sample group had participated in previous elections, while 19% (*f*=26) of the sample group had not voted before.

Regarding whether they had experienced any challenges with manual voting, 74% (*f*=104) of the participants indicated that they had experienced any problems with manual voting, while 26% (*f* = 36) had not experience any challenges.

Concerning whether the participants had any knowledge about e-voting, 43% (*f*= 61) suggested that they did have knowledge of e-voting, while 57% (*f*=79) had no knowledge of e-voting.

4.3 Benefits of e-voting

The outcomes of the study concerning the benefits of e-voting are outlined in this section.

Table 4.3: Benefits

		Strongly disagree	*Disagree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewh at agree*	*Agree*	*Strongly agree*	*Total*
Q4	Count	*2*	*1*	*8*	*38*	*84*	*7*	*0*	*140*
	Row N %	*1.4%*	*0.7%*	*5.7%*	*27.1%*	*60.0%*	*5.0%*	*0.0%*	*100.0 %*
Q5	*Count*	*0*	*1*	*2*	*25*	*70*	*42*	*0*	*140*
	Row N %	*0.0%*	*0.7%*	*1.4%*	*17.9%*	*50.0%*	*30.0%*	*0.0%*	*100.0 %*

As shown in Table 4.3 above, the responses to Q4: E-voting reduces voter errors and the chances of voter fraud, illustrate that the majority of participants felt neutral about or somewhat agreed with the statement. A total of 27.1% of the participants were neutral and 60% somewhat agreed that e-voting would reduce errors and the opportunity for fraud.

For Q5: E-voting improves accessibility for people with disabilities and who are unable to reach the polling places to vote, the responses illustrate that the majority of participants chose the “somewhat agree” option. A total of 50% and 30%, respectively, somewhat agreed and agreed that e-voting would improve accessibility to people with disabilities and those that are unable to reach polling stations.

4.4 Challenges of e-voting

The results concerning the challenges of e-voting are discussed below.

Table 4.4: Challenges

		Strongly disagree	**Disagree**	**Somewhat disagree**	**Neither agree nor disagree**	**Somewhat agree**	**Agree**	**Strongly agree**	**Total**
Q6	Count	1	2	15	73	49	0	0	140
	Row N %	0.7%	1.4%	10.7%	52.1%	35.0%	0.0%	0.0%	100.0%
Q7	Count	1	3	14	35	66	19	2	140

	Row N %	0.0%	0.7%	1.4%	17.9%	50.0%	30.0%	0.0%	100.0%

As one can see in Table 4.4 above, in response to Q6: E Voting are susceptible to data breaches like (leakages of personal information loss), the majority of participants centred on neutral (52.1%) and somewhat agree (35%).

In reaction to Q7: E Voting are vulnerable to malicious programming and if it gets affected then any hacker can hack the machine and can tamper the vote counts easily, the responses illustrated that the majority of participants somewhat agreed, at 50%, or agreed, at 30%.

4.5 Descriptive statistics assessment

This segment provides an overview of the descriptive statistics, indicating the measures of central tendencies and distribution of the key factors created.

Table 4.5: Key Factors that Influence E-voting

Construct	Items	Mean	Std Dev	Min	Max
SE	*Q8_I believe e-voting keeps my vote secure*	*4.59*	*0.822*	*1*	*6*
	Q9_E–voting provides accurate results	*5.07*	*0.774*	*2*	*6*
	Q10_E-voting is relatively free from faults	*4.79*	*0.775*	*2*	*6*
TT	*Q11_E-voting is trustworthy*	*4.19*	*0.738*	*1*	*5*
	Q12_E-voting keeps my vote secret	*4.62*	*1.007*	*1*	*7*
	Q13_I believe e-voting machine has good reputation	*3.80*	*1.081*	*1*	*5*
PE	*Q14_I believe e-voting machine useful*	*5.05*	*1.095*	*2*	*7*
	Q15_E-voting will enhances my efficiency in	*5.50*	*0.803*	*4*	*7*

	Q16_E voting will improve participate in elections	*5.00*	*0.955*	*2*	*7*
	Q17_If offered the opportunity to e-voting, I will be more likely to vote	*6.00*	*1.278*	*3*	*7*
EE	*Q18_ E-voting will provide clear and understandable process*	*4.50*	*0.898*	*2*	*6*
	Q19_It will be easy for me to become skilled once adopt e-voting	*5.00*	*0.901*	*1*	*7*
	Q20 E-voting will be easy to adopt usage	*5.50*	*0.982*	*2*	*7*
	Q21_Learning to use e-voting device will note challenging	*6.00*	*1.094*	*5*	*7*
SI	*Q22_People who impact my behaviour think that I should use e-voting*	*4.00*	*0.656*	*2*	*5*
	Q23_Family and friend who are key enablers to influence my think that I should cast my vote using e-voting	*4.00*	*0.748*	*2*	*6*
	Q24 I adopt e-voting because of the part of friend prefer e -voting	*4.00*	*0.671*	*3*	*6*
BI	*Q25 I intend to adopt e-voting tool to cast my vote*	*5.00*	*0.759*	*3*	*6*
	Q26_I prefer e-voting instead of manual voting	*0.74*	*0.741*	*3*	*7*

Table 4.5 above explains the factors identified as influencing e-voting. The Security Expectancy (SE) construct statements established participant response regarding behavioural intention on the basis of security. The statements for this section of the questionnaire focused on whether the participant considered e-voting to keep their vote secure, provide accuracy and be relatively free from faults. The outcomes indicated a mean score of between 4.59 and 5.07 and a standard deviation (SD) of between 0.77 and 0.88.

The Trust in Technology (TT) construct section of the questionnaire established participant response regarding behavioural intention according to trust in technology. The statements tested the views that: e-voting is trustworthy, my vote will remain my secret and e-voting has a good reputation. The outcomes indicated a mean score of between 3.80 and 4.19 and an SD of between 0.73 and 1.08.

The questionnaire statements for the Performance Expectancy (PE) construct established participant response regarding behavioural intention based on performance. Statements focused on: usefulness of e-voting, and whether the system will enhance the user's efficiency, improve their participation and improve

access to voting. The outcomes indicated a mean score of between 5.00 and 6.00 and an SD of between 0.80 and 1.27.

The questionnaire statements concerning the Effort Expectancy (EE) construct established participant response regarding behavioural intention on the basis of effort. The statements focused on: the clarity and comprehensibility of e-voting, whether adoption of the tool will stress-free to become more skilled using it, whether the participant will find e-voting effortless to utilize and whether developing new skill to master the system will be practical and informal. The outcomes indicated a mean score of between 4.50 and 6.00 and an SD of between 0.89 and 1.09.

The section of the questionnaire that tested the Social Influence (SI) construct established participant response regarding behavioural intention based on social influence. The statements concern the importance of people who influence the participant's behaviour in their decision to vote, the importance of the view of family and friends, and the influence of views of co-workers and peers. The outcomes indicated an overall mean score of 4.00 and an SD of between 0.65 and 0.74.

Lastly, the questionnaire focused on the Behavioural Intention (BI) construct to establish participant response regarding independent variables. The statements concerned the participant's intention to cast an e-vote and whether they would prefer e-voting over manual voting. The outcomes indicated a mean score of between 0.74 and 5.00 and an SD of between 0.74 and 0.75.

4.6 Determine validity of the study

CR and AVE methods were used for testing the internal uniformity and validity of the study. The study illustrated that CA and CR values were bigger than 0.7, while the AVE value was better than 0.5 (cf. Hair et al., 1988). The CR and AVE values for the Behavioural Intention construct could not be measured as the construct consisted of only two questions. However, a Pearson assessment was conducted to ascertain whether there was a correlation between the statements and the behaviour intention.

The reliability of the scores from the Likert scales obtained from the UTAUT questionnaire items were measured using the CR and AVE measures for each construct. CR and AVE scores of above 0.7 show satisfactory internal consistency and an acceptable reliability of a model's measurement model.

Table 4.6: CR and AVE Assessment

Construct	Composite Reliability (CR)	AVE
(SE)	0.961	0.89
(TT)	0.921	0.797
(PE)	0.964	0.872
(EE)	0.923	0.75
(SI)	0.977	0.933

The Pearson correlation was used to determine the power of a linear relationship between two variables. Pearson's correlation coefficient determines the consequence of change in one variable when the other variable changes.

- A value of -1 to 1, with a value of -1 implies a total negative linear correlation.
- A value of 0 implies no correlation.
- A value of +1 implies a total positive correlation.

The use of Pearson's correlation revealed a consistent score of +1, which implies satisfactory internal consistency and acceptable reliability of the model's measurement.

Table 4.7: Statistics and Correlations of Constructs

Pearson Correlation	SE	TT	PE	EE	SI	BI
(SE)	1					
(TT)	.597**	1				
(PE)	.604**	.372**	1			
(EE)	0.118	0.149	.210*	1		

(SI)	.177*	.371**	-.187*	-.221**	1	
(BI)	0.008	.505**	.300**	.497**	-.206*	1

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity were executed to test the validity of the study. The purpose of this assessment is to analyse that the information is appropriate to assess the factor analysis.

The KMO measure of sampling adequacy confirmed the results of the study for independent variables are above minimum requirement 0.6. Behavioural intension outcomes are below the minimum requirement. However, the Bartlett's assessment of sphericity demonstrated a significant (p-value<0.000), representative reliability with cut-off values and signifying that factor analysis were suitable.

Table 4.8: KMO Measure of Sampling Adequacy

Constructs	***Kaiser-Meyer-Olkin Measure***
(SE)	*0.764*
(TT)	*0.679*
(PE)	*0.706*
(EE)	*0.769*
(SI)	*0.732*
(BI)	*0.5*

4.7 Determining reliability of the study

The Cronbach's alpha assessment for each of the constructs of this study revealed scores of larger than .70 while the score for Behavioural Intention was 0.641, which is deemed suitable as per Hair et al.'s (1998) advice. A suitable benchmark according to Hair et al. (1998) is 0.5. The Cronbach alpha assessment consequently indicated satisfactory internal consistency and is therefore an acceptable model for validation.

Table 4.9: Cronbach's Alpha Assessment

Construct	Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
(SE)	0.736	0.738	3
(TT)	0.745	0.771	3
(PE)	0.892	0.898	4
(EE)	0.841	0.842	4
(SI)	0.883	0.885	3
(BI)	0.641	0.643	2

Explanatory Factor Analysis (EFA) was performed to measure the validity and reliability of each constructs. The five independent variables were assessed to determine validity and reliability based the information collected for this study.

Table 4.10: Reliability and convergent validity tests

Construct	*Item*	*Factor Loading*	*Corrected item–total correlation*
(SE)	SE_Q1	0.953	0.908
	SE_Q2	0.934	0.872
	SE_Q3	0.944	0.891
(TT)	TT_Q1	0.894	0.800
	TT_Q2	0.938	0.881
	TTQ_3	0.843	0.711
(PE)	PE_Q1	0.905	0.819
	PE_Q2	0.924	0.853
	PE_Q3	0.935	0.874
	PE_Q4	0.969	0.938
(EE)	EE_Q1	0.772	0.596
	EE_Q2	0.852	0.726
	EE_Q3	0.918	0.843
	EE_Q4	0.913	0.833

(SI)	SI _Q1	0.955	0.912
	SI_Q2	0.982	0.964
	SI_Q3	0.961	0.924
(BI)	BI_Q1 BI_Q2	0.964 0.964	0.929 0.929

4.8 Statistical hypothesis testing between variables

Statistical hypotheses analyse the strength of the correlation between the dependent and independent variables by using a multiple linear regression, including tests for moderating effects, in order to accept or reject the hypotheses.

4.8.1 Results for Research Question 1: What are the factors that will influence the voter's adoption of e-voting?

4.8.1.1 Multiple linear regression

Multiple regression techniques were performed to determine the correlation between the independent variables and the dependent variable. Regression is a technique for determining the line of most suitable fit. The regression model line uses the independent variables to predict the outcome or dependent variable. The dependent variable characterises the output. The independent variables characterise the inputs that are verified to ascertain that the predicted outcome is a positive or negative relationship between the variables. A positive result in the regression assessment means that if there is any alteration in the independent variable, the same alteration will occur in the dependent variable.

Regression assessment can be performed to determine or verify different relationships. A P-Value of > or 0.05 or 0.1 (5% or 10% level) is not statistically substantial, while a P-Value of < or 0.05 or 0.1 (5% or 10% level) is statistically substantial.

Table 4.11 Multiple Linear Regression

Variable	Beta Value	Std. Error	Beta		P-Value

(Constant)	5.200	0.028		184.404	0.000
(SE)	-0.235	0.042	-0.345	-5.637	0.000
(TT)	0.711	0.039	1.044	18.390	0.000
(PE)	-0.014	0.039	-0.020	-0.347	0.729
(EE)	0.110	0.030	0.162	3.670	0.000
(SI)	-0.297	0.035	-0.436	-8.603	0.000

R^2adjusted = 0.520. Sig. = .000, means p < .0005

The multiple linear regression model explains that the *adjusted R^2* in the regression model is 0.520-, signifying that the predictor variables Security Expectancy, Trust in Technology, Performance Expectancy, Effort Expectancy and Social Influence in the regression explain 50.10% of the variance in the dependent variable Behavioural Intention. The overall regression model is statistically significant and indicates a good model fit. It is substantial at the 1% extent (*sig. f = .000*), thereby indicating the model fitness.

The standardised beta coefficients (B) measure the strength of the influence of each independent variable on the dependent variable. The model illustrates the extent of change in the dependent variable caused by one unit of alteration in the independent variables, *ceteris paribus*.

4.8.1.2 Normality

A normal P-P plot was drawn up to illustrate the outcomes of the linear regression model, which were examined to determine the normality of the residuals. The P-P plots as illustrated in Figure 4.1 below provide evidence of normality as the points (dots) are generally along the 45-degree line (cf. Hills, 2014). Furthermore, the histogram shown in Figure 4.2 indicates a normal distribution of residuals.

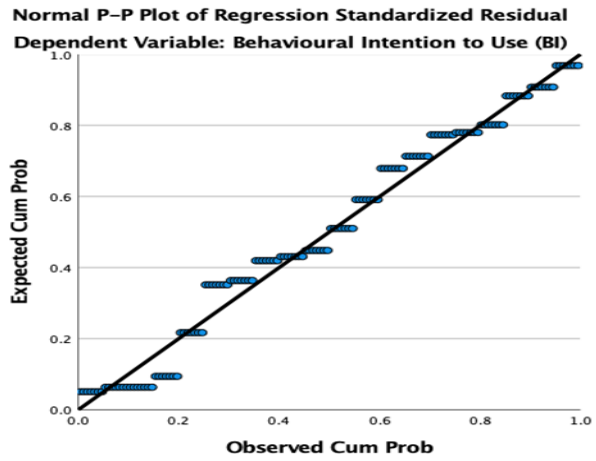

Figure 4.1: Normal P-P Plot of Regression Standardised Residuals

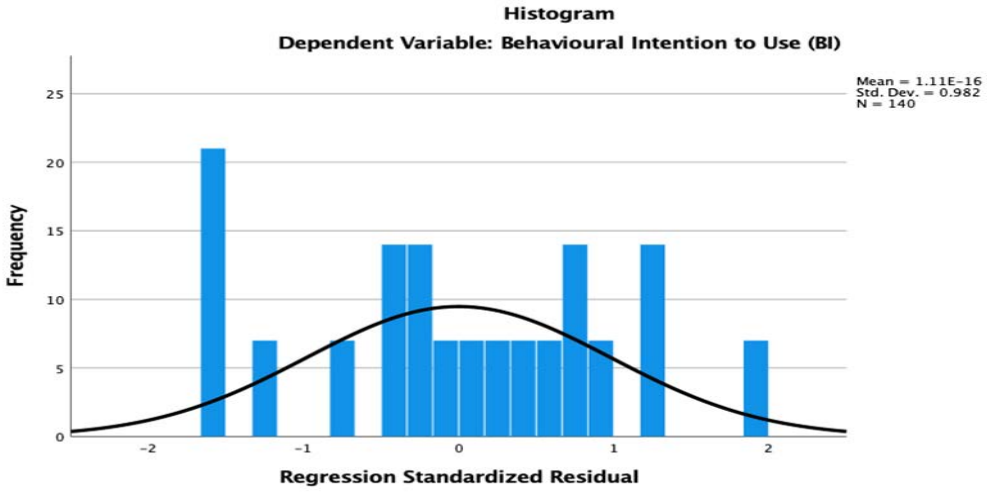

Figure 4.2: Histogram of Regression Standardised Residuals

The final phase involved determining the correlation between the dependent and independent variables. The linear association between the independent and dependent variables indicated a significant ($p < 0.01$) relationship of each construct as per the statistical correlation shown in Figure 4.2.

4.8.1.3 Path coefficient

After determining that all construct measurements were consistent, valid and reliable, the researcher progressed to the structural model, based on the scale and determining the influence of the measurements for each construct.

A path coefficient signifies the correlation between the hypothesised constructs and standardised values between them. The path coefficients (hypotheses) were

statistically significant at the P-Value < or 0.05 or 0.1 (5% or 10% level) and not statistically significant at the P-Value > or 0.05 or 0.1 (5% or 10% level (Hair,2014).

Table 4.8: Recap of the Multiple Linear Regression

Hypothesis	Path	Path coefficient	T-statistic	P-value	Result
H1	SE-BI	0.042	-5.637	0.000	Support
H2	TT-BI	0.039	18.390	0.000	Support
H3	PE-BI	0.039	-0.347	0.729	Not Support
H4	EE-BI	0.030	3.670	0.000	Support
H5	SI-BI	0.035	-8.603	0.000	Support

Below is a summary of the coefficients of the relationships between the multiple constructs and the behavioural intention to adopt e-voting.

- Security Expectancy (SE) represent to have a substantial influence on Behavioural Intention (BI) to use an e-voting system (β = 0.042, p = 0.001). The standardised path coefficient between SE and BI was extremely substantial.
- Trust in Technology (TT) represent to have a substantial influence on Behavioural Intention (BI) to utilize e-voting system (β = 0.039, p = 0.000). The standardised path coefficient between TT and BI was extremely substantial.

- Performance Expectancy (PE) represent not to have a substantial influence on Behavioural Intention (BI) to utilize e-voting system (β = 0.039, p = 0.729). The standardised path coefficient between PE and BI was not significant.
- Effort Expectancy (EE) represent to have a substantial influence on Behavioural Intention (BI) to utilize e-voting system (β = 0.030, p = 0.000). The standardised path coefficient between EE and BI was extremely substantial.
- Social Influence (SI) represent to have a significant influence on Behavioural Intention (BI) to utilize e-voting system (β = 0.035, p = 0.00). The standardised path coefficient between EE and BI was extremely substantial.

4.8.1.4 Hypothesis: Factors that will influence the voter's adoption of e-voting.

The first research question was to explore factors that will influence the voter's adoption of e-voting.

H1: Security expectancy (SE) has a positive influence on behavioural intention to use e voting

H2: Trust in technology expectancy (TT) has a positive influence on behavioural intention to use e voting.

H3: Performance expectancy (PE) have a negative influence on behavioural intention to use e voting.

H4: Effort expectancy (EE) has a positive influence on behavioural intention to use e voting

H5: Social influence (SI) has a positive influence on behavioural intention to use e voting.

The multiple regression analysis, as illustrated in Table 4.12, inferred that hypotheses for Security expectancy (SE), Trust in technology expectancy (TT), Effort expectancy (EE) and Social influence (SI) have a positive influence on user Behavioural Intention to adopt e voting. The hypothesis for question 1 is supported.

The hypotheses for Performance expectancy on have a negative influence on Behavioural Intention to use e voting. The hypothesis specific to Performance expectancy (PE) is not supported.

4.8.2 Results for Research Question 2: What are the benefits associated with the digital transformation of the democratic electoral process?

4.8.2.1 Summary of hypotheses in relation to benefits of the transformation of the electoral process

The hypotheses in relation to the benefits of the transformation of the electoral process are set out in Table 4.13.

Table 4.9: Hypotheses related to Benefits

Hypotheses	Description
H2 a	Trust in technology (TT) will have a substantial influence on user behavioural intent (BI) to adopt e-voting
H3 a	Performance Expectancy (PE) will have a substantial influence on user behavioural intent (BI) to adopt e-voting

Table 4.14: Benefit Hypotheses Results

Hypothesis	Path	T-statistic	P-value	Result
H2 a	TT-BI	18.390	0.000	Support
H3 a	PE-BI	-0.347	0.729	Not Support

4.8.2.2 Results of hypotheses in relation to benefits of the transformation of the democratic electoral process.

The relationship between Trust in Technology (TT) and Behavioural Intention (BI) represent to have a significant influence ($\beta = 0.039$, $p = 0.000$) and the standardised path coefficient between TT and BI was extremely significant. Performance

Expectancy (PE) represent not to have a significant influence on Behavioural Intention (BI) to use an e-voting system (β = 0.039, p = 0.729) and the standardised path coefficient between PE and BI was not significant.

4.8.2.3 Hypothesis: The benefits associated with the digital transformation of the democratic electoral process.

The second research question was to determine the benefits associated with the digital transformation of the democratic electoral process.

H2a: Trust in technology expectancy (TT) has a positive influence on behavioural intention to use e voting.

H3a: Performance expectancy (PE) have a negative influence on behavioural intention to use e voting.

The multiple regression analysis, as illustrated in Table 4.14, inferred that hypotheses for Trust in technology expectancy have a positive influence on user Behavioural Intention to adopt e voting. The hypothesis is supported.

The multiple regression analysis, as illustrated in Table 4.14, inferred that hypotheses for Performance expectancy (PE) have a negative influence on user Behavioural Intention to adopt e voting the hypothesis specific to Performance expectancy (PE) is not supported.

4.8.3 Results for Research Question 3: What are the challenges associated with the digital transformation of the democratic electoral process?

4.8.3.1 Summary of the hypotheses in relation to challenges of transformation of the electoral process

The hypotheses related to the challenges of digitally transforming the electoral process are summarised in Table 4.16 below.

Table 4.10: Hypotheses related to Challenges

Hypotheses	Description
H1 b	Security expectancy (SE) will negatively affect the voter behavioural intent (BI) to adopt e-voting.
H2 b	Trust in Technology (TT will negatively affect the voter behavioural intent (BI) to adopt e-voting..

4.8.3.2 Results of hypotheses in relation to challenges of transformation of the electoral process

Table 4.11: Challenge Hypotheses Results

Hypothesis	Path	T-statistic	P-value	Result
H1 b	SE-BI	-5.637	0.000	Support
H2 b	TT-BI	18.390	0.000	Support

The multiple regression analysis, as illustrated in Table 4.10, further supports the relationship of the Security Expectancy and Trust in Technology constructs with behavioural Intention for the adoption of e-voting.

- Security Expectancy (SE) represent to have a substantial impact on behavioural intention to utilize e-voting system (β = 0.042, p = 0.001); the standardised path coefficient between SE and BI was extremely significant.
- Trust in Technology (TT) represent to have a substantial impact (β = 0.039; p = 0.000), the standardised path coefficient between TT and BI was extremely significant.

4.8.3.3 Hypothesis: The challenges associated with the digital transformation of the democratic electoral process

The third research question was to determine the challenges associated with the digital transformation of the democratic electoral process.

H1 b: Security expectancy (SE) will negatively influence the voter behavioural intent (BI) to adopt e-voting.

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H2 b: Trust in Technology (TT) will negatively influence the voter behavioural intent (BI) to adopt e-voting.

The multiple regression analysis, as illustrated in Table 4.16, inferred that hypotheses for Security expectancy (SE) and Trust in technology expectancy (TT) have a positive influence on user Behavioural Intention to adopt e voting. The hypothesis for is supported.

4.9 Summary of the results

The aim of this research study was to explore factors that could influence voter behavioural intention, and the benefits and challenges associated with the adoption of e-voting in the South African context.

The hypotheses set out in Table 4.17 were identified as suitable for achieving the objectives of this research. Table 4.17 presents a high-level summary of the research hypotheses and findings.

Table 4.12: High-level Summary of Hypotheses Results

Hypothesis	Beta	P-Value	Effect	Outcome
SE will have a substantial influence on behavioural intent to utilize e-voting system.	-0.345	0.000	Positive	Supported
TT will have a substantial influence on behavioural intent to utilize e-voting system.	1.044	0.000	Positive	Supported
PE will have a substantial influence on behavioural intent to utilize e-voting system.	-0.020	0.729	Negative	Not Supported
EE will have a substantial influence on behavioural intent to utilize e-voting system.	0.162	0.000	Positive	Supported

SI will have a substantial influence on behavioural intent to utilize e-voting system.	-0.436	0.000	Positive	Supported

A multiple linear regression analysis was performed on SPSS to validate the hypotheses amongst a sample of 140 respondents. Hypothesis H3 was not supported. Performance Expectancy (PE) indicated no significant association with a voter's adoption of e-voting. The rest of the analysis illustrated support for the hypotheses H1, H2, H4 and H5, as the relationships between the independent variables Security Expectancy (SE), Trust in Technology (TT), Effort Expectancy (EE) and Social Influence (SI) and the dependent variable Behavioural Intention (BI) were statistically significant ($p < .001$).

CHAPTER 5. DISCUSSION OF RESULTS

5.1 Introduction

This chapter discusses the research results presented in Chapter 4 in relation to the literature review as presented in Chapter 2.

How the Research questions identified from the literature review were used in the study is outlined as follows:

- Research Question 1: What are the factors that will influence the adoption of e-voting? Separate discussion of the UTAUT instrument outcomes.
- Research Question 2: What are the benefits associated with the digital transformation of the electoral process? A blended approach between instrument outcomes of the UTAUT and the second instrument outcomes (Benefits).
- Research Question 3: What are the challenges associated with the digital transformation of the electoral process? A blended approach between the instrument outcomes of the UTAUT and the third instrument outcomes (Challenges).

To evaluate the factors that influence voter behavioural intention, the research questions were to understand the voters fully, including their past voting experience, and to identify the benefits and challenges related with the digital transformation of the electoral process. A multiple linear regression was performed to assess the strength of the correlation between voters' behavioural intention (dependent variable) and Security Expectancy (SE), Trust in Technology (TT), Performance Expectancy (PE), Effort of Expectancy (EE) and Social Influence (SI) (independent variables).

5.2 Discussion related to Research Question 1

RQ1: What are the factors that will influence the adoption of e-voting?

This section discusses Research Questions 1 to ascertain the factors that will influence voter behavioural intention to adopt e-voting. This section of the study quantitatively authenticated the proposed research model, which was designed according to the UTAUT model. On the basis of this model, the following variables were used: Performance Expectancy (PE), Effort Expectancy (EE) and Social Influence (SI). Two other variables were added to the proposed research model , namely, Security Expectancy (SE) and Trust in Technology (TT) to ascertain voter behavioural intent to adopt e-voting in the South African context.
The method from Agbesi, (2020) and Jaiswal, et al., (2018) was applied to obtain a comprehensive view through the usage of the adopted UTAUT framework.

As mentioned above, to evaluate the factors that influence voter behavioural intention, the study aimed to understand the voters and their past voting experience fully, along with the benefits and challenges associated with the digital transformation of the electoral process. Multiple linear regression techniques were performed to assess the strength of the relationship between voters' behavioural intention (dependent variable) and Security Expectancy (SE), Trust in Technology (TT), Performance Expectancy (PE), Effort Expectancy (EE) and Social Influence (SI) (independent variables). The results are discussed below.

5.2.1 Security Expectancy (SE)

This variable was discovered to have a substantial influence on behavioural intent to utilize e-voting system (β = 0.042, p = 0.001). In comparison with previous literature studies, the outcomes of this study support the outcomes of Jaiswal and Kar (2018) and Powell et al. (2012. The study highlights that security expectancy directly influence voter behavioural intentions to adopt e-voting.
This finding suggests that to increase voter behavioural intention to adopt e-voting, the IEC should create an environment that demonstrates that systems are free from errors, ensures that voter personal information is stored securely and offers voter results that are accurate and reliable.

A recent study by Mattison Thompson et al. (2019) indicate that perceived security risk will have a negative relationship with the adoption of any application. According to the Privacy Calculus model, the consumer will only surrender key personal and private information when it appears to be worth the risk of revelation. Consumers are likely to adopt online application methods only once the security expectancy about the environment and behavioural uncertainties is eased. The theory of reasonability forecasts that consumers are willing to transact online if the perceptions of security risk are low (Kim et al., 2008). Voters' self-confidence in security may increase over time with ongoing education, which has a powerful positive impact on voter attitude to security. The gradual implementation of the e-voting system will allow for sufficient pilot projects that create opportunities for additional enhancement and modification to ensure that the system is robust and reliable. Cybersecurity eco systems, with key focus, customer data compliance, data integrity and confidentiality, can also be developed.

The finding on security expectancy as an independent variable construct illustrate that majority of the participants agree that security expectancy is major factor that will influence the voters' behavioural intentions to adopt e-voting.

Security expectancy is a key factor that influence voter's behavioural intentions, it's therefore a key consideration for drive the adoption for digital transformation of the electoral process. Voters perceive views that the system lacks auditability and verifiability applications will have a negative on the entire digital transformation process.

5.2.2 Trust in Technology (TT)

This variable was discovered to have substantial influence on behavioural intent to utilize e-voting system ($\beta = 0.039$, $p = 0.000$). The outcomes support previous literature by Faisal, et al. (2016) and Powell et al., (2012) that trust in technology directly influence voter behavioural intentions to adopt e-voting.

Recent studies have illustrated that security positively influences voter trust in technology (Chiang, 2009). This suggests that security expectancy cultivates voters' trust in technology to adopt e-voting. With the adoption of any system, voters are

likely to want to ensure that the system is trustworthy and secure. If voters have any uncertainty about e-voting, the IEC will have to illustrate to them the system security features and trustworthiness of the system. Trust is a key enabler for any online process; the development of an inclusive cybersecurity framework will enhance trust and confidence, which will influence behavioural intention to adopt e-voting.

Recent studies have illustrated that effective management of information asymmetry improves the adoption level of and trust in technology (Mavlanova et al., 2012). Failure to adequately manage any uncertainties and information asymmetry leads to the so-called “market for lemons”, which will have a negative impact on the voters’ adoption rate. The adoption of trademarks (e.g. pictures, symbols and electronic labels) can be used to illustrate that the IEC website for online application conforms to standard specifications (e.g. privacy laws and integrity of cyber compliance). Mattison Thompson et al. (2019) provide empirical data to illustrate that the use of trademarks has a substantial influence on user willingness to accept online applications. The adoption of education campaigns can result in an increase in voter knowledge about the online application and improve trust in website application assurances. A positive effect of trust in technology is voter behavioural intent to accept e-voting. Trust has a direct influence on use perceptions, which in turn influence the behavioural intention to adopt e-voting (Agbesi, 2020).

The finding on Trust in Technology as an independent variable construct illustrate the majority of the participants neither disagree or agree that trust in technology is major aspect that will impact the voters behavioural intents to accept e-voting. The participant uncertainty could be influence perceive view that Governmental intuitions lacks the necessary creditability to implement online application that offer user anonymity and system integrity.

The outcome clearly illustrate that government intuition’s that establish proactive measure to manage user personal information in a secure manner and ensure system integrity will build sustainable trust relationship with the users, which has a direct impact on the user adoption rate.

5.2.3 Effort Expectancy (EE)

This variable was discovered to have a substantial influence on behavioural intent to utilize e-voting system (β = 0.030, p = 0.000). The outcome support the literature by Faisal, et al. (2016) and Powell et al., (2012) that Effort Expectancy directly impact voter behavioural intents to adopt e-voting. However the study by (Choi, et al.,2012) illustrate there no substantial impact of effort expectancy on the behavioural intent to accept e-voting, further empirical data illustrate that majority of the participant somewhat agree and agree the effort expectancy will influence the voters' behavioural intents to accept e-voting

The outcome suggests that voters are keen to consider e-voting if they distinguish the new technology as useful and helpful to society. The general assessment is that e-voting systems that are user friendly and have an efficient authentication process will improve voter adoption of e-voting.

The adoption rate of new technology is influence by effort expectancy. The adopting of new technologies will enable user to use low effort however still achieve the desire objective of participating in democratic process. Online voter registration, e-voting and access to accurate results will have a significant impact on the voter participant rate.

5.2.4 Social Influence (SI)

This variable was discovered to have a substantial influence on behavioural intent to utilize e-voting system (β = 0.035, p = 0.00). The outcome support the literature from Faisal et al., (2016) and Powell et al., (2012) Social Influence will directly impact voter behavioural intents to accept e-voting. Above 70% of participant neither disagree nor agree that Social Influence is major factor that will influence the voters' behavioural intents to adopt e-voting.

The finding suggests to increase voter acceptance of e-voting, institutions like the IEC may implement awareness campaigns to drive the promotion of e-voting. Recent studies have indicated that promotional campaigns have a direct impact on adoption rates (Mahéo, 2017). Driving awareness with the appointment of social

influence and thought leaders can influence system adoption rates. The effective use of online reviews and comments can offer the voter credible insights into application security features, easy navigation and the website in general, which results in a direct influence on the adoption rate (Mattison Thompson et al., 2019). Research illustrates that women and younger members of society have a more positive attitude toward social media influence. The development of a media campaign that focuses on women and younger members of society will have a significant effect on the acceptance of e-voting (Jaiswal et al.,2018).

Research by Carter et al., (2011) illustrates that 31% of adults use internet-based services, emails, blogs and social networking applications to access government information.

5.2.5 Performance Expectancy (PE)

Performance expectancy was found not to have a substantial consequence on behavioural intent to utilize e-voting system ($\beta = 0.039$, $p = 0.729$). The outcome does not support the literature from Carter et al., (2011) and Choi, Kim, et al.,(2012), which indicate performance expectancy will directly impact voter behavioural intents to accept e-voting.

The outcomes suggest that irrespective of the usefulness and efficiency of a system there is no correlation between how voters expect the system to perform and the voter adoption rate. The results for this sample group illustrate that irrespective of the efficiencies that the system offers, voters still prefer manual voting. The study also showed that 57% of the sample group had no knowledge of e-voting. The adoption of an education campaign to demonstrate the benefits that e-voting offers in terms of operational efficiencies and cost effectiveness may improve voters' knowledge of the system.

The empirical outcome of the study is equally divided between neither disagree nor agree, somewhat agree and agree. The participant diverse views on Performance Expectancy could be influenced by different interpretation of the attributes that can be derived from Performance Expectancy. For some users system efficiency is key

enabler while it has a low priority for other users who prefer system functional layout / design.

5.3 Discussion to Research Question 2

RQ2: What are the benefits associated with the digital transformation of the electoral process

As shown in Table 4.3, 60% of the participants believed that e-voting would reduce voter errors and mitigate any chances of voter fraud, while 27.1% of the participants offered a neutral response. This suggests that 87% support the view that e-voting will improve voting, which can be interpreted as benefit to society.

Of the participants, 80% believed that e-voting would improve accessibility for people with disabilities and others that are unable to reach the polling places to vote. Of these, 50% somewhat agreed and 30% agreed with this statement.

Table 5.1: Recap of Benefit Hypotheses

Hypotheses	Description
H2 a	Trust in technology (TT) will have a substantial influence on user behavioural intent (BI) to adopt e-voting
H3 a	Performance Expectancy (PE) will have a substantial influence on user behavioural intent (BI) to adopt e-voting

5.3.1 Trust in Technology (TT)

The relationship between the Trust in Technology variable and behavioural intent was discovered be substantial ($\beta = 0.039$, $p = 0.000$) and the standardised path coefficient between TT and BI was extremely significant. The outcome supports the literature from Carter et al., (2011) and Choi, et al., (2012) which indicate Performance expectancy will directly influence voter behavioural intents to accept e-voting.

Trust can be described as the individual's perceived views that institutional regulation and legislative guidelines make the environment trustworthy and safe for

transacting. E-government involves the creation of a conducive environment in which citizens can trust that services and information are reliable and available upon request. Society must believe that government and the IEC have the ability to manage personal customer information and data privacy effectively and seamlessly integrate various government operational systems. For trust to qualify as a benefit, society must perceive that the system is trustworthy, reliable and beneficial for usage. According to Carter et al., (2011), trust is a key factor that influences behavioural intentions for the adoption of e-voting. Trust in Technology needs to build on all layers of governmental institutions over an extended period. A flaw in just one governmental institutional layer can be sufficient to undermine government capabilities, which can lead to loss of trust in the entire system (Russell & Zamfir, 2018). The hypothesis that trust in technology will have a substantial impact on user behavioural intent (BI) to accept e-voting is supported.

5.3.2 Performance Expectancy (PE)

Performance expectancy was found not to have a significant effect on behavioural intent to use an e-voting system ($\beta = 0.039$, $p = 0.729$) and the standardised path coefficient between PE and BI was not significant. The outcome does not support the literature from Carter et al., (2011) which indicate performance expectancy will directly influence voter behavioural intentions to adopt e-voting.

Research suggests that there are commonalities between system usefulness and system advantages (Carter et al., 2011), with previous studies finding a strong predictor of behavioural intention once a perceived benefit has been identified. The sample group did not perceive system performance as a benefit for driving the adoption of e-voting. This outcome implies that irrespective of the usefulness and efficiency of systems, there is no correlation between the expectancy of their performance and the voter adoption rate. The hypothesis that trust in technology will have a substantial impact on user behavioural intention (BI) to accept e-voting is not supported.

The adoption of e-voting contributes to higher voter turnout rate, improve accessibility, improve accuracy and faster result tabulation.

5.4 Discussion related to Research Question 3

RQ3: What are the challenges associated with the digital transformation of the electoral process

The first challenge examined was the threat of data breaches. From Table 4.4 above, it is clear that 52.1% of the participants had a neutral view about the association of data breaches with e-voting, while 35% of the participants believed that e-voting systems are vulnerable to data breaches such as personal data and loss. The view of the 35% of participants that e-voting systems which illustrate vulnerabilities to data breaches could be interpreted as a barrier to the adoption of e-voting.

Concerning whether e-voting is vulnerable to malicious programming and if it gets affected then any hacker can hack the machine and can tamper with the vote counts easily, 50% of the participants somewhat agreed and 30% agreed. This meant that 80% of the sample group believed that e-voting systems are vulnerable to malicious cyberattacks.

Table 5.2: Recap of Challenges Hypotheses

Hypotheses	Description
H1 b	Security expectancy (SE) will negatively affect the voter behavioural intent (BI) to adopt e-voting.
H2 b	Trust in Technology (TT) will negatively affect the voter behavioural intent (BI) to adopt e-voting

5.4.1 Security Expectancy (SE)

Security Expectancy was found to have a significant negative effect on behavioural intent to use an e-voting system ($\beta = 0.042$, $p = 0.001$). The outcome supports the literature by Jaiswal et al., (2018) and Powell et al., (2012) The study highlights that Security Expectancy directly influence voter behavioural intentions to adopt e-voting.

Any failure from government or the IEC that causes voters any system inconvenience or security-related challenges will have a profound influence on the acceptance of e-voting. Security may negative influence voter behavioural intent to accept e-voting. This illustrate if the apparent risk around of security are seen to be high, voters will avoid accepting e-voting systems if they perceive the possibility of a data breach or loss of personal information. The hypothesis that security expectancy will have a negative influence on behavioural intent to adopt e-voting is supported.

5.4.2 Trust in Technology (TT)

Trust in Technology was also found to have a substantial correlation with behavioural intent to use an e-voting system ($\beta = 0.039$, $p = 0.000$). The outcomes support previous literature by Faisal, et al. (2016) and Powell et al., (2012) that trust in technology directly impact voter behavioural intents to accept e-voting.

E-government offerings are still in their early stages, with society starting to obtain meaningful information from government websites, exchange information online and process transactions. There is a general propensity to trust that government system reliability and operational efficacy will influence behavioural intentions to adopt government online applications. However, if users encounter system challenges and unavailable services, this lack of ability will have a negative bearing on the intent to accept an e-voting application. This illustrates that voters will avoid adopting e-voting if they perceive the possibility of system challenges such as breaches in security protocols regarding anonymity, secrecy, data verifiability and voter authentication processes. The hypothesis that trust in technology will have a negative influence on behavioural intent (BI) to adopt e-voting is supported.

Notwithstanding of the numerous benefits that e-voting offers, security expectancy and trust in technology are potential barrier to acceptance of innovative technologies. E-voting have major challenges which may compromise the integrity of the results, and secrecy of the ballot.

In summary, the outcomes for factors that will influence user behavioural intention to adopt e voting of this research study supported by four research hypotheses and their accompanying research proposition (H1, H2, H4 and H5) and observed negative outcomes and lack of support for the research hypotheses (H3).

The study furthermore illustrated that the outcomes for hypotheses for the benefits associated with the digital transformation of the electoral process. This research study supported by one research hypotheses and their accompanying research proposition (H1a) and observed negative outcomes and lack of support for the research hypotheses (H3a).

The final assessment illustrated that the outcomes for hypotheses for the challenges associated with the digital transformation of the electoral process. This research study supported by one research hypotheses and their accompanying research proposition (H1b and H2b).

The research findings were discussed in comparison with the available literature, results from past studies and the theoretical frameworks used.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The main conclusions for this study are presented in this chapter. The conclusions address the research questions, which are derived from the research objectives. On the basis of these conclusions, recommendations are made for the digital transformation of the electoral voting system. The chapter closes with future research recommendations.

The research method applied was a quantitative assessment. The study focused on the South African context and an online questionnaire was sent to eligible South Africa voters.

This study applied two theoretical frameworks to determine the outcomes for this research. The first theoretical framework, Westerman et al.'s (2014) Digital Transformation Compass was used to obtain a better understanding of the benefits and challenges related with the digital transformation of the electoral process. (See Figure 2.2.)

The second theoretical framework used was Venkatesh et al.'s (2003) Unified Theory of Acceptance and Use of Technology (UTAUT). This model was used to determine the factors that would influence behavioural intentions to adopt e-voting in the South African context. The UTAUT is a key instrument used by researchers to determine factors that influence user attitudes towards the acceptance of e-voting. As this was a key factor for this research, the UTAUT was considered as the central academic framework for this study. (See Figure 2.3.)

The organising framework (Figure 2.5) drawn up for the study Guided the approach to conducting the research.

The research objectives for this study are as follows:

1. To determine the factors that will influence the voter's acceptance of e-voting
2. To determine the benefits associated with the digital transformation of the democratic electoral process
3. To determine the challenges associated with the digital transformation of the democratic electoral process

These research objectives informed the research questions below, under which the conclusions for the study are drawn.

1. What are the factors that will influence the adoption of e-voting?
2. What are the benefits associated with the digital transformation of the electoral process
3. What are the challenges associated with the digital transformation of the electoral process?

6.2 Conclusions for Research Question 1

What are the factors that will influence the adoption of e-voting?

To answer this research question, five independent variables based on the modified UTAUT model designed for the study were tested. These were Security Expectancy (SE), Trust in Technology (TT), Performance Expectancy (PE), Effort of Expectancy (EE) and Social Influence (SI).

The outcomes indicated that four of the independent variables were significant: Security Expectancy (SE), Trust in Technology (TT), Effort of Expectancy (EE) and Social Influence (SI). The findings showed that these variables were significant predictors of voter behavioural intention to adopt e-voting in the South African context.

Performance Expectancy (PE) as an independent variable showed no significant predictor correlation with voter behavioural intent to accept e-voting in the context of this study. The empirical outcomes of this study imply that irrespective of the

usefulness and efficiency of systems, there is no correlation between the performance expectancy and behavioural intentions to adopt e-voting.

The outcomes for challenges with manual voting clearly illustrate that 74% of the participants experience difficulty with manual voting, while its very concerning that only 43% of the participant don't have any knowledge about e-voting.

For any ICT to be universally accepted in the South African context, the system should make provision for the marginal sector of society. With the implementation of any transformational voting solutions, the IEC and government institutions must ensure that the marginalised sector of society is not excluded from the transformation journey. For example, the digital divide is still a barrier to universal access to government services and information. Without proactive means to eliminate the digital divide, government and the IEC will have to consider a hybrid model. Manual voting must remain part of the process, with members of society that do not have access to electronic devices and the necessary skills to manage the system offered the option to cast manual votes.

6.3 Conclusions for Research Question 2

What are the benefits associated with the digital transformation of the electoral process?

Two independent variables – Trust in Technology and Performance Expectancy were used to ascertain whether the independent variables could be perceived as beneficial contributors to the adoption of e-voting.

Trust in Technology as an independent variable showed substantial predictor correlation with the behavioural intention to adopt e-voting, which can be perceived as making beneficial contributions to the adoption of e-voting.

In contrast, Performance Expectancy (PE) as an independent variable showed no substantial predictor correlation that could be perceived as making a beneficial contribution to the adoption of e-voting. The hypothesis that Performance Expectancy (PE) will have a substantial impact on behavioural intention to utilize e-

voting system is not supported. The results of this study implies there is no correlation between the independent variable and dependent variable.

In the South African context, e-voting can be seen as a tool with the potential to advance democratic process, improve the credibility of the IEC, shape trust in government institutions and improve overall operational efficiencies. E-voting can be described as an innovative tool that can transform the electoral process, improving operational efficiency and cultivating trust in government institutions. If properly implemented, the solution can offer increased ballot security, increased voter authentication processing and effective result tabulation.

6.4 Conclusions for Research Question 3

What are the challenges associated with the digital transformation of the electoral process?

Two independent variables – Security Expectancy and Trust in Technology were used to ascertain whether the independent variables could be apparent as creating challenges to the accepting of e-voting.
Both Trust in Technology and Security Expectancy as independent variables illustrated substantial predictor correlation with behavioural intention to adopt e-voting and can be perceived as providing challenges to the adoption of e-voting in South Africa.

The hypotheses that Trust in Technology and Security Expectancy will have a negative influence on voter behavioural intent (BI) to acceptance e-voting are supported.

If not prudently deliberated on and planned, the introduction of e-voting can weaken government/IEC assurance on the entire process. Policy makers should therefore devote adequate resources and time to investigating all possible feasibility and observational studies from countries with transformation experiences of e-voting.

However, e-voting projects face multiple challenges. Failure to proactively implement a dynamic cybersecurity framework to manage and protect customer data effectively, for example, will undermine confidence in government institutions.

In addition, not all e-voting transformation processes yield successful results. It is therefore imperative that policy makers investigate all suitable technologies that have been successfully deployed and investigate countries that have successfully transformed their electoral process.

6.5 Contribution of this research

This study contributes the literature on the South African government's digital transformation journey and adoption of ICT to improve service delivery. The study's primary aim was to respond to the research gap regarding the benefits and challenges related with the digital transformation of the electoral process in the South African context. A secondary aim was to ascertain factors that will influence user behavioural intentions regarding the adoption of e-voting technologies.

The adoption of technologies for the transformation of the electoral process creates very complex challenges which require careful deliberation and planning. Transformation of the electoral process offer voters operational efficiency and improve trust in the IEC and Governmental Institutions. If appropriately implemented, e-voting tools can increase the security of the ballot, speed up the processing of results and make voting easier. However, the challenges are considerable. If not carefully planned and designed, e-voting can undermine the confidence in the entire electoral process. Legislative and technical challenges have arisen in some cases; in others, there has been scepticism about or opposition to the introduction of new voting technologies. It is therefore important to devote adequate time and resources to considering its introduction and looking at previous experiences of electronic voting.

6.5.1 Characteristic and functionalities of e-voting systems.

E voting have a variety of functions, including communication, encryption, randomization, and security systems. The following list of some of the end-user functionalities that such systems can provide to both voters.

E voting lists and voter authentication. E Voting system can be an electronic voter register, covering either a regional polling station or national voter registration of the country. This list can be used to authenticate eligible voters and to record that they have cast their vote.

Electoral staff member interfaces. System functionalities that are only available to authorise electoral staff member, resetting the vote count at the opening of the polling station, closing polling, printing and transmission of results.

Interfaces for casting votes. Touch screens, visual mark acknowledgement ballot papers that are read into a scanner, touch-sensitive tablets, push buttons, web pages or special client software for Internet voting.

Special interfaces for handicapped voters. Braille or audio input devices for the blind, easier access for voters with physical disabilities, and simpler interfaces for illiterate voters.

6.5.2 Potential benefits

- Improved convenience for voters, easy of usage
- Improve fraud prevention at polling stations and during the transmission and tabulation of results by reducing human interference.

- Offer multilingual user interfaces which accommodate for broader user segment

- Increased user accessibility, audio ballot papers for blind voters, with Internet voting as well for housebound voters and voters from abroad

- Increase operational efficiency and accurate results as human error is excluded

6.5.3 Potential Challenges

- Prospective violation of the secrecy of the vote, especially in systems that perform both voter authentication and vote casting

- Risk of manipulation by insiders with privileged access to the system or by hackers from outside

- Reduced level of control by the election administration because of high provider - and/or technology dependence.

- Increased security requirements for protecting the voting system during and between elections including during transport, storage and maintenance.

The ultimate aim of electoral reform will be adopting an e-voting solution which offer credibility to the electoral process and enjoys a high level of civic trust and confidence in the new system.

6.6 Recommendations

The following recommendations are made on the basis of the study results and conclusions.

1. **Ensure engagement with key stakeholders:** There needs to be emotional and intellectual buy-in from the IEC, legislators and the executive about the opportunities and challenges that the transformation process will present. Creating a climate for change involves beginning by establishing a sense of urgency through initiating conversations about how industry and society have successfully adopted transformation and the value creation that was derived from the process.
2. **Provide a message that is clear and unambiguous about the new imagined transformation process**: This would involve the appointment of a digital officer to lead the transformation process; the creation of a digital channel to communicate with key stakeholders; and the use of digital tools

such as social media, webcast, twitter and blogs to convey a message about the envisaged benefits of the transformation process.

3. **Determine institutional readiness** before commencing with the transformation of the process. A digital maturity assessment will help to identify the gaps and the development programmes necessary to address these gaps. Investment in skills development programmes and the building of internal capabilities needs to be made.
4. **Establish a task team that is led by industry leaders** who have successfully led transformation processes. This could be achieved through the creation of information-sharing sessions with broader society about the challenges and opportunities that the digital transformation process presents. Voter education drives could also offer experiential campaigns that illustrate the benefits of e-voting and how society can benefit from the transformation process.
5. A significant consideration for policy makers is to ensure that **the electorate is offered voter education campaigns** to drive a communication message about the benefits and challenges associated with the transformation of the electoral process. Effective campaigns should familiarise the voter with system rules and procedures. The findings of the study propose that the development of a pilot project on a small scale to test system reliability, make people accustomed to the systems and identify human challenges that need adjustment or improvement may be useful.

6.7 Suggestions for future research

The current study used a quantitative methodology. A study that uses a mixture of quantitative and qualitative methods could obtain a broader diversity of consequences when dealing with human factors that include both numerical results and the basis for these results. The opportunity to combine both types of information instantaneously into a single study will enhance significance of the research. Multidimensional results will enable the researcher to make profound suggest justifications and further research steps in a given field of study.

Further topics that could be investigated are:

- Ascertain voter readiness for adoption of the digital transformation of the democratic electoral process
- Ascertain institutional readiness for adoption of the digital transformation of the democratic electoral process
- Ascertain the impact of the digital divide on the adoption of e-voting

REFERENCES

Achieng, M., & Ruhode, E. (2013). The Adoption and Challenges of Electronic Voting Technologies Within the South African Context. *International Journal of Managing Information Technology*, *5*(4), 1–12. https://doi.org/10.5121/ijmit.2013.5401

Agbesi, S. (2020). Examining voters' intention to use internet voting system: A case of Ghana. *International Journal of Electronic Governance*, *12*(1), 57–75. https://doi.org/10.1504/IJEG.2020.106997

Almut G. Winterstein, C. . K. &. (2008). Validity and reliability of measurement instruments used in research. *American Journal of Health-System Pharmacy, Volume 65, Issue 23, , Pages 2276–2284*.

Andrew, C. T., & Josephine, M. T. (2019). The electoral commission and youth participation in the electoral process of South Africa: A critical deductive discourse on Africa's electoral legitimacy. *African Renaissance*, *16*. https://doi.org/10.31920/2516-5305/2019/v16n1a9

Apuke, O. D. (2017). Quantitative Research Methods : A Synopsis Approach. *Kuwait Chapter of Arabian Journal of Business and Management Review*, *6*(11), 40–47. https://doi.org/10.12816/0040336

Carter, L., & Campbell, R. (2011). The impact of trust and relative advantage on internet voting diffusion. *Journal of Theoretical and Applied Electronic Commerce Research*, *6*(3), 28–42. https://doi.org/10.4067/S0718-18762011000300004

Chaushi, A., Chaushi, B. A., & Ismaili, F. (2015). Measuring e-Government Maturity: A meta-synthesis approach. *SEEU Review*, *11*(2), 51–67. https://doi.org/10.1515/seeur-2015-0028

Chiang, L. (2009). Trust and security in the e-voting system. *Department of Political Science, National Cheng Kung University, No. 1, University Rd., Tainan, 701 Taiwan*.

Choi, S.O. and Kim, B. C. (2012). ‘Voter intention to use E-voting technologies: security, technology acceptance, election type and political ideology’, . *Journal of Information Technology and Politics, Vol. 9, No. 4, Pp.433–452*.

DHLAMINI, S. (2020). Experts to propose changes to electoral system. *Polity*.

Dr Brian Armstrong, D. G. J. L. (2021). *Digital Business*.

Elewa, A. E., AlSammak, A., AbdElRahman, A., & ElShishtawy, T. (2015). Challenges of Electronic Voting - A Survey. *Advances in Computer Science : An International Journal*, *4*(6), 98–108. http://www.acsij.org/acsij/article/view/379

Essex, A. (2017). *Internet Voting in Canada : A Cyber Security Perspective*.

Faisal Al Amry, & Kie, C. (2016). Assessment of E-Voting Risks Using AHP Method for the Omani Government Election. *Information Security and Computer Fraud, Vol. 4, 2016, Pages 1-8*, *4*(1), 1–8. https://doi.org/10.12691/iscf-4-1-1

Farelo, M., & Morris, C. (2021). *The Status of E-government in South Africa*. 1–12.

G. David Garson. (2006). *Public Information Technology and E-governance: Managing the Virtual State*.

George Westerman, Didier Bonnet, A. M. (2014). *Leading Digital: Turning Technology Into Business Transformation*.

Gliner JA, Morgan GA. Research Methods in Applied Settings: An Integrated Approach to Design and Analysis. New Jersey, London: Lawrence Erlbaum Associates; 2000

Goldsmith, B., & Ruthrauff, H. (2013). Case Study Report on Electronic Voting in the Netherlands. *Implementing and Overseeing Electronic Voting and Counting Technologies*, 259–274. https://www.ndi.org/implementing-and-overseeing-e-voting-counting-technologies

Grauvogel, J. (2016). Africa Spectrum. *Africa Spectrum*, *2*, 3–14.

Green, D. P., & Schwam-Baird, M. (2016). Mobilization, participation, and American

democracy: A retrospective and postscript. *Party Politics*, *22*(2), 158–164. https://doi.org/10.1177/1354068815605678

Gustafsson, R. (2018). *Strategic leading of digital transformation in large established companies.pdf*. 104.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (1998). *Multivariate Data Analysis*.

IDEA. (2016). Voter Turnout Trends around the World. In *International IDEA*. http://www.idea.int/sites/default/files/publications/voter-turnout-trends-around-the-world_0.pdf

Jaiswal, M., & Kar, A. K. (2018). *The acceptance of electronic voting machines in India : A UTAUT approach The acceptance of electronic voting machines in India : a UTAUT approach Sumedha Chauhan * Mahadeo Jaiswal Arpan Kumar Kar*. *September*. https://doi.org/10.1504/EG.2018.093427

Kiayias, A. (2010). Electronic voting-A brief study of remote internet voting in Estonia. *Handbook of Financial Cryptography and Security*, 59–82.

Kim, D. J., Ferrin, D. L., & Rao, H. R. (2008). *A trust-based consumer decision-making model in electronic commerce : The role of trust , perceived risk , and their antecedents*. *44*, 544–564. https://doi.org/10.1016/j.dss.2007.07.001

Kotter on accelerating change. (2014). *Kotter on accelerating change*.

Leedy, Paul D.; Ormrod, J. E. (2010). *Practical Research: Planning and DesignPlanning and Design, 12th Edition*.

Lyytine, K. (2003). Why organizations adopt information system process innovations: a longitudinal study using Diffusion of Innovation theory. · *Information Systems Journal 13(3):275-297*.

Mahéo, V.-A. (2017). Information Campaigns and (Under)Privileged Citizens: An Experiment on the Differential Effects of a Voting Advice Application. *Pages 511-529 | Published Online:*

Mattison Thompson, F., Tuzovic, S., & Braun, C. (2019). Trustmarks: Strategies for exploiting their full potential in e-commerce. *Business Horizons*, *62*(2), 237–247. https://doi.org/10.1016/j.bushor.2018.09.004

Mavlanova, T., Benbunan-Fich, R., & Koufaris, M. (2012). Signaling theory and information asymmetry in online commerce. *Information and Management*, *49*(5), 240–247. https://doi.org/10.1016/j.im.2012.05.004

Meyer, J. (2011). The Adoption of New Technologies and the Age Structure of the Workforce. *SSRN Electronic Journal*, *08*. https://doi.org/10.2139/ssrn.1210162

Minecast. (2021). Mimecast Annual Security Report. *Mimecast Annual Security Report*.

Nonkqubela Jordan-Dyani. (2020). *NOTICE No…. OF 2020 DEPARTMENT OF COMMUNICATIONS AND DIGITAL TECHNOLOGIES*. *43834*.

Ophelius, Y. M. (2017). *International Journal of Advanced Research in Overview of Biometric Electronic Voting System in Ghana*. *3*(May), 1–5.

Petitpas, A., Jaquet, J. M., & Sciarini, P. (2021). Does E-Voting matter for turnout, and to whom? *Electoral Studies*, *71*(February 2020). https://doi.org/10.1016/j.electstud.2020.102245

Powell, A., Williams, C. K., Bock, D. B., Doellman, T., & Allen, J. (2012). E-Voting intent: A comparison of young and elderly voters. *Government Information Quarterly*, *29*(3), 361–372. https://doi.org/10.1016/j.giq.2012.01.003

Pratama, H. M., & Salabi, N. A. (2020). Adoption of Voting Technology: A Guide for Electoral Stakeholders in Indonesia. In *Adoption of Voting Technology: A Guide for Electoral Stakeholders in Indonesia*. https://doi.org/10.31752/idea.2020.26

Ramoriting, T. (2022). Digital transformation and its role in advancing the public sector. *City Press*.

Remane, G. (2017). Digital Maturity in Traditional Industries - an Explanatory

Analysis. AIS Electronic Library, May, 104–125.

Rogers, D. (2016). *THE DIGITAL TRANSFORMATION PLAYBOOK*.

Runciman, C., Bekker, M., & Mbeche, C. (2021). *Analysing voter abstention in the 2021 local government elections : A view from five metropolitan municipalities*.

Russell, M., & Zamfir, I. (2018). Digital technology in elections. Efficiency versus credibility? *EPRS | European Parliamentary Research Service*, *September 2018*. http://www.europarl.europa.eu/RegData/etudes/BRIE/2018/625178/EPRS_BRI(2018)625178_EN.pdf

Trechsel, A. H., Kucherenko, V., & Silva, F. (2016). *Potential and Challenges of E-Voting in the European Union Study*. 44. https://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_STU(2016)556948

UNDESA. (2015). Population 2030: Demographic challenges and opportunities for sustainable development planning (ST/ESA/SER.A/389). *United Nations*, 58. http://www.un.org/en/development/desa/population/publications/pdf/trends/Population2030.pdf

Ursachi, G., Horodnic, I. A., & Zait, A. (2015). How Reliable are Measurement Scales? External Factors with Indirect Influence on Reliability Estimators. *Procedia Economics and Finance*, *20*(15), 679–686. https://doi.org/10.1016/s2212-5671(15)00123-9

Vassil, K., Solvak, M., Vinkel, P., Trechsel, A. H., & Alvarez, R. M. (2016). The diffusion of internet voting. Usage patterns of internet voting in Estonia between 2005 and 2015. *Government Information Quarterly*, *33*(3), 453–459. https://doi.org/10.1016/j.giq.2016.06.007

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27(3), 425–478.*

Venkatesh. (2003). *Unified Theory of Acceptance and Use of Technology (UTAUT) (2003)*. *September 2003*. https://doi.org/10.2307/30036540

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly: Management Information Systems*, *36*(1), 157–178. https://doi.org/10.2307/41410412

Vial, G. (2021). Understanding digital transformation. *Managing Digital Transformation*, 13–66. https://doi.org/10.4324/9781003008637-4

Visser, W., & Twinomurinzi, H. (2008). E-government & public service delivery: Enabling ICT to put “People First” - A case study from South Africa. *IMSCI 2008 - 2nd International Multi-Conference on Society, Cybernetics and Informatics, Proceedings*, *3*, 81–86.

Warkentin, M., Sharma, S., Gefen, D., Rose, G. M., & Pavlou, P. (2018). Social identity and trust in internet-based voting adoption. *Government Information Quarterly*, *35*(2), 195–209. https://doi.org/10.1016/j.giq.2018.03.007

Williams, M. D., Rana, N., Dwivedi, Y. K., & Lal, B. (2014). *IS UTAUT REALLY USED OR JUST CITED FOR THE SAKE OF IT ? A SYSTEMATIC REVIEW OF CITATIONS OF UTAUT ’ s*. *May*.

Wolf, P. (2017). *Introducing Biometric Technology in Elections*.

Wyk, B. Van. (2015). Research design and methods Part Iمناهج بحث. *File:///C:/Users/NJODZELA/Downloads/Unconfirmed 947211.Crdownload*.

Yurong Yao & Lisa Murphy. (2007). Remote electronic voting systems: an exploration of voters’ perceptions and intention to use. *European Journal of Information Systems, Vol. 16, No. 2, Pp.106–120.*

Zelić, B., & Stahl, B. C. (2005). Does ontology influence technological projects? The case of irish electronic voting. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *3782 LNAI*, 657–667. https://doi.org/10.1007/11590019_73

APPENDIX A. CONSISTENCY MATRIX

Table.1: Consistency Table: Research Questions, Propositions, Data Collection, and Data Analysis

RQ #		State Research Objective	Prop/hyp #	State Research Question	Data-collection detail	Data-analysis method
1.1		Explore the benefits associated with the digital transformation of the democratic electoral process	1.1	What are the benefits associated with the digital transformation of the democratic electoral process? .	Online Survey	Quantitative method
1.2		Explore the challenges associated with the digital transformation of the democratic electoral process	1.2	What are the challenges associated with the digital transformation of the democratic electoral process?	Online Survey	Quantitative method
1.3		Explore voter Behaviour Intention toward adoption of the digital transformation of the democratic electoral process	1.3	What is the voter Behaviour Intention toward adoption of the digital transformation of the democratic electoral process in South Africa?	Online Survey	Quantitative method

APPENDIX B. ONLINE QUESTIONNAIRE

		Likert scale	1	2
		Please select your level of agreement or disagreement to the following statement	**Yes**	**NO**
Past Experience	**1**	**Have you voted before**		
	2	**Have you experienced challenges with the manual voting system?**		
	3	**Do you have any knowledge of E-voting**		

		Likert scale	1	2	3	4	5	6	7
		Please select your level of agreement or disagreement to the following statement	**Strongly agree**	**Agree**	**Somewhat Agree**	**Neutral**	**Somewhat Disagree**	**Disagree**	**Strongly disagree**
Security Expectancy (SE)	**1**	*I believe e-voting keeps my vote secure*							
	2	*E –voting provides accurate results*							
	3	*E-voting is relatively free from faults*							
Trust in Technology	**1**	*E -voting is trustworthy*							
	2	*E-voting keeps my vote secret*							
	3	*I believe e- voting machine has good reputation*							
Performance Expectancy	**1**	*I believe e- voting machine useful*							
	2	*E-voting will enhances my efficiency in*							
	3	*E voting will improve participate in elections*							
	4	*If I have access to e- voting ,I will be more likely to vote*							
	1	*E -voting will provide clear and understandable process*							

Effort Expectancy	**2**	*It is easy for me to become skilful at using e- voting*							
	3	*I find e- voting easy to use*							
	4	*Learning to use e- voting machine is easy for me*							
Social Influence	**1**	*People who influence my behaviour think that I should cast my vote using e-voting*							
	2	*_Family and friend who are important to me think that I should cast my vote using e voting*							
	3	*I cast my vote using e-voting because of the proportion of friends who use it*							
Behavioural Intention	**1**	*Family and friend who are important to me think that I should cast my vote using e voting*							
	2	*I cast my vote using e-voting because of*							
Benefits	**1**	*E voting reduce voter errors and the chances of voter fraud*							
	2	*E voting improves Accessibility for people with disabilities and who are unable to reach the polling places to vote*							
Challenges	**1**	*E Voting are susceptible to data breaches like (Personal data n loss)*							
	2	*E Voting are vulnerable to malicious programming and if it gets affected then any hacker can hack the machine and can tamper the vote counts easily.*							

APPENDIX C. ONLINE INTERVIEW INFORMATION SHEET

Dear Sir / Madam,

My name is Hendrick Scheepers and I am a Masters student in Digital Business at the University of the Witwatersrand, Johannesburg. As part of my studies, I have to undertake a research project, and I am investigating The Digital Transformation of the democratic election process under the supervision of Dr. Manessah Alagbaoso.

As part of this project, I would like to invite you to take part in an answering an online questionnaire. This activity will involve online questionnaire and will take around 20 minutes.

Your participation is voluntary, and you can withdraw at any time without penalty. Your participation is anonymous and only aggregated data will be reported. By completing the survey, you indicate that you voluntarily participate in this research. If you have any concerns, please contact my supervisor or me.

Looking forward to your response.

Yours sincerely,

Researcher: Email:

Cell:

Supervisor:

APPENDIX D. ETHICS CLEARANCE CERTIFICATE

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

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

Ethics Clearance Certificate

Ethics protocol number: WBS/DB0317503d/155
This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

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

Project title	The benefits and challenges of the digital transformation of the democratic election process
Investigator / Researcher	Mr Hendrick Schoeman
Nature of Project	MM (Digital Business)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed anonymity and confidentiality.
Issue Date of Certificate	2021-11-11
Expiry date	Date of submission of the project report
Chairperson	Prof Anthony Stacey +27 11 717 3587 +27 82 880 4531 anthony.stacey@wits.ac.za

Declaration by Researcher

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

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

Signature

11-11-2021
Date:

C2 General