

**CONTRIBUTION OF SYSTEMS AUTOMATION TO THE REDUCTION OF
CORRUPTION LEVELS AT THE KENYA PORTS AUTHORITY**

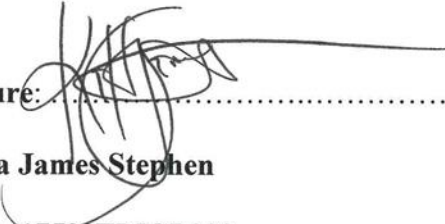
KALUMA JAMES STEPHEN

**A Thesis Submitted in Partial Fulfilment of the Requirements for the Award of
the Degree of Master of Science in Governance, Peace and Security Studies in the
Department of Governance, Peace, and Conflict Studies and the School of
Humanities and Social Sciences of Africa Nazarene University**

June 2022

DECLARATION

I declare this thesis is my original work and has not been presented for a degree at any other university.

Signature: ..... Date: 23/06/2022.....
Kaluma James Stephen
Reg No: 17J03EMGP022

This thesis was conducted under our supervision and is submitted with our approval as university supervisors.

Signature: ..... Date: 23rd June 2022.....

Dr. Simon Muthomi

Department of Governance, Peace and Conflict Studies

Africa Nazarene University

Signature: ..... Date: 23/06/2022.....

Dr. Victoria Mukami

Department of Computer and Information Technology

Africa Nazarene University

Africa Nazarene University

Nairobi, Kenya

DEDICATION

I dedicate this thesis to my loving parents, Mr. Karuu M'Ikiba and Mrs. Anjelica Karuu, and my siblings for their unwavering support and love; they have made this thesis possible and will forever be indebted.

ACKNOWLEDGEMENTS

My greatest gratitude goes to God almighty for giving me the strength, knowledge, and above all good health for the duration of my program. I also wish to express my heartfelt appreciation to my Supervisors Dr. Simon Muthomi and Dr. Victoria Mukami for their assistance, direction, and helpful criticisms throughout the research process. I am also grateful to Dr. Emily Okuto, the Head of Department, Governance, Peace and Security Studies for her support. I would also wish to acknowledge my lecturers for indispensable support, my classmates for moral support, and my employer for recognizing the need for continuous knowledge acquisition and encouraging me to study. Finally, I wish to thank my loving parents, siblings, and loyal friends for their support, understanding, encouragement, and prayers during the entire period of my study.

TABLE OF CONTENTS

DECLARATION.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	v
LIST OF TABLES	ix
LIST OF FIGURES	x
ABSTRACT.....	xi
DEFINITION OF TERMS.....	xii
ABBREVIATIONS AND ACRONYMS.....	xiv
CHAPTER ONE	1
INTRODUCTION.....	1
1.1 Introduction	1
1.2 Background to the Study	1
1.3 Statement of the Problem	8
1.4 Purpose of the Study	9
1.5 Specific Objectives.....	9
1.6 Research Questions	9
1.7 Significance of the Study	10
1.8 Scope of the Study.....	11
1.9 Delimitation of the Study	12
1.10 Limitations of the Study	12
1.11 Assumptions of the Study	13
1.12 Theoretical review	14
1.12.1 Technological Determinism theory by Thorstein Veblen	14
1.12.2 Theory of Social Determinism by Emile Durkheim (1858 - 1917).....	16
1.12.3 Rent-Seeking Theory of Corruption by Gordon Tullock	18
1.13 Conceptual Framework	20
CHAPTER TWO	23
LITERATURE REVIEW	23
2.1 Introduction	23
2.2 Empirical Literature Review	23
2.2.1 Nature of systems automation deployed to reduce corruption	23

2.2.2 Strategies put in place to support systems automation at the Port.....	29
2.2.3 Effectiveness of the systems automation in Corruption reduction	33
2.3 Summary of literature and research gap.....	39
CHAPTER THREE.....	40
RESEARCH METHODOLOGY	40
3.1 Introduction	40
3.2 Research Design.....	40
3.3 Research Site	41
3.4 Target Population	41
3.5 Sample Size and Sampling Procedure.....	42
3.5.1 Sample Size	42
3.5.2 Sampling Procedure.....	43
3.6 Data Collection.....	45
3.6.1 Research Instruments.....	45
3.6.2 Pilot Study	46
3.6.3 Validity of the Instruments	47
3.6.4 Reliability of the Instruments	48
3.6.5. Data Collection Procedure.....	48
3.7 Data Analysis Techniques.....	49
3.8 Ethical Considerations.....	50
CHAPTER FOUR.....	51
DATA ANALYSIS AND FINDINGS.....	51
4.1 Introduction	51
4.2 Presentation of Research Analysis and Findings	51
4.2.1 Response Rate and Socio-Demographic Characteristics.....	51
4.2.2 Nature of Systems Automation Deployed to Reduce Corruption	55
4.2.2.1 Departmental Based Automation System	55
4.2.2.2 Frequently Used Systems.....	56
4.2.2.3 Automation of Major Port Operations	57
4.2.2.4 Presence of an Online Platform for Reporting Corruption	58
4.2.2.5 Investigation Corruption Allegations.....	59
4.2.2.6 Significance of automation system in Corruption reduction	60
4.2.2.7 Bridging loopholes exploited by corrupt officials	60

4.2.2.8 Correlation between Nature of System Automation and Reduction in Corruption.....	62
4.2.3 Strategies to support systems automation at the KPA in the reduction of corruption.....	62
4.2.3.1 Strategies to Support Systems Automation at the KPA.....	63
4.2.3.2 Customers Training and Sensitization	66
4.2.4.3 Staff Training and Sensitization.....	66
4.2.3.4 System Audits	67
4.2.3.5 Regular Maintenance of Systems.....	68
4.2.3.6 Resource Allocation to Support System Operations.....	68
4.2.3.7 Correlation between Strategies to Support Systems Automation at the KPA in the Reduction of Corruption	70
4.2.4 Effectiveness of systems automation in reduction of corruption levels at the KPA	70
4.2.4.1 Effectiveness of automation in the reduction of corruption.....	71
4.2.4.2 Presence of electronic payment methods that help reduce corruption..	71
4.2.4.3 Clearing Time Following the Automation of Services	72
4.2.4.4 Reduction of delays previous occasioned by corrupt individuals.....	73
4.2.5.5 The flow of the Clearing Process.....	74
4.2.4.6 Cargo Security	74
4.2.4.7 Cost Incurred in Clearing a Cargo	75
4.2.4.8 Time Taken to Clear Cargo.....	76
4.2.5 Perceived Reduction of Corruption at KPA	78
4.2.5.1 Reduction of bribery	78
4.2.5.2 Reduction of the embezzlement of funds at the port	79
4.2.5.3 Reduction of kickbacks at the port.....	79
4.2.5.4 Reduction of the nepotism and cronyism at the port	80
CHAPTER FIVE	81
DISCUSSION, SUMMARY, CONCLUSION, AND RECOMMENDATIONS ..	81
5.1 Introduction	81
5.2 Discussion	81
5.2.1 Respondent Socio-Demographic Factors	81
5.2.2 Nature of systems automation deployed at the KPA to reduce corruption ..	82

5.2.3 Strategies to support systems automation at the KPA in the reduction of corruption.....	83
5.2.4 Effectiveness of systems automation in reduction of corruption levels at the KPA	84
5.3 Summary of the Findings	86
5.3.1 Socio-Demographic Factors	86
5.3.2 Nature of systems automation deployed at the KPA to reduce corruption .	86
5.3.3 Strategies to support systems automation at the KPA in the reduction of corruption.....	87
5.3.4 Effectiveness of systems automation in reduction of corruption levels at the KPA	87
5.4 Conclusion.....	88
5.5 Recommendations	88
5.6 Areas of Further Research.....	89
REFERENCES.....	90
APPENDICES	107
Appendix I: Commitment Letter	107
Appendix II: Questionnaire	108
Appendix III: Interview Guide.....	113
Appendix IV: Authorization from NACOSTI	116
Appendix V: Letter from Nazarene University.....	118
Appendix VI: Port Map.....	119
Appendix VII: Plagiarism Report	120

LIST OF TABLES

Table 3. 1: Target population.....	42
Table 3. 2: Sample size determination.....	44
Table 4. 1: Social Demographic Information	52
Table 4. 2: Duration and Section Worked at KPA.....	54
Table 4. 3: Major Operations at the KPA have been Automated	58
Table 4.4: KPA investigates Corruption Allegation.....	59
Table 4. 5: Automated operations in our department help reduce corruption	60
Table 4. 6: Correlation between nature of system automation and reduction in corruption.....	62
Table 4. 7: KPA conducts customers training and sensitization on the use of various systems.....	66
Table 4.8: KPA conducts staff training and sensitization on the use of various systems and customer support	67
Table 4. 9: KPA carries out system audit to ensure no interference with the operation of systems.....	67
Table 4. 10: There is regular maintenance of systems in our department.	68
Table 4. 11: KPA has made the resource available to support system operations.....	69
Table 4.12: Association between Strategies to support systems automation at the KPA in the reduction of corruption	70
Table 4. 13: There improved clearing time following the automation of services	73
Table 4. 14: There is a seamless flow of the clearing process.....	74
Table 4. 15: There is a decrease in cost incurred in clearing a cargo	76
Table 4. 16: Association between Effectiveness of systems automation in reduction of corruption levels at the KPA.....	77
Table 4. 17: Reduction of the bribery at the port.....	78
Table 4. 18: Reduction of the embezzlement of funds at the port.	79
Table 4. 19: Reduction of kickbacks at the port	80
Table 4. 20: Reduction of the nepotism and cronyism at the port.....	80

LIST OF FIGURES

Figure 1. 1: Conceptual Framework	22
Figure 4. 1: Response Rate	52
Figure 4. 2: Departmental Based Automation System.....	56
Figure 4. 3: Frequently Used Systems at KPA	57
Figure 4. 4: KPA has an Online Platform for Reporting Corruption.....	59
Figure 4. 5: Automation bridged loopholes exploited by corrupt officials.....	61
Figure 4. 6: Strategies to support systems automation in reduction of corruption	65
Figure 4. 7: Effectiveness of automation on the reduction of corruption	71
Figure 4. 8: KPA has electronic payment methods that help reduce corruption	72
Figure 4. 9: Automation has reduced delays occasioned by corrupt individuals.....	73
Figure 4. 10: There is increased security of cargo being cleared at the port	75
Figure 4. 11: Effectiveness of automation to reduce time for cargo clearing.....	76

ABSTRACT

Corruption remains a major problem in most parastatals in Kenya not excluding Kenya Port Authority. The main objective of this study was to study the contribution of systems automation to the reduction of corruption levels at the Kenya Ports Authority (KPA). To achieve this, the researcher sought to address the following specific objectives; to establish the nature of systems automation deployed at KPA, strategies adopted to support systems automation, and the effectiveness of the systems automation in the reduction of corruption at the KPA. The study was anchored on Technological Determinism theory and the Theory of Social Determinism. The researcher employed a descriptive survey design to evaluate the objectives of this study. The target population for this study was 6511 staff members from Kenya Ports Authority from 27 departments. A sample of 377 staff from KPA was recruited to participate in the study. To ensure fair distribution and avoidance of bias, a stratified sampling technique was used to determine sample representatives from each department to participate in the study; the researcher further used simple random sampling to select individual members of the department for this study. Piloting of the study tool was done targeting staff from Kenya Revenue Authority's (KRA) Port Office from which reliability of the tool was determined. The KRA Port office being a strategic partner and having physical premises at the Port of Mombasa is deemed ideal for piloting. This averted the possibility of respondents of the main study being influenced to respond to questionnaires in a particular pre-determined way. The primary was gathered using questionnaires and an interview guide. Reliability was established by calculating Cronbach's coefficient alpha where values obtained were greater than 0.70 and were considered good or acceptable. The collected data were analysed using descriptive and inferential statistics in Statistical Package for Social Sciences (SPSS) version 26.0 and then the results were presented in form of graphs, pie charts, percentages, and frequencies. The thematic approach was used in summarizing qualitative data in line with the three research objectives. The qualitative findings are presented using a descriptive approach. The findings of this study have a significant contribution to policymakers, KPA, parastatals, and scholars. The study found that various automated systems had been adopted at KPA. The commonly used systems include SAP (47.7%), CARTOS (31.1%), and KWATOS (9.8%). The study also found various strategies had been adapted to support system automation; training of the staff (21.1%) system audit (12.5%) and allocation of resources (6.6%) to improve automated systems. It was also observed that the automation eliminated human factors in the clearing of cargo and particularly payments, tracking of cargo which initially was done through human escort leading to reduced corrupt practices at the port. The study concluded that there is an association between automation and reduction in corruption. The study recommends increased automation of major operations at the port to enhance the fight against corruption at the port and continued strategizing to support system success at the port.

DEFINITION OF TERMS

Automated System: It is a mix of software and hardware that is intended and configured to do tasks even without the intervention of a human. In the view of Bolle, Casey, and Jacquet (2020), an automated system is capable of performing an intervention “instead of a person.”

Automation: The automation concept refers to the takeover or delegation of functions that were previously carried out by humans to a “machine agent” (Coombs et. al, 2020; Parasuraman, 1997).

Corruption: Hartani, Cao & Nguyen (2020) views Corruption as a moral and ethical vice that entails, in the opinion of Burbules, (2018), criminal acts perpetrated by people in positions of influence and power in pursuit of unlawful benefits. It is dishonesty on the part of individuals in positions of power, such as executives or public servants. Presenting or receiving bribes or unethical presents, double-dealing, under-the-table deals, rigged elections, diverting resources, embezzling, and scamming investors are all examples of corruption.

E-government: It is the use of technological communications devices, such as computers and the Internet, to provide public services to citizens and other persons in a country or region (United Nations, 2022).

Information Communication Technology: This entails “innovations for the control and communication of all digital data” (Suleiman, Yahya & Tukur, 2020). It is an electronic medium used to create, store, manipulate, receive, and send data from one location to another. It facilitates communication

delivery by making it more accessible, accessible, understandable, and easily understandable.

State Corporation is a legal entity founded by a state to engage in business transactions on behalf of the state (Law Insider, 2022).

ABBREVIATIONS AND ACRONYMS

2SLS:	Two-Stage least squares
ACS:	Access Control Service
AI:	Artificial Intelligence
ASYCUDA:	Automated System for Customs Data
BA:	Building Automation
BIM:	Building Information Modeling
CCI:	Commodity Channel Index
CCTV:	Closed-Circuit Television
CPI:	Corruption Perception Index
CVR:	Content Validity Ratio
DLT:	Distributed Ledger Technology,
EACC:	Ethics and Anti-Corruption Commission
EDA:	Exploratory Data Analysis
EFCC:	Economic and Financial Crime Commission
EGDI:	E-Government Development Index
FIS:	Financial Information System
FOI:	Freedom of Information
GDP:	Gross Domestic Product
HP-UX:	Hewlett Packard UNIX
ICPC:	Independent Corrupt Practices and Related Offences Commission
ICT:	Information Communication Technology
ICT4D:	Information and Communication Technology for Development
IFC:	Industry Foundation Classes
IFMIS:	Integrated Financial Management Information System
IMF:	International Monetary Funds
ITU:	International Telecommunication Union
KACC:	Kenya Anti-Corruption Commission
KPA:	Kenya Ports Authority
KRA:	Kenya Revenue Authority
KWATOS:	Kilindini Waterfront Automated Terminal Operations System
NACOSTI:	National Commission for Science, Technology, and Innovation
NARC:	National Alliance of Rainbow Coalition

NGO:	Non-governmental organisation
OECD:	Organisation for Economic Cooperation and Development
OLS:	Ordinary least squares
OSI:	Online Service Index
PSIP:	Public Service Integrity Programme
ReSPA:	Real Estate Settlement Procedures Act
SAP:	Systems Application and Product
SDGs:	Sustainable Development Goals
SPSS:	Statistical Package for Social Science
SST:	Social Shaping of Technology
SUDPLAN:	Sustainable Urban Development Planner
SYOS:	Special Yard Operations System
TD:	Technological Determinism
TI:	Transparency International
UN:	United Nations
UNCTAD:	United Nations Conference on Trade and Development
UNODCCP:	United Nations Office for Drug Control and Crime Prevention
VTMS:	Vessel traffic management System
WGI:	Worldwide Governance Indicators

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter looked at the background of the study. It also dissects the need for the research and the historical background of the research topic. In addition, the chapter presents the statement of the problem using relevant literature. Further, the section outlined the purpose of the study, specific objectives, research questions, significance of the study, the scope of the study, delimitation of the study, limitation of the study, the assumptions, theoretical review, and conceptual framework.

1.2 Background to the Study

Automated systems have been prevalent; most organizations invest a lot of money to procure and establish these systems (Delgado, et al., 2019; Nyholm, 2018). According to Kurfess (2018), automation is a computerized mechanism adopted to improve the efficiency of the organization. This efficiency is achieved by applying effective management and execution of organizational activities. Digital communications circulation, simple searching of encoded information, swift and prompt response to clientele, eliminating paper from the office arrangement loop, suitable regulation over consumers, certification and preservation of beneficial info, and enhancing communication process are among the operations. The automating data system aids the team of an organization in attaining its objectives (Bolle, Casey & Jacquet, 2020). It can also be defined as "all formally and informally digital circuits that pertain to transmitting information between individuals within and without the business" (Rifai et al, 2020). It is also one of the aspects that can help increase organization productivity" (Acemoglu & Restrepo, 2018). Automation of services is being adopted widely to address time wastage and loss of revenue which occurs through

corruption. Some elements of this system automation include; an online portal, digital electronic payment, CCTV Automation Tally system, and automated Management of Customs Transaction.

According to the World Bank (2007), between US\$1 trillion and US\$1.6 trillion are lost to fraud each year. Tax avoidance, bribery, exaggerated budgets, and illicit spending are among the losses (Otusanya, Lauwo, & Adeyeye, 2012). Misappropriation of taxpayers' finances and theft of government resources are not included in this estimation because they are exceedingly hard to assess. Corrupt practices often happen if there is a potential for a clandestine exchange of goods and services, resulting in significant economic, societal, and ethical consequences to the community (Abrate, Erbetta, Fraquelli & Vannoni, 2015).

Numerous studies have concentrated on efforts to employ the Information and Communication Technology (ICT) component as an important means of the corruption reduction strategies (Bhattacharjee & Shrivastava, 2018; Charoensukmongkol & Moqbel, 2014). In the implementation of the e-government system, systems such as open government where the citizen can discuss and report corrupt practices have reduced corruption significantly (Park & Kim, 2020). To enhance e-government technologies, leverage programmes, adoption of diverse web applications, use of social networks, and computer systems are being used (Chohan & Hu, 2020).

The fundamental goal of using ICTs as part of the Access Control Service (ACS) is to minimize virtual corruption. Digital systems are essential in minimizing revenue and expense fraud inside the government financial sector (Srivastava, Teo & Devaraj, 2016). ASYCUDA, a system that was developed by United Nations Conference on Trade and Development (UNCTAD) is one of the positive uses of ICT in corruption prevention. The system accelerates the movement of goods and reduces

transport expenses, increasing government revenues by reducing corruption (Wijayasiri & Jayaratne, 2010; Wakelin & Shadrach, 2001). By following, the norm of digital communications for administrative, business, and transportation, the network also facilitates data exchange between merchants and customs officers (Wijayasiri & Jayaratne, 2010). ASYCUDA World is an e-customs edition that works with different databases and virtual systems.

Several types of research have been published on the need of enhancing e-government to minimize corruption (Andersen, 2009; Bertot, Jaeger & Grimes, 2010). According to Andersen (2009), e-government has a considerable anti-corruption influence as well as a favourable and commercially optimistic outcome. This system allows individuals to keep an eye on potentially corrupt operations like planning permission and certifications, and to voice concerns if there are any abnormalities. Rodriguez, Caba Pérez, and López Hernández (2007) found that extensive use of integrated and swift national networks had a considerable influence organization's productivity. Several experts have proposed that the blackguard stand-alone system may be adapted to prevent corruption on the online platform (Hui, 2008; Pathak, Naz, Rahman, Smith, & Agarwal, 2009). E-Government and particularly the use of the internet and mobile phones have opened government processes hence allowing citizens to access information (Zhang & Zhang, 2009). This has suppressed corruption by increasing the detection of corrupt behaviours of politicians and public servants, and, thus, acting as deterrence (Andersen, Bentzen, Dalgaard, & Selaya, 2011).

Procurement information systems play a crucial role in upholding the much-needed standards in public procurements (Hossain & Islam, 2021). This is because it is a one-of-a-kind financial information system (FIS) that has been hailed as effective in fighting corruption issues. System automation enhances the reduction of human-human

interaction, work flow and system Security (Yurkevich & Stepanovskaya, 2021). Various instances from other nations such as the Czech Republic and Russia have been elucidated by publications (Hossain, & Islam, 2021). It would be challenging to establish an explanatory framework for explaining corruption and find strategies to control it without digital information technology (Achim, Borlea & Anghelina, 2018). Using management information systems in public procurement systems, however, mitigates the potential negative consequences of corruption (Tacconi & Williams, 2020).

In Russia, 'Dmitry Medvedev's Anti-Corruption System' was launched to combat bribery in public contracts by integrating automated inspections in the operation. The state regarded corruption as the main evil and automated a mechanism to fight it (Gouvea & Montoya, 2022). The official state purchase portal identifies signs of corruption in tenders made to public entities and state-owned firms electronically. Bids that were incorrectly constructed were supposed to be immediately reported to the Federal Antimonopoly Service. Several requirements are checked, as well as vulnerabilities generated by the translation of the Cyrillic and Latin alphabets. In a single week, the software allegedly spotted 190 bids with unusual anomalies (Unfold News, 2021). Many people, nevertheless, argue that information management over state purchases is inadequate because extortion still occurs.

Tax information platforms are used to provide services like filing a tax return or renewing a permit. This condition has a significant impact on accountability and pro-government efforts (Akins, 2021). Technological methods help to combat corruption by increasing openness and allowing for thorough information audits. Tax digitalization aids in the selection of inspections and improves the information and help provided to taxpayers (Baldacchino, Duca, Tabone, & Grima, 2020). Tax information networks aid

in the prevention of corruption in several nations, such as Korea, Mexico, and the Philippines (Ameen & Ahmad, 2017).). These FISs give administrative support to several civil affairs commissions, reducing interaction involving tax officers and taxpayers and, as a result, lowering the risk of theft (Andersen, 2009). The effective establishment of systems in the revenue collection has produced outstanding outcomes (Musonza, 2017)

Documentation about public purchasing in India should now be made available to the public. Digital rural-property databases are dramatically improved the pace with which information may be accessed and updated, while also eliminating the possibility of accepting bribes (Akins, 2021). In its first few years, the Bhoomi computerized property database in Karnataka, India, was projected to have saved Rs. 806 million in bribery to local government officers (World Bank, 2004)

In Africa, Mutungi, Ejiri, Baguma and Janowski (2021) analysed the role of automation in corruption prevention. They observed that corruption levels in Kenya, Tanzania, and Uganda remain high despite an institutionalized approach to tackling it. However, automated systems like “automated audits of transaction records” alongside other service-based automation were viewed as a remedy to untamed public officials’ discretion (Mutungi, Ejiri, Baguma, & Janowski 2021). It was further observed that digital technology is crucial in combating corruption. Mutungi et al. (2021) documented that Countries like Kenya, Ghana, Malawi, Nigeria, Senegal, and Uganda are in the process of adopting digitalization in corruption prevention. Notably, these initiatives can only be effective if they are properly aligned with the type of corruption that they are meant to fight.

Bribery, deception, extortions, theft, and favouritism are all examples of corruption that have persisted all through history (Elbahnasawy, 2014). This type of corruption can occur at the highest level (governance and economic), when lawmakers or high-ranking officials skew state spending, or at the lowest level (petty or administrative bribery) when street-level officials are compromised during the provision of public services (Charoensukmongkol & Moqbel, 2014). Complaints about corruption have grown in recent years, as proof of its negative influence on productivity has grown (World Bank, 2004). According to studies, corruption decreases development, impedes wealth creation, diminishes continuous encouragement, and promotes revenue disparity and authority (Giri, 2019). Public trust in public institutions is frequently eroded by corruption. It misdirects monies away from products and services that should serve citizens, eroding state organizations and the legal system (Chêne, 2014). It is also prone to stifle productivity expansion by deterring innovation, causing redundancies in the economy, and leading to wealth disparity (Kaufman, 2018). The pressing need to combat corruption has resulted in the creation of two anti-corruption agencies and Authorities: The Independent Corrupt Practices and Related Offences Commission (ICPC) and the Economic and Financial Crime Commission (EFCC).

Kenyan corruption has been a source of concern both domestically and internationally, because "it can scarcely be stated that corruption in [the country] is limited to a few rogue individuals at the top." Corruption has taken root in society as a whole and has become pervasive' (Mogeni, 2009, p. 1). According to Kenyans' remarks, everyone is corrupt in Kenya, including grandparents, as Wrong (2014) stated. This deepening of corruption in Kenya indicates something has gone wrong with the country's government. Mechanisms that were created to regulate the interactions

between citizens and the government are now being utilized to profit public officials (party leaders and bureaucracy) and other unscrupulous private agents. Opportunism politicians and officials, in specific, have been effective in maximizing their start taking without particular respect for the overall size of the pie, thereby accounting for the growth of corrupt activities and the especially adverse influence that crime has on the nation (Hope, 2012). Corruption in Kenya is comprehensive, affecting the structural and political levels as well as people. 'The presence of robust and functional democratic systems has fostered on-going corruption, impunity, politically motivated violence, and a loss of respect for the constitution of law,' as previous US Secretary of State Hillary Clinton (2009, p. 1) stated in a presentation in Nairobi. 'True economic success also relies on ethical administrations that oppose corruption, uphold the rule of law, and provide benefits for their citizens (Clinton, 2009)

The Kenya Ports Authority (KPA) has constantly introduced automated systems since 2008 to streamline the port operations and curb corruption dealings (KPA, 2021). Kenya Ports Authority's automated system includes Systems Application and Product (SAP) which is used in the finance division, Kilindini Waterfront Automated Terminal Operations System (KWATOS), used in the operations division, Vessel traffic management system (VTMS) which is used in marine operations. Other automation in the Port includes the Special Yard operations System (SYOS) for container inventory at Nairobi Inland Container deport, employee's service portal, an e-recruitment portal in the Human Resources and administration division, plant management module of SAP in the engineering division, and teammate in the Audit department. The system also improves the coordination of services between the port and the Simba system used by KRA. Systems automation appears to be a solution in the effort to fight corruption.

People happen to be the main corruption enablers, therefore replacing manual processes may minimize the avenues available for corrupt individuals to steal from the public.

1.3 Statement of the Problem

Kenya Ports Authority is among Kenyan parastatals with unresolved cases of corruption. AllAfrica in 2005, KPA was rated among the most corrupt parastatals in Kenya. In 2020, the former KPA boss was charged with a loss of 2 billion. The World Economic Forum (2016) claims that Africa's biggest threat is corruption. It perceives corruption in Africa as the biggest terror risk, a hindrance to development, and one of Africa's biggest killers. Kenya ranks high in corruption globally. In the year 2020, Kenya was ranked 28th out of 180 countries (TI, 2020). According to the Ethics and Anti-Corruption Commission (EACC), Kenya is losing an estimated Kshs 608.0bn (7.8% of Kenya's GDP) to corruption annually. Reduced corruption is therefore crucial for the country's development. Various government agencies have turned to Information Communication Technology (ICT) and prosecution to curb corruption.

Scholars have argued for and against automation as a cure for corruption in public sectors leading to the emergence of e-governments. Nevertheless, there is evidence that e-government has contributed significantly to the reduction of corruption. The adoption of most systems in the KPA has not been adopted with the primary aim of fighting corruption. However, this study hypothesized that the use of automation in KPA has led to a reduction in corruption. For instance, Davies and Fumega (2014), opine that automation through ICT has enormous potential in "preventing, detecting, analysing and addressing corruption". The introduction of automation of port processes and financial management systems such as Integrated Financial Management Information Systems (IFMIS) is a step in the right direction. Bhatnagar (2003), argues

that when people engage with the organization through automated services, there is no officer to bribe. However, the influence of automation systems at KPA remains unclear.

Kenya Port Authority has made a substantial investment in automation systems over the last decade. Though automation was not adopted at KPA to fight corruption, elsewhere there exists evidence system automation has contributed to the fight against corruption. Whether the system automation at the KPA could have contributed to the reduction of corruption or not and if any effort has been made to increase the success of automation remains unclear. Therefore, this study seeks to evaluate the contribution of systems automation to the reduction of corruption levels within the Kenya Ports Authority

1.4 Purpose of the Study

The main objective of this study was to assess the contribution of systems automation in the reduction of corruption levels at the Kenya Ports Authority

1.5 Specific Objectives

- i. To establish the nature of systems automation deployed at the KPA and their effect on the reduction of corruption at KPA.
- ii. To determine strategies adopted to support systems automation and their effect on the reduction of corruption at KPA
- iii. To assess the effectiveness of systems automation effects in the reduction of corruption levels at the KPA

1.6 Research Questions

- i. What is the nature of systems automation deployed at the KPA to reduce corruption?

- ii. What strategies have been adapted to support systems automation at the KPA and how have they influenced the reduction of corruption?
- iii. How has the effectiveness of the systems automation affected the reduction of corruption levels at the KPA?

1.7 Significance of the Study

The significance of the study relates to the relevance of the study itself (Marimba & Kimalu, 2014). The findings of this study may be of great value to the various stakeholders. The study provided evidence on the effect of automation on the reduction of corruption levels.

The findings of this study inform the government agencies fighting corruption on the contribution of automation. The insight may be used by policymakers in the formulation of regulations and government regulations in the automation of various processes in the government departments. The insight drawn from the study may also offer a better understanding of the management of the KPA and other government Parastatals to enhance their performance through automation. The study's results and suggestions may also aid in improving the efficiency and effectiveness of parastatals. Furthermore, the study provides new information for other academics and policymakers to use in future studies.

The findings of this study may also offer insight to the policymakers on policy requirements in enforcing automation in government agencies as a move to reduce the level of corruption in the government sector. If automation is found to have a significant contribution to the reduction of corruption levels, the policy makes may provide policy requirements to automate government agencies.

The community who in most cases are the silent victims of corruption when seeking the services from the port may become aware of ways; they can fight corruption, particularly through reporting corrupt officials in the port.

Finally, the results of the study contribute toward filling the information gap on the automation and state of corruption in government Parastatals. The findings of the study make beneficial additions to the literature in the field of management of public resources.

1.8 Scope of the Study

Scope of the study refers to the limits wherein the investigation is conducted (Akanle, Ademuson & Shittu, 2020). This entails defining the area of research and precisely outlining what the investigator is examining, as well as the variables that fall inside the acceptable limits (Akanle, Ademuson, & Shittu, 2020). This could imply defining the participants, the degree of ideological inclusion in the research goals, and the timeline to place the study's scope in perspective. In this context, the survey's scope is a description of broadness, intensity, and specifics to guarantee breadth, complexity, and elaboration compatible and satisfactory to resolve the outlined research goals within the time allotted and in a way that maximizes resources (Bjørn, et al., 2018).

Concerning this study, the variable scope comprised the effectiveness of automated systems on the level of corruption in the Kenya Ports Authority. The study addressed three objectives; to establish the nature of systems automation deployed at the KPA to reduce corruption; to assess the effectiveness of systems automation in reduction of corruption levels at the KPA and to determine strategies adopted to support systems automation at the KPA. Data were collected using a structured questionnaire targeting a sample of 377 (three hundred and seventy-seven) respondents from KPA.

On the geographical scope, the study targeted the management staff at Kenya Ports Authority, Kilindini in Mombasa. The study was conducted from January 2022 through March 2022.

1.9 Delimitation of the Study

Delimitations are in essence the limitations consciously set by the authors themselves. They are concerned with the definitions that the researchers decided to set as the boundaries or limits of their work so that the study's aims and objectives do not become impossible to achieve (Leedy, Ormrod & Johnson, 2016). In this respect, it can be argued that delimitations are in the researcher's control. Thus, delimitations are mainly concerned with the study's theoretical background, objectives, research questions, variables under study, and study sample.

The study did not examine all aspects of system automation such as capacity and nature of procurement of systems. The study did not cover the specific automated software or program but general automated systems such as CCTV Automation Tally Technology, automated Management of Customs Transaction, and E-payment system payment among others. The study also did not cover private agencies and did not compare different automated systems.

1.10 Limitations of the Study

Study limitations are features embedded in the study design or framework that alter the significance and analysis of the study outcome (Greener, 2018). They are the limitations on generalization, applicability to practice, and/or value of outcomes that are a consequence of the investigator's choice of study construct and/or the method employed to demonstrate reliability and validity (Vargas & Mancina, 2019). The study's restrictions are opportunities and problems that investigators encounter during the

investigation that may have influenced or impacted the outcomes and perceptions of the outcomes (Akanle, Ademuson & Shittu, 2020). According to Theofanidis and Fountouki (2018), limits are elements that influences the study's outcome or how research outcomes that are generally outside the researcher's control.

The present study faced several limitations during implementation. The targeted respondents comprised employees of Kenya Port Authority who worked on a long contract basis. The researcher experienced difficulty in securing time with the targeted participants to respond to the survey questions. To mitigate the challenge, the questionnaires were distributed using a drop and pick method. This allowed participants to choose their own suitable time to fill out the questionnaire. Some selected participants also found some of the components of the instruments uncomfortable and subsequently did not respond to them. Questions on corruption for instance faced such challenges. This is because corruption is a very sensitive topic and respondents may feel that if they talk about it, and the information gets into the public domain, the company's competitive advantage might be in jeopardy. To address this challenge, the researcher provided a personal commitment letter (appendix D) assuring that the data would be handled with the utmost confidentiality. The authorizations from Africa Nazarene University and the National Commission for Science, Technology, and Innovation (NACOSTI) were also attached.

1.11 Assumptions of the Study

“Assumptions are so fundamental that the research question itself cannot arise without assumptions” Leedy and Ormrod (2010) asserted (p. 62). In a study, assumptions are circumstances that are out of the researchers' influence, but without them, the research could be meaningless. This study assumed that all respondents provided honest and accurate information upon which the study drew independent

deductions. On the other hand, the study assumed that there was enough time to collect sufficient data. Finally, the study assumed that the target clientele from the Kenyan Ports Authority was willing to take part in the study. The study further assumed there existed a link between system automation and incidences of corruption.

1.12 Theoretical review

The study was anchored on technological determinism theory and the theory of social determinism. The theories were used to explain the contribution of systems automation to the reduction of corruption levels at KPA.

1.12.1 Technological Determinism theory by Thorstein Veblen

The term "technological determinism" was coined by Thorstein Veblen (1929). It refers to the idea that technology determines the structure of civilization. Technological determinism is the idea that technology shapes and alters basic things about behavior and society like the way we think and act, the way we conduct our interpersonal relationships, our values, and the way we learn. "Technology" includes such things as basic tools, codes and structures for interpersonal behaviours and social institutions, and modern computer and Internet technologies.

Technology is a social system or a power that drives change, according to technological determinism (TD). It is seen as a culture's driving factor of civilization that determines the trajectory of its history (Brette, 2003). Technology alters the attitude, organization, responsibility line, norms, as well as other characteristics of the organization, as well as the switching states. Technological determinism has two central concepts: 1) that technological development itself follows a predictable, traceable path that is beyond any cultural or political influence; and 2) that the technology in turn organizes society in a way to further develop itself.

The notion that a current societal technology base is the essential requirement determining all processes of social interaction, as well as the assumption that technological advance is the primary and essential source of variation in a community, underpins technological determinism. Additional aspects have key drivers, according to critics such as (Chandler, 2000), and some of them comprise political problems, economic interests, financial pressures, academic qualifications, perceptions, and many others.

In the social science in particular and organization studies in especially, TD has a long and tumultuous history. TD critiques (Neil Postman, 1995; Chandler, 2000) argue that this approach is social constructions, technologies and modern frameworks co-evolve in a non-deterministic, emerging process, or that the influence of any specific technology is determined primarily by how it is executed, that is culturally driven. The TD argument is constantly revived due to the advent of new advancements in the modern economy.

When new technological platforms are invented, the idea claims, the culture or society is quickly altered to reflect the perceptions required to use the new technology. It anticipates that as new media and advanced technologies emerge, society alters and adapts to them. Between the emergence of new technologies and transformations in the current societal worldview, feeling, doing, or perceiving, there is a straightforward cause and effect assessment. If an advanced innovation is developed so nothing alters, the idea could've been proven untrue. There is a logical flow of proof that has been established over time. According to Hertwig and Todd (2002), the hypothesis would differ from culture to culture within and beyond the United States. This hypothesis gives a framework for understanding why this has occurred.

One weakness in this theory is that it ignores the processes of technical invention, despite the reality that it is precisely this result of the discovery that explains how diverse technologies are built. Man invents, creates, and deploys media technology. As a result, there is a control aspect that influences their use and possible impact to some extent.

Critics of modernization theory argue that socioeconomic and cultural issues such as processing conditions, methods of use, values, considerations, skill, style, choice, regulation, and connection directly are more important than actual characteristics, or, as Finnegan puts it, "who uses it, who controls it, what it is being used for, how it fits into the system of power, how widespread it is dispersed (Finnegan 1988). This study seeks to analyze the effect of technology adoption at the KPA and has the technology influenced the culture that promoted corrupt practices among the employees or not.

1.12.2 Theory of Social Determinism by Emile Durkheim (1858 - 1917)

According to this theory's proponent, technology shapes humanity, not the other way around, since innovations are constantly reconstructed by consumers and offered additional, sometimes unforeseen courses. Whereas the internet began as a communication and information search engine, it has now evolved to include various applications such as e-commerce, marketing media, and interpersonal interactive content. The social moulding of technologies, as described by Mackenzie and Wajeman (1999), is the essential premise of this theory. It is based on the concept that it is the social or economic structure in which innovation is entrenched that contributes, not the innovation itself. Their point of view is an alternative to "naive Technological Determinism," because they warn those individuals who haven't realized how social and economic influences shape technology haven't progressed very far. They denigrate

Technical Determinism as merely "technological politics," even though archaeologists, sociologists, and social theorists have been captivated by it.

Bijker and Law also make a compelling case that the concept of "pure" technologies is a myth. Technology is synonymous with compromises. Whenever an artefact is conceived or manufactured, political, economic, and raw material considerations are all tossed into the mix. We believe that innovations do not emerge as a result of some internal scientific and technical rationale. They don't have any momentum of their own even though they've been forced into that form that things develop or transform. Administrative, political, financial, and cultural issues do shape the formulation and construction of technologies, according to (William & Edge, 1996). The preceding reasons show that not only does technology influence the community, but that social aspects also influence technologies.

Some aspects of social determinism can be disproved. Giotta (2018), for instance, point out how technology has unpleasant effects which do not correspond to economic wellbeing, such as gas emissions from automobiles (Giotta, 2018). This point emphasizes the unsatisfactory nature of social determinism's uncompromising nature. While it is feasible to divide software's impacts into major and secondary effects, such a method has drawbacks. Trying to distinguish between outcomes and adverse effects hence has the potential to diminish something bad about technologies while favouring and emphasizing the possibility for good change (Giotta, 2018). What social determinism offers is an exaggeration of the actuality that overlooks other factors that may influence technology advancements, such as scientific and technical constraints, historical background, or sociocultural background. For industrialized civilizations that embrace 'development' as a fundamental requirement, a change could even ensure persistence (Katsikides, 2018). Only by being able to reconstruct itself through

adjusting to constantly changing in a controlled manner can such societal progress be sustained indefinitely.

Individual behaviour is solely determined by social interactions and constructs, according to social determinism (as opposed to biological or objective factors). Merely social dynamics such as conventions, cultural expectations, knowledge, and interpersonal relationships would be considered contributory variables in shaping people's behaviour by a social hard determinism. Non-social elements, such as biology, would've been overlooked in terms of their impact on behaviour. This theory is tied to the effectiveness of the use of automation technology in KPA.

1.12.3 Rent-Seeking Theory of Corruption by Gordon Tullock

The tenet of this theory is Gordon Tullock in 1967. The theory, however, has been traced to the work of Anne Kruger in 1974. The theory helps the study by defining rent seeking theory of corruption as the processes of disbursing resources that create no social benefits with the aim of influencing public policies outcomes and consequently public resources spent are socially wasted. According to this theory, rent seeking is the disbursement of resources and efforts in creating or transferring rents.

According to this theory, corruption occurs in cases where artificial barriers to entry are created as a means for bribes or other undesirable behaviour, such as lobbying. The theory focuses on the collaboration between the State and other stakeholders in the sector. The State has the power to assign proprietary rights of, for example, oil trade through licensing, regulations, taxes, and by awarding oil contracts.

However, the theory supports the study by arguing that government officials in the sector through bureaucracy and administrative bottlenecks create artificial barriers. Government officials as well as other stakeholders in the sector influence the State to

create these to serve their self-interest and then exploit petroleum operators in the sector. Corruption does not only occur in cases where companies give bribes, so that artificial barriers to entry are removed and they operate, it triggers disputes over rent and causes upstream petroleum companies to compete for preferential treatment, which is against due process.

In this case, there is the need to differentiate between corruption and lobbying. Lobbying differs from corruption; in that it is legal while corruption is not. Corruption is the pecuniary gain or other benefits transferred between a bribe-giver and a bribe-taker, whereas lobbying is an attempt to sway another person without the involvement of any payments. In the same vein, corruption differs from other rent-seeking activities due to the varying levels of transparency

The theory suggests a reduction of artificial barriers by the State. The researchers of this paper (hereafter, the researchers) argue that certain barriers to entry may be socially effective. This perceived barrier may prevent persons with fraudulent intentions from gaining access to the sector. The challenge the theory faces lies with describing rules that give rise to artificial barriers and those that do not.

The theory also has shortcomings in terms of designing incentives and managing incorruptible behaviour. To combat corruption in the sector, finding solutions to these problems are fundamental. The researcher argues that corruption is an obstacle to economic development; thus, competitive lobbying is preferable to corruption.

Government policy creates and protects many contestable rents and government officials and politicians are gatekeepers who control who have access to the rents. Tullock had something similar in mind. Economic agents cannot contest the rent in this situation by diverting resources to the creation of the underlying good or service.

Instead, individuals are motivated to devote time, effort, and other tangible resources in rent-seeking activities in the hopes of obtaining either the initial assignment of the right to the rent or the removal of others from their privileged position. These resources are being wasted, yet they have social worth in other occupations.

1.13 Conceptual Framework

The relationship between the variables employed in the study is outlined in the conceptual framework (Peeters, Krahmer & Maes, 2021). According to Thönes and Stocker (2019), a variable is a quantifiable trait that takes on different values depending on the subject. A trait that influences or regulates the results is referred to be an output factor (dependent variable). A dependent variable is reliant on another variable. In the study, the nature of automated systems, the effectiveness of automated systems, and automated systems' support from the independent variables while the state of corruption in the Kenya Ports Authority forms the dependent variable.

It is a researcher's perspective on a subject that guides the research (Varpio, Paradis, Uijtdehaage & Young, 2020). It is a model that is proposed to categorize the concepts employed in a study as well as their relationship. The purpose of a conceptual framework, according to Peeters, Krahmer, and Maes (2021), is to serve as a guide for the audience to quickly understand the expected relationship between the predictor variables and predicted variables.

The study explored the nature of system automation at the Kenya Ports Authority. An attempt was made to link the nature of systems and the state of corruption within the KPA Mombasa. According to Linhartová (2017), automation systems can be adopted to fight bribery and corruption. Some systems are specifically developed to fight corruption while other systems are developed to automate processes that would

otherwise promote corruption is carried out manually. For instance, the online portal for submission of clearance documents prevents interference by individuals. Digital electronic payment systems protect cash being handled by individuals minimizing possible losses. CCTV Automation Tally system helps reduce cases of cargo losses while automated Management of Customs Transaction may hinder the loss of funds. System automation aspects such as the presence of an online corruption reporting portal, payment systems, surveillance system, and clearance system were evaluated in this study.

Reduction in cases of bribery smooths the clearing of cargos since there is little time wastage which otherwise would have occurred due to back and forth of bribe negotiations. Systems effectiveness may promote workflow, system security, and turnaround time.

Adoption of strategic approaches which would promote a better-automated system that helps in fighting corruption is crucial. To achieve reduced corruption, customer support is critical to ensure customers adopt the systems provided. Also, system audit and system maintenance should be enhanced to ensure systems are not infringed on or compromised by corrupt officials and fraudulent individuals.

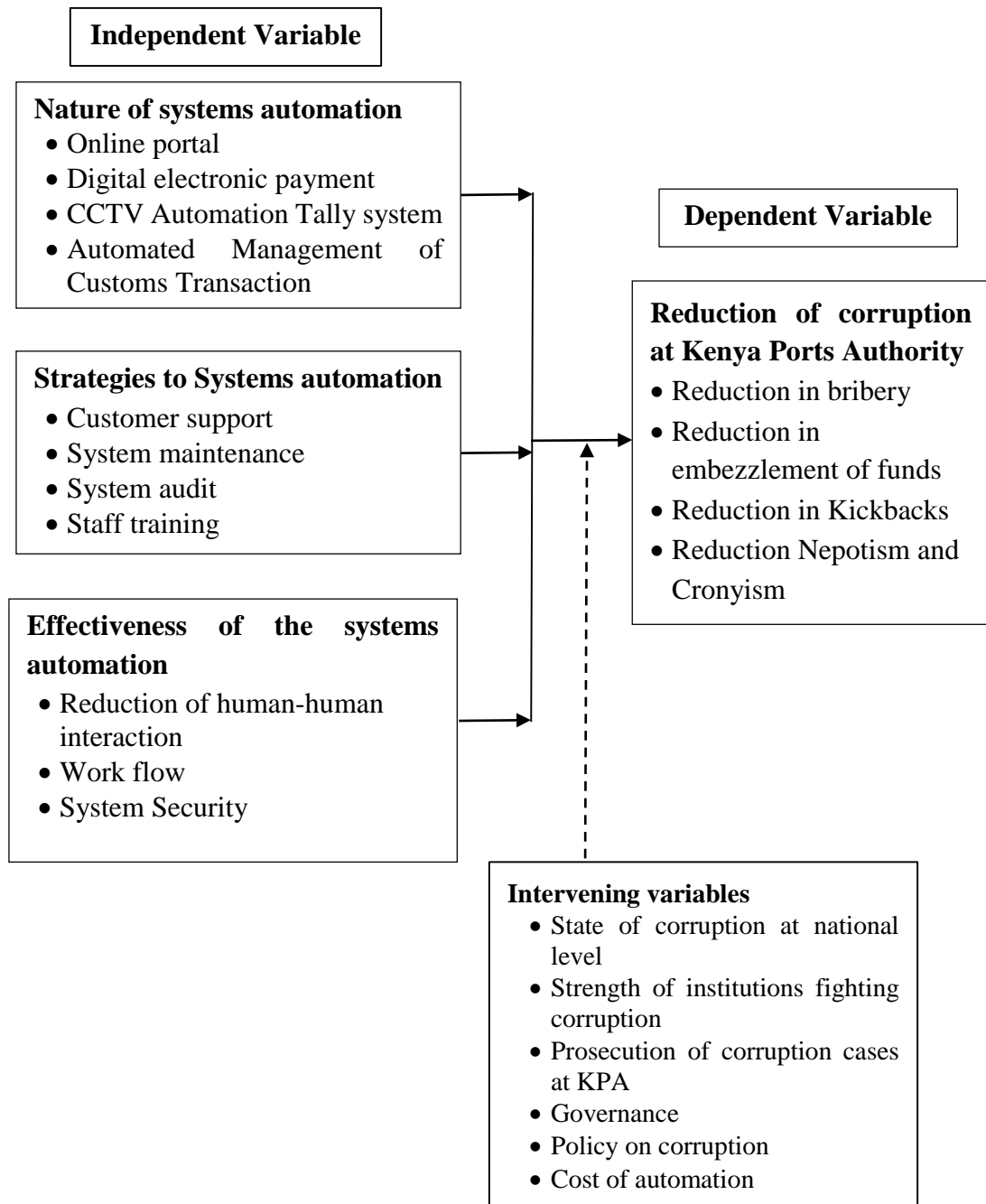


Figure 1. 1: Conceptual Framework

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section presented an empirical review and general literature review. The study reviewed related scholarly work in five sections. The first four sections focused on the contributions of CCTV Automation Tally Technology, automatic cargo tracking system, automated Management of Customs, and E-payment systems on reduction of corruption in government Parastatals. Finally, the state of corruption in Kenya was explored.

2.2 Empirical Literature Review

2.2.1 Nature of systems automation deployed in the Ports in order reduces corruption

Park and Kim (2020) studied the effects of the internet on corruption in different countries. The study's major goal was to measure corruption. Automation is linked to the adage "knowledge is power". Online systems can distribute levels of influence evenly to all, avoiding monopolistic intermediaries from misusing it. Furthermore, the internet can reveal intimidation, unlawful alterations in regulations or timelines, and bureaucratic solicitations for bribes. Park and Kim discovered that state websites can offer accurate information about state policies and services, hence limiting officials' discretionary authority. The study was generalized to a large body, the government without a clear targeted institution. This study seeks to fill the gap by analysing the effects of automation aspect on the levels of corruption.

Oye (2013) looked at how to reduce corruption across African countries by reducing authorities' discretion and increasing transparency. According to the study,

ICT eliminates numerous chances for corrupt practices for people who do not fully comprehend the latest tech; yet, it offers up more possibilities for those who fully comprehend the new platforms and can influence them. As a result, suitable protections are required. Putting in place systemic barriers could deter people from misusing their positions of power for personal benefit. Although total corruption elimination is challenging to attain, there is plenty that may be done to reduce its occurrence. ICT can help players strengthen governance ability and eliminate corrupt practices, but whether the technological innovation is used to its maximum potential depends on the range of approaches, social, political, and infrastructure context. Automating inefficient bureaucratic processes does not deliver positive benefits. The paper offered a system reorganization technique to tackle corruption-utilizing ICT. Because most developing nations are not yet ready to embrace a complete e-government program, transparency is not uniform across all industries. Instead of waiting for complete preparedness, it is encouraged to take a trial-and-error method to learn and preserve minor achievements. While e-Government has considerable promise in several developing nations, it faces significant hurdles. Inadequate planning capabilities and poor politics are responsible for the failure of numerous ICT projects.

Talab et al. (2019) used case studies to show that e-government can help minimize corruption by fostering good governance and empowering reform-minded players. They concentrated on how e-government can decrease corruption both publicly by improving ties with consumers and inside by better managing and monitoring employees' behavior. Using national-level data, this study assessed the impact of e-government on corruption. The effects of other cultural characteristics given by the public administration publications, such as bureaucratic competence, quality, and law enforcement, were also investigated. According to a statistical study, both e-

government and traditional pro-state features have a consistent and positive influence on the reduction of corruption.

Kossow (2020) assessed hopes and challenges in the adoption of digital anti-corruption systems. The study explains how ICT is being extensively employed in anti-corruption programs around the world, and how NGOs and donor organizations are promoting it. It also provides an overview of ICT in anti-corruption. It evaluates scholarly, peer-reviewed publications and connects theoretical background to empirical data on this particular subject. It does so by categorizing and reviewing quantitative research, comparative analysis, and case research that focus on situational ICT applications in anti-corruption settings. As a result, the analysis not only outlines the situational analysis but also highlights gaps in the existing literature to maintain a call for future study on the use of ICT in the fight against corruption. Therefore, this study seeks to establish the contribution of ICT automation in the reduction of corruption in Kenyan State Corporation.

Charoensukmongkol and Moqbel (2014) investigated whether ICT investment reduces or increases corruption. The ICT is progressively being promoted as a means of combating corruption. The goal of the study was to see if these expenditures can minimize or increase corruption. Increased ICT investment offers technical frameworks that can efficiently monitor and manage corruption, but the increased investment may provide opportunities for corruption. The goal of the research was to demonstrate that the nation's investment in ICT had both a good and bad influence on corruption. The research was based on data from 42 nations that were observed between 2003 and 2007. The study employed Transparency International's (TI) Corruption Perceptions Index (CPI) scores as an indicator of corruption in a country. TI evaluates a country's level of corruption by producing a "poll of polls" based on the assessments of both domestic

and international business executives and proper evaluation of multinational corporations and organizations in that nation.

Grönlund and Flygare (2011) investigated the impact of e-Government on corruption: Measuring index consistency. To address this gap, this paper employs statistical approaches to see if the positive impact of e-Government is consistent across different indices. The CCI and CPI indexes accurately evaluated corruption, whereas e-Government measures vary greatly as predictions. The best forecasts are the Economist and ITU indexes. The UN index has a respectable score, but none of the other indicators studied can be used as a predictor. According to the findings, embracing cultural and institutional assessment significantly enhances an index, whereas monitoring websites is useless. This shows that scores might differ significantly on other digitalization influences and that selecting the right digitalization index is critical.

Asiimwe, Wakabi and Grönlund (2013) investigated the use of technology to improve transparency and accountability in Uganda's low-income neighborhoods. The goal of the study was to look into the customers' requirements, activities, experiences, and obstacles in using ICT to promote transparency and accountability in low-resource settings. The study focused on two ICT4D efforts, a phone center, and a telecentre, which were funded by two projects: "Boosting Social Accountability in the Health Sector in Northern Uganda" and "Catalysing Civic engagement and democratic assessment by leveraging ICTs." The two programs aimed to combat corruption by promoting openness and accountability through the use of ICT to facilitate "whistle-blowing," or the reporting of service-delivery malfeasance. Interviews, focus group discussions, and observations were utilized to answer three research questions: how have the two programs provided individuals with a trusted and efficient avenue for

"whistle-blowing?" What are the facilitating variables for whistle-blowing via ICT, as well as the difficulties that whistle-blowers face, and how can they be resolved? Users of information and communication technologies are hopeful and trusting of these technologies. Effective whistleblowing comprises timely and easy disclosure protocols, reporting ease, genuine service delivery enhancements, accessibility and confidentiality, and cost. There are also a variety of obstacles, such as user training, gender relations, and general business strategy concerns, such as fiscal sustainability and determining the most efficient scope of operations.

Camarero Orive, Santiago, Corral, and González-Cancelas (2020) performed a strategic assessment of port operations terminal robotics using BOT (business observation tool). This paper sought to provide responsible organizations with a new approach (BOT) that enabled them to effectively automate terminals while keeping in mind the realities of the context in which they are built. It will be essential to interpret the strategies to be taken and the essential steps to be employed in the program by measuring the aspects that support or hamper execution, resulting in novel management and strategic tool.

Martn-Soberón, Monfort, Sapia, Monterde and Calduch (2014) established the principle of automation and port cargo handling and discussed some fundamental issues related to automation in this type of port facility. Their research adds to the present understanding of the subject by presenting a robotics ideology that tailors the application of presently offered robotic technology to the specific demands of each PCT. These qualities, combined with increased port industry competitiveness, have prompted the creation of automated docks to lower operating expenditures (OPEX), mostly in terms of labour, increase productivity, security, and a

sustainable environment. Eventually, it summarizes the main benefits and challenges associated with the automation of PCTs.

Shramenko and Muzylyov (2019) Forecasted overloading volumes in transport systems based on the fuzzy-neural model. Because it enables planning, scheduling, and equipment controlling, a TOS is critical for effective and efficient port services. The TOS automation has been on increase over recent days. As the extent and degree of automation continue to grow, the system must be thoroughly tested and fine-tuned before going live. Conventional methods of testing and modifying the TOS, as well as technical support, are constrained, resulting in avoidable hazards. In this study, we describe a tried-and-true, safe, and low-cost method for testing and tuning the TOS and training users on some virtual terminals. During the preceding years, this unique method in the field of port facilities was effectively implemented at over twenty terminals.

Heilig, Schwarze and Voß (2017) investigated the past and future of digital transformation in modernized ports. To illustrate those advances, the study looked at ports and operations in the maritime shipping industry. Due to the high demands in the logistics industry, such as cost, effectiveness, safety, and sustainability, digitalization is required to remain relevant. The modernization of ports has been shaped by previous digitalization. It is unavoidable to analyze the results of previous advancements and their influence on port services in an attempt to comprehend future difficulties in this area. The research examined digital developments in shipping ports in great detail. The study also highlights three generations and used a well-known framework to analyze the phases of their respective digital transitions. We identify essential experiences and difficulties based on our observations. In the 1990s and 2000s, automated terminals were established as a result of administrators' use of new

handling systems (sensors and laser capabilities) and the aggregation of information collected from systems.

Orwenjo and Aila (2018) analysed the use of e-procurement at Kenya Power Lighting Company. The objective of the study was to highlight the factors leading to E-procurement success and showcase Kenya Power as a role model for E-procurement practices. The study adopts a meta-synthesis and descriptive research design. A review of five recent studies from the Kenya Power website revealed that e-procurement processes are efficient and effective. However, the study did not analyze the effect of e-procurement in fighting corruption.

2.2.2 Strategies put in place to support systems automation at the Port

Moscato and Muñoz, (2020) investigated the automatic generation and verification of test-stable floating-point code. They adopted the term "live testing" to represent testing modifications or additional features in the manufacturing process as part of the continuous delivery and installation. Canary deployments, dark launches, A/B tests, and incremental rollouts are all examples of this. Several of these live testing techniques are frequently required to be integrated. For programmers or release engineers, constantly managing such multi-phase live testing procedures is a demanding endeavour. Moscato and Muñoz presented a formal paradigm for multiphase live testing, as well as Bifrost, a Node.js-based middleware that enables businesses to specify and automate complicated live testing strategies. The study thoroughly examined Bifrost's runtime behavior in three rollout circumstances of a microservice-based research report program, concluding that our prototype's efficiency overhead was at or below 8 ms in several circumstances. Furthermore, the study found that even on low-cost public cloud examples, more than 100 simultaneous techniques may be implemented.

The key contributors to researching automation are Willcocks, Lacity, and Craig (2015). They've been concentrating on finding best practices for implementing automation and deriving lessons gained from research papers examining early integration automation systems. The features of automation of processes support and expedite acceptance and deployment, the function of IT in automation of processes adoption, and task requirements, use cases, and integration effects have become the primary focus of the investigation.

To succeed in implementing automation, according to Lacity and Willcocks (2016), the C-suite should show strong support for deployment, competencies must be situated in business units, and personnel management concerns must be introduced to reconsider the renewed emphasis on employment. They also discovered that corporation automated processes efforts have more control over the automation processes and that POCs are a wonderful method to get more buy-in throughout the firm. Notwithstanding, it is recognized that IT plays a role in the implementation of automation systems; the IT component should enable business units and be engaged in issues such as corporation systems orientation, management structure, delivery methodological approach, focus on the implementation, and industrial automation governance, and scaling plans.

Supportive building of automated systems in BIM/IFC was examined by Vieira, Carreira, Domingues, and Costa (2020) to analyze the existing information asymmetries and determine the requirements for additional advances. The notion of expanding BIM to larger support Building Automation (BA) concepts was considered in this study, which looked into the prevailing knowledge gap. The study identified the information needs of BA and executed a needs assessment with the present BIM guidelines, including such Industry Foundation Classifications, on basis of an

examination of scientific and technological foundations. According to the literature review, there was a shortage of comprehensiveness in terms of BAS automating and management features. It was demonstrated that IFC was the most appropriate data model for covering BAS without compromising its aim, although there was still much work to be done in future studies. BIM standards like IFC, for example, have presented themselves as natural alternatives for modelling and communicating information about BA. The degree to which BIM enables automation, however, never was investigated thoroughly. The study looked into the current knowledge gap and discussed the possibility of expanding BIM to include more BA ideas. The study evoked the information needs of BA and performed a needs assessment with current BIM specifications such as IFC, based on an examination of scientific and technical publications.

Using a case study of container terminal service automated processes, Wang, Mileski and Zeng (2019) investigated the connections between strategic content and processes framework. The research looked into whether the strategic message and process framework were in sync. The study looked at why these outcomes are contradictory in the context of service automation. The research focuses on two major strategic factors and how they should be aligned to get the optimum quality of service. The port's overarching marketing strategy and strategic content are the first part. Porter's (Competitive Strategy, Free Press, New York, 1980) generic strategic categorization of low cost, distinctiveness, or emphasis approaches was used in this investigation. The study discovered that a port's competitive market dominance influences its corporate strategy. If a port is strategically placed as a global gate, it must pursue a cost-cutting approach, but a transshipment terminal should pursue a diversification strategy. The study also discovered that the process framework used is

linked to the level of automated processes and that strategic analysis is influenced by a great deal of flexibility, efficiency, and dependability. Lower market unpredictability necessitates greater quality and capacity, whereas higher market ambiguity necessitates greater flexibility. The research also revealed that the level of automated processes was determined by the amount and consistency of throughput.

Santos, de Queiroz, Leal and Montevechi (2020) looked at the vision and needs of the type of situation environment decision analysis infrastructure that supports end-user processes. The research was based on the SUDPLAN project's conception that was an EU FP7 initiative aiming at developing sophisticated climate resilient technologies for urban planning and management. As an essential shared service, SUDPLAN contains links to climate change simulators and model findings. The research included a high-level description of SUDPLAN, with a focus on the highly engaging Scenario Management Solution. It also provided a summary of customer needs produced from a user-centered design process including a wide range of user representations from four selected application regions.

Cui, Voyles, Zhao, Bao and Bond (2017) focused on building an architecture-based self-adaptation infrastructure for resource-constrained robotic systems. Their study objective was to provide an architecture to guide the engineers to conveniently build self-adaptive systems, and alleviate the workload to program a task. The study contributed to architecture support of self-adaptive systems which enables a system to perform analysis on itself for such quality attributes as performance and reliability; real-time functional components design framework for building self-adaptive embedded systems; and a mechanism to achieve fault tolerance in the presence of faults and uncertainties. This was achieved through the implementation of a simple, yet

comprehensible case study, line-up blocks, to demonstrate the effectiveness and simplicity of programming a self-adaptive task.

2.2.3 Effectiveness of the systems automation in reduction of corruption levels

Automation of state services, according to Andersen & Rand (2007), reduces corruption. States that invested more in automation of state services also saw lower levels of corruption, according to the report. Fiscally, the link between state automation and corruption was stronger than the link between real GDP per capita increase and corruption. 2SLS twice the impact of automation of state services on corruption when opposed to OLS, although the change is not statistically significant. Finally, the findings found that automation of state services might make significant progress in the battle against corruption.

Andersen (2009) used a panel of 149 nations and two-time data to quantify the influence of automation of state services on the "prevention of corruption" parameter. The effect of the first conditional variance estimate was positive and strategically significant. Increasing from the 10th percentile to the 90th percentile in the automation of public services distribution resulted in a reduced corruption similar to shifting from the 10th percentile to the 23rd percentile in the management of corruption range.

Emerging technology can help developing nations win the fight against corruption (Adam & Fazekas, 2018). Virtual federal programs, crowdsourcing networks, whistleblowing tools, transparent portals, big data, decentralized ledger technologies (DLT), and artificial intelligence are among the techniques examined (AI). The study looked at the evidence for the efficiency, limitations, and even possible abuse of certain systems that could lead to corruption. Using the commonalities between the various technologies, it seems that ICT can aid pro-government efforts by influencing

intense exposure in a variety of ways. It can, for example, enhance transparency and accountability by digitizing public services and enabling corruption reporting, as well as promote lobbying and civic engagement and stronger government-citizen connection. ICT, on the other hand, can open up new avenues for corruption, whether through the dark web, cryptos, or just the exploitation of well-intentioned technologies like digital government services and central systems. The results demonstrate that information and communication technology (ICT) is not a panacea for preventing corruption, and that it can potentially play into the hands of corrupt officials. Significantly, the presence of ICT tools does not imply that they were being used to combat corruption. Rather, the effects of digitalization are determined by its fit for contextual factors and demands, different cultures, community support, and competence.

Using a broad panel dataset, Elbahnasawy (2014) explored the effect of automation of public services and internet usage on reducing corruption. The findings show that automated public services can help reduce corruption by leveraging communications infrastructure and expanding the scope and quality of online services, which is aided by increased internet penetration. The interaction effects of e-government and internet adoption show that both can be useful in anti-corruption efforts. The endogeneity challenge is addressed, and corruption continuity is taken into account, using a dynamic panel data model. Panel Granger causality tests reveal a unidirectional link between automated government services and corruption, as well as a bilateral link between digitalization and corrupt practices.

Setyobudi and Setyaningrum (2019) used cross-country data to examine the impact of digitalization on the corruption perception index (CPI). The article's goal was to assess the influence of digitalization in industrialized and developing nations, as well

as evaluate the most successful digitalization components in preventing corruption. The digitalization, which includes a digital services index, a human capital index, and a telecoms infrastructure index, was used to evaluate the digitalization of state services. From 2009 to 2013, 521 samples were collected from 122 nations. The study discovered that digitalization deployment harmed the CPI. Additionally, it was discovered that the factor infrastructure has a negative influence on CPI, while the factor human resource aspect has a significant impact, based on the expansion of the factor of digital systems. This suggests that while the growth of digital infrastructure can help reduce corruption impressions in a country, human resource factors can have the opposite effect and enhance corruption perceptions. The impact of digital services varies depending on whether the country is industrialized or underdeveloped. The deployment of digital systems in industrialized nations is in the transactional and transformational stage, which makes its influence effective in terms of corruption eradication. Because e-government in underdeveloped nations has just entered the information and engagement stage, it is ineffective in combating corruption.

A study on the Linkage between digital integration, Integrity, and economic expansion in Asian economies was undertaken by Sheikh, Ijaz-Ur-Rehman, Tariq, and Khalid (2021). In Asian nations, the study identified the effect of digitalization on productivity expansion and as a disincentive to corruption. It provided guidance and led economies and companies on successful digitalization journeys, contributing significantly to the studies on economic progress and corruption management. From 1990 to 2019, the study was carried out. The study looked at two distinct models with corruption control and GDP growth as predictor factors. The findings demonstrated that digitalization has a large and favourable effect on economic development and

corruption prevention in Asian nations. This research also made policy suggestions for the establishment of pro-growth and anti-corruption strategies.

Using a sample of 147 nations from 2003 to 2012, Majeed and Malik (2016) evaluated the influence of digitalization and press freedom on corruption. OLS and 2SLS econometrics methodologies were used in the empirical observation. The empirical data demonstrated that press freedom and digitalization were ineffective in combating corruption on their own. Despite this, the combined influence of digitalization and press freedom was beneficial in combating corruption. The results were unaffected by the use of other factors, econometric methodologies, or the endogeneity question.

Baniamin (2014) aimed to investigate the possibilities of digitalization through the utilization of both global and micro-level data. The worldwide data was gathered from two databases: Transparency International's CPI) and the United Nations' Online Service Index (OSI); whereas the micro-level instances were required to be taken from a nation (Bangladesh), which has a high rate of corruption and is developing digital system. The results, which were predicated on state-level data, showed that digitalization explained the majority of the changes in corruption levels among nations, hence supporting the result of the research premise that digitalization had a positive effect on reducing corruption. Although some developed nations, especially those in the OECD, displayed conflicting patterns, the conclusions were more strong and more consistent in the context of emerging economies. According to micro-level examples, simply implementing digitalization is insufficient to combat corruption.

ReSPA (2013) published a report that details how digitalization public service technologies are being abused for fraud. For example, in Bosnia-Herzegovina, police

and public administration officials abused their accessibility and faked data to sell fake ID cards and passports after the establishment of a computerized citizen registration process. As this example shows, rather than necessarily being a weapon to combat corruption, digital essential authorities may permit fraud to be hidden or open up new and perhaps greater focus 'rent-seeking' options, especially for individuals who are ICT literate.

The ICT infrastructure is included in the equation by Garcia-Murillo (2013). The study examines the relationship between the integration of digitalization innovations and Worldwide Governance Indicators (WGI) CPI using data from a six-year panel of 208 nations. The authors argue that an enhanced digital government engagement through digitalization and ICT infrastructure—reduces the impression of fraud around the globe.

Krolkowski (2014) looked into the use of digital payment systems to pay for municipal water bills. They discovered that this decreased small corruption possibilities boosted revenue collection per consumer, and enhanced the quality of the data obtained during the purchase process. There are limited quantitative studies if any on the negative impact of digital technologies on government services facilitating fraud have been documented.

Officials altering data in a new computerized road toll infrastructure and re-registering trucks as automobiles to maintain the pricing margin for themselves, resulted in an operating loss of €2 million (Kshs. 257 million) from Croatian toll booths, according to ReSPA (2013). They suggest that, though digitizing the state administration can improve openness, it can also open the door to far more misuse than

would otherwise be feasible. This is because authorities find ways to exploit or evade the new systems by fabricating, fraudulently collecting, or erasing data.

Asogwa, Ezeani and Asogwa (2021) analyze the issues of e-records administration in Africa as an aspect of successful digital public services. The advantages of digitalization can only be realized if sufficient infrastructures, legislation, financing, and ICT-trained personnel are available, according to the study. Public records become increasingly susceptible and public services may be jeopardized if these standards are not met.

According to Jain, Singh, and Bhatti, (2018) conducted targeting SMEs in India the primary aim of digitalization is often efficient and effective. This forces the state to decrease corruption, which necessitates the deliberate inclusion of oversight and openness as principles in new digital public service networks during the planning and design process. As a result, whenever public administrative practices haven't changed much, the advantages of digitalization are probably limited. Nevertheless, when a variety of elements related to corruption prevention are deliberately included in the design of electronic public services, automated public services are more likely to be successful. This can comprise of things like needs and situation appropriateness, ICT accessibility and competencies, and computer security, as well as suitable legislative frameworks that provide openness, unfettered accessibility of information, and the capacity to follow choices and actions down to individual state officials.

Nyaga, Ndiku, and Mwai (2019) analysed the impact of the adoption and implementation of the integrated financial management information system in service delivery in Kenya through a case study of the National Treasury. The findings revealed that IFMIS had to a significant extent been implemented and adopted at the National

Treasury and the 'Procure to pay' module was the most widely used in the organization. The challenges identified in the use of IFMIS ranged from technological, proficiency, and technical while the most prevalent technological challenge faced was technophobia. The complexity of the system, resistance to change, and bureaucracy in authorization were the most prevalent technical challenges while lack of training was the most prevalent proficiency-related challenge. Delays in service delivery concerning the application of IFMIS were attributed to the many levels of IFMIS authorization and the use of a manual system.

2.3 Summary of literature and research gap

The digitalization of government services minimizes direct interaction between citizens and government officials. Previous studies have highlighted systems such as corruption reporting, and payment of revenue online among others. Automation was found to have been documented in other countries, particularly in Europe. However, none of these studies have examined aspects of system automation involving port operation in Kenya. It was also observed; that hardly any study has been conducted to assess the effect of automation at the port on fighting corruption. On the issues of the strategies to promote automation, various studies focused on identifying the best practices related to automated systems implementation. Also, studies on ICT/Automation have focussed on its effect on efficiency in service delivery, ability to foster control of processes, standardization of organizational output, and ability to raise awareness to the general users and public. There exists a knowledge gap on the effect of automated systems on the reduction of corruption levels.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section describes the methodology used in the execution of this study. It comprises the research design, target population, sample size and sampling procedure, research instrument, pilot study, the validity of the instrument, reliability of the instrument, data collection procedure, data analysis techniques, ethical considerations, and the operationalization of the variables.

3.2 Research Design

The study employed a descriptive research design using both quantitative and qualitative approaches. Descriptive research design is normally structured and precisely intended to gauge the features outlined in a research question. Siedlecki (2020) argues descriptive design obtains data that describes existing phenomena through inquisition into people's perceptions, outlooks, activities, or values. Further, the design is ideal for this study since data can be collected from a big population. Elsewhere, Bloomfield and Fisher (2019) assert that descriptive design collects data in testing hypotheses and answers on the current state of the subjects under study, which is applicable in this research. The implication in line with Rahi (2017) is that this specific design studies an enormous population to reveal the distribution and interventions of sociological and psychological variables. A descriptive study design also enables the scholar to collect data at a specific point in time (Herbst, Harper, Kalfa & ESPU Research Committee, 2018). The researcher used a descriptive research design to examine the contribution of automation to the reduction of corruption at Kenya Ports Authority (KPA), Kilindini in Mombasa.

3.3 Research Site

The research site for the study was Kenya Ports Authority, Kilindini, located in Mombasa County. Mombasa is known majorly for fishing and tourism. The port supports Kenya and its neighboring countries' international shipping through the sea, making it an access point to East Africa. The Kenya Ports Authority (KPA), which owns and controls the port infrastructure in Mombasa, manages the port. Kilindini Harbour, Port Reitz, Port Tudor, the Old Port, and the entire tidal waves encircling Mombasa Island are all part of the port. Within the port, the KPA is solely responsible for pilotage, tug, mooring, dockage, buoyage, anchorage, security, logistics services, and shore management. Private enterprises provide other operations including shipping, clearing & forwarding, transportation, and warehousing. Several state agencies in the port are responsible for tax collection and standard adherence.

3.4 Target Population

A population is a group of people, events, or things; that share measurable features (Otzen & Manterola, 2017). According to Beins (2017), a population is a collection of occurrences that an investigator is interested in and wishes to extrapolate. This study's target population was comprised of staff working at KPA. 6,511 employees worked at KPA at the time of this study. There are eight divisions under Kenya Ports Authority, handling day-to-day operations of the port, which were targeted for the study. Further, support departments were considered. These departments include; information technology, financial accounting, administration, container operations, audit, and risk management, project development, marine operations, conventional cargo operations, procurement & supplies, and ethics and integrity.

Table 3. 1: Target Population

	Division	Number of staff
1	Human resource and admin division	602
2	Finance and procurement division	196
3	Corporate service division	567
4	Operations division	2,415
5	Infrastructure division	856
6	Engineering Division	1,412
7	Legal services division	463
8	Total	6,511

Source: Kenya Ports Authority, Mombasa 2022

3.5 Sample Size and Sampling Procedure

Sampling is the process of selecting a subset of a population to serve as a representation of that population (Otzen & Manterola, 2017). The most important condition for any sample is that it be as inclusive as representative of the population from which it is taken. A sample is a representation of the findings of the analysis performed using the investigator-sampling units that are comparable to those found in case the investigator was to analyze the complete population. The sample size and sampling process utilized in this investigation are listed below.

3.5.1 Sample Size

A sample is a small percentage of the target population chosen for analysis. Any statement made more about sampling should be accurate in terms of the population (Orodho, 2012). A sample is a portion of respondents gathered from the “accessible population of the study” (Marimba & Kimalu, 2014). It was carefully selected and characteristic of the entire population that is relevant to the study. In the study, the total number of persons targeted to fill in questionnaires formed the sample size. The study adopted the formula developed by Slovin (1960) as follows:

It was computed as follows;

$n = N / (1+Ne^2)$. Whereas:

n = no. of samples N = total population

e = error margin / margin of error

$n = 6,511 / [1+6,511 (0.05^2)]$

$n = 6,511 / [1+6,511 (0.0025)]$

$n = 6,511 / [17.2775]$

$n = 376.85 \sim 377$

The 376.85 was rounded off to 377 Staff worked with Kenya Port Authority

3.5.2 Sampling Procedure

To select the sample that participated in the study, the researcher employed a probability-sampling technique. Probability sampling is a sampling procedure in which samples are collected in a way that ensures that every member of the population has an equal opportunity of being chosen (Alvi, 2016). The investigator must ensure that everyone in the company has an equal chance of being chosen using this method using the randomization approach. To be more specific, the participants for this research were chosen using stratified sampling methods followed by a basic random sample methodology. When the population under investigation varied features, stratified sampling was used to guarantee that all constituents are included in the research (Sharma, 2017). This study employed a stratified sampling technique to select a sample per division and a simple random sampling technique to select participants to participate in this study.

The sample size was computed as follows using a stratified sampling technique according to Cochran (1977).

Let N =target population

n = the desired sample size

N_i = i^{th} stratum population. For $i=1, 2$

n_i = i^{th} stratum sample size. For $i= 1, 2$

Then we compute i^{th} stratum sample as follows

$$n_i = \frac{\text{ithstratumpopulation}}{\text{targetpopulation}(N)} \times (\text{the desired sample size}(n))$$

Therefore, we obtain the desired sample size by adding the stratum samples.

$n = n_1 + n_2$ which can be summarized as follows:

$$n = \sum_{i=1}^k n_i$$

Where n is desired sample size, $\sum_{i=1}^k$ is the summation from i^{th} to k^{th} stratum samples, n_i is i^{th} stratum sample size, and k is the total number of stratum samples/number of strata.

Table 3. 2: Sample size determination

Division	N (Target Population)	$n_i = \frac{\text{ithstratumpopulation}}{\text{targetpopulation}(N)} \times n$	% of the desired sample size
1 Human resource and admin division	602	35	9.28
2 Financial and procurement division	196	11	2.92
3 Corporate services division	567	33	8.75
4 Operations division	2,415	140	37.14
5 Infrastructure division	856	50	13.26
6 Engineering Division	1,412	82	21.75
7 Legal services division	463	27	7.16
8 Total	6,511	377	100.00

3.6 Data Collection

3.6.1 Research Instruments

Questionnaires and interview guides were adopted as a means of acquiring data from the study participants. Questionnaires were used because they can obtain data from a large population in a short period. Further, they can be administered directly or through representatives where people can read and write (Sahaya, 2017). Questionnaires were used to gather both quantitative and qualitative data since they can contain both open-ended and close-ended questions. Specifically, questionnaires that were administered to the respondents in this study contained both closed and open-ended questions. This helped them to be more objective and detailed. Questionnaires were used to target the staff of KPA. The questionnaire is attached in appendix II. The study questionnaire contained questions with a Likert scale ranging from 1-to 6 where 6 = Agree Strongly, 5=Agree, 4=Neutral, 3= Disagree, 2= Disagree Strongly, 1= I don't Know)

Interviews were conducted using a face-to-face method for a better understanding of the situation. Interviews give the researcher a chance to seek clarifications from the respondents, especially on vague responses. On the other hand, the researcher can use interviews to get in-depth insights from respondents. The researcher used an interview schedule (Appendix III) to obtain data from 12 managers/representatives of Kenya International Freight and Warehousing Association (KIFWA), KRA, East African Community, Transparency International, African Parliamentarians Network against Corruption, Ethics and Anti-Corruption Commission, Asset Recovery Agency, Directorate of Criminal Investigations, Central Bank of Kenya, Directorate of Public Prosecution and Office of Auditor General.

3.6.2 Pilot Study

Before the official survey, a pilot survey was conducted to evaluate the tools and research processes. This was done to ensure the tool's validity and reliability. According to Junyong (2017), completing a pre-test using the questionnaires or interview guide is a good way to avoid difficulties before starting the actual collection of data. It was proposed that a sample of people related to those who were in the research sample be picked for the pilot test.

The pilot survey aids in the detection of flaws in the questionnaires that could lead to inappropriate responses or queries that do not sound right to participants; it also aids in the improvement of the investigation tool's internal consistency. A pilot survey might also aid in the development of a larger study. It can also predict where the primary study failed, as well as the likelihood of not adhering to research procedures and the suitability of adopted methodologies. It also shows what works and what does not, such as ambiguous queries and suggestions (Patel, et al., 2017). The testing also allows researchers to see how the tool can help them create coding strategies for open-ended inquiries (Hazzi & Maldaon, 2015). A pilot study with 10% of the sample with homogeneous features is suitable for the pilot study. As a result, a pilot study was conducted with 38 (at least 10% of the sample size) participants from the Kenya Revenue Authority (KRA) Port Office to examine the tool's potential to gather reliable data. The choice to pilot at the KRA port office was informed by the fact that their main office is housed within KPA, with their systems interfaced with KPA technologies. KRA Port Office was therefore perfect for piloting. On the other hand, the researcher took cognizance of the fact that piloting at the very same organization (KPA) runs the danger of administration influencing the replies during the research process, as corruption is thought to influence any company's competitive edge.

3.6.3 Validity of the Instruments

According to Rahardja, Aini, Graha, and Lutfiani (2019), validity relates to the reliability and significance of conclusions drawn from study findings. If the data evaluates what it is designed to measure, it is valid. Face and content validity was evaluated in this study. The tools were designed and passed on to university supervisors for constructive critique to determine face validity. The criticisms and suggestions from the supervisors were considered in the design of the final tool.

The extent of precision in obtaining the required data is defined as validity (Mbwesa, 2008). The researcher assessed the construct validity of the questionnaire. This test establishes a connection between the measurement and the theoretical underpinnings. The existence of a relationship between the assessments and the linked domains obviates construct validity. According to Lawshe (1975), the expression for computing content validity is shown below;

$$CVR = (n_e - N/2)/(N/2)$$

Where CVR: Content Validity ratio

n_e: number of experts indicating the question is essential.

N: Total number of experts presented to rate the tool

The CVR is in the +1 to -1 range. The positive figure shows that at least half of the professionals deemed the question important. Evaluating the average CVR across all queries in the questionnaire subject to specialists (Technical and investigative officials from EACC) in the topic of the research established the content validity of the queries.

3.6.4 Reliability of the Instruments

The capability of a measurement device to deliver the same response in the same surroundings, repeatedly, is referred to as reliability (Mohamad, Sulaiman, Sern & Salleh, 2015). It means that if people respond to a questionnaire in the very same way on numerous occasions, the instruments are considered dependable.

Running frequencies and editing inaccuracies are also used to determine the reliability of the survey questionnaires. The piloting was utilized to determine how long the questionnaires would take to present to the sample within two weeks, the investigator presented surveys to almost the same group twice. The degree to which the tools provide persistent results is referred to as reliability (Heale & Twycross, 2015). The Cronbach's coefficient was used to test the reliability of the questions. The Cronbach coefficient is a widely used reliability test. Cronbach's alpha reliability coefficient is a number that runs from 0 to 1. A value larger than 0.70 indicates that the study instrument is consistent (Mohamad, Sulaiman, Sern & Salleh, 2015). This was used in this research using SPSS based on the construct under each variable.

3.6.5. Data Collection Procedure

The drop-and-pick data collection approach was adopted for distributing questionnaires as recommended by Smith and Kim (2015) as ideal when dealing with respondents working with a busy schedule. The researcher presented a questionnaire to the respondents and collects them after a period agreeable by both researcher and the respondent within two weeks. Respondents were accorded up to two weeks to answer the questionnaires and return them. Secondary data was obtained by examining published reports, management reports, and other publications by the organization.

Quantitative data were collected using structured questionnaires and a secondary data checklist while qualitative data was collected using the key informants' guide. The study questionnaire had four sections; the first section targeted respondents' general information, the second section gathered data on system automation; the third section gathered data on the effectiveness of the systems automation, and the fourth section on strategies to support systems automation. All these sections had open-ended questions and a Likert scale. The qualitative findings were used to supplement data obtained through a quantitative approach.

3.7 Data Analysis Techniques

Raw data was sorted and serialized after data gathering. Data cleaning entailed identifying inaccurate and unreliable responses that were then updated to enhance the replies' quality; these errors occurred during data entry or when collecting data in the field. Statistical Package for Social Sciences was used to summarise and code the responses. This was done by running frequencies and values outside the range were removed

The data gathered using open-ended queries was coded to make computer processing easier. The final data was entered on SPSS Ver. 26 for analysis once validation is completed. SPSS is a versatile tool that allows users to manage data in a variety of formats. Before any manipulation of the dataset was used in the assessment, the original data was preserved. Qualitative data were analysed using the Thematic approach in line with the three study objectives. The data were summarized using a descriptive analysis approach. Percentage and frequency charts were used to obtain the analysis outcomes.

Descriptive statistical analysis was utilized since they allow for a comprehensible distribution of values through the use of quantitative measures of

central inclinations, dispersal, and distributions (Mihas, 2019). Verbatim was used to illustrate the qualitative statistical results.

3.8 Ethical Considerations

Before the data collection procedure, the investigator and the participants must sign agreements that spell out their respective responsibilities and obligations via informed permission. As a result, all ethical considerations relevant to the nature of this study were observed. The rights of participants as the second level of ethical consideration were strictly adhered to. Permission to perform this research was sought from the Nazarene postgraduate Board and the National Commission for Science, Technology, and Innovations as a vital aspect of adhering to the ethical criteria.

All relevant stakeholders were informed of the intent to carry out the research. The description of the survey was communicated to all participants. Respondents were informed of any possible positive and negative effects of their involvement in the study by the investigator (Arifin, 2018). After the purpose of the study was described to the participant, they were requested to sign written consent indicating their willingness to take part in the study. The investigator obtained participants' written consent before conducting the study and did not compel them to provide information.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

The fieldwork data was serialized, cleaned, and analysed in SPSS. This chapter presents the data analysed by the use of descriptive statistics. The chapter begins with a response rate followed by demographic information of the respondents and descriptive statistics. The study findings are presented based on the objectives of the study. The objectives of this study comprise; to establish the nature of systems automation deployed at the KPA to reduce corruption; determine strategies used to support systems automation at the KPA in the reduction of corruption; to assess the effectiveness of systems automation in the reduction of corruption levels at the KPA. The study findings are summarised on basis of the responses for each category of the Likert scale where 1 is i don't know, 2 is strongly disagree, 3 is disagree, 4 is neutral, 5 is agree, and 6 is strongly agree.

4.2 Presentation of Research Analysis and Findings

The study adopted a mixture of descriptive research designs. The study targeted 377 employees of the Kenya port Authority. The study relied on primary data that was collected using a semi-structured questionnaire. The questionnaires were self-administered. This study used descriptive statistics during data analysis. The analysed data was then presented in tables and figures.

4.2.1 Response Rate and Socio-Demographic Characteristics

This section provides the response rate and a profile of the respondents. This entails information about the basic characteristics of the respondents, including gender, age, education, years of experience at KPA, and the division they work at by the time the study was carried out. This information offers a general understanding of the

population under the study. An analysis of these variables provides the socioeconomic context within which other subsequent factors fall. It was observed that Out of the 377 questionnaires that were distributed to the respondents, 345 responses were obtained, which gives a response rate of 91.5%. According to Kothari (2019), a response rate of 50% or more is adequate for analysis therefore; the responses obtained were acceptable and can be used for conclusion. This is demonstrated in Figure 4.1 below.

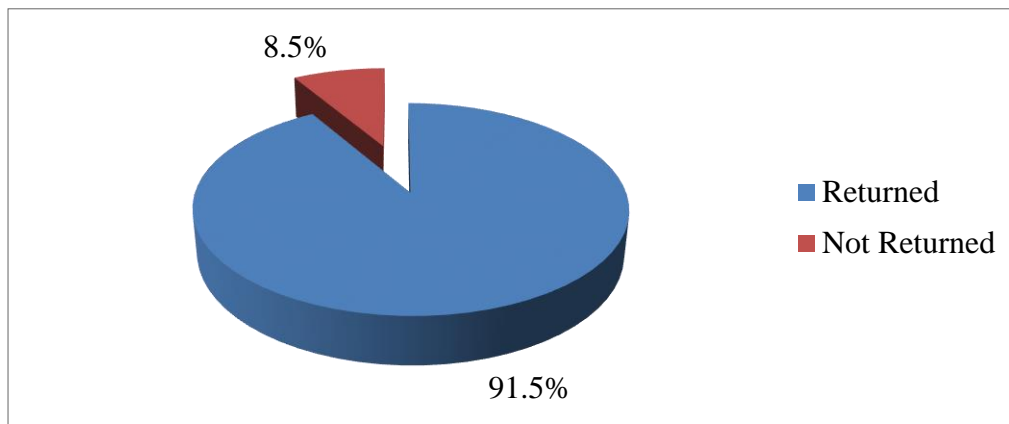


Figure 4. 1: Response Rate

Source: Field Data (2022)

Table 4.1 below presents the responses on the gender, age, and education qualification of the respondents.

Table 4. 1: Social Demographic Information

		N	%
Gender	Female	143	41.7
	Male	200	58.3
	Total	343	100.0
Age	Below 25 years	35	10.1
	26-35 Years	89	25.8
	36-45 Years	101	29.3
	46-55 Years	82	23.8
	Above 55 Years	38	11.0
	Total	345	100.0
Education	Certificate	51	14.8
	Diploma	130	37.7
	Degree	108	31.3
	Masters	56	16.2
	Total	345	100.0

Source: Field Data (2022)

The respondents were requested to indicate their gender. Gender is a crucial social demographic factor in social-economic studies. The consumption and understanding of technology differed between men and women. The study found that most of the respondents were male, accounting for 58.3% of the respondents while females accounted for 41.7%. The representation of the gender is not biased by the population and this shows appreciation of technology among the females at KPA.

The study also assessed the respondent distribution by age where the respondents were required to indicate their age category. It was found that most of the respondents were aged 36-45 years and accounted for 29.3%, followed closely by those aged 26-35 years (25.8%). Those between 46-55 years were at 23.8%, and those below 25 years were at 10.1%. finally, those above 55 years were at 11%. This implies that over 80% of the workers were aged at least 26 years. The age of the person has an implication on the ease of adaptiveness to changing technological scene with the youths likely to adapt easily as the old ones shun technology.

The other demographic factor assessed in this study was the education qualification. Respondents were asked to indicate their education qualifications. The individual level of education is strongly associated with individual judgment on issues affecting society. For instance, in this case, persons with better education are more likely to understand the possible contribution of automation to the issues of corruption at the port. The study found most of the respondents had a diploma (37.7%) followed closely by those who had a bachelor's level of qualification (31.3%) with a master accounting for 16.2%. The certificate holders were at 14.8%.

Table 4.2 presents the findings on duration and division worked. The study also assessed the duration worked by the respondents and the division they worked at KPA.

The duration and division worked influenced the individual understanding of the subject of the study.

Table 4. 2: Duration and Section Worked at KPA

		n	%
Duration Worked	Less than 2 years	28	8.2
	2 to 5 Years	76	22.2
	6 to 9 Years	28	8.2
	10 years and above	210	61.4
	Total	342	100.0
Division	Human resource and admin division	28	8.6
	Finance division	30	9.2
	Corporate services division	38	11.7
	Operations division	135	41.5
	Infrastructure division	35	10.8
	Engineering Division	20	6.2
	Legal services division	23	7.1
	Security division	12	3.7
	Management	2	0.6
	ICT	2	0.6
Total	325	100.0	

Source: Field Data (2022)

The study further assessed the duration worked by the respondents at KPA. It is assumed persons with higher experience are more likely to assess how various changes in an organization affect certain behaviors. In this case, persons who had worked in the port for a long period could tell how corruption has changed when various systems were adopted at the port. The study found the majority had worked for 10 years and above (61.4%), 22.2% had worked for 2 to 5 years, 8.2% had worked for less than two years while another 8.2% had worked for 6-9 years. Over 90% of the respondents had worked with KPA for at least 2 years at the time of this study.

The study further assessed the responses based on the division worked. The study found most of the respondents worked in the operations division (41.5%). Other divisions include 11.7% from the corporate division, 10.8% from the infrastructure division, 9.2% from the finance division, 8.6% from the human resources and

administration division, 7.1% from the legal services division, 6.2% from the engineering division, 3.7% from security division and 0.6% from ICT and Management divisions respectively.

The study also assessed the duration worked by individuals interviewed. From the data collected using interviews of key informants, the average duration worked in their respective organizations was more than 5 years. Most of the interviewees worked at the managerial level at the time of the study.

4.2.2 Nature of Systems Automation Deployed at the KPA to Reduce Corruption

The first objective of the study sought to assess the nature of systems automation deployed at the KPA to reduce corruption. The study assessed the major automated systems adopted by KPA over the 10 years before the study period, level of automation, an online platform for reporting corruption, investigations of corruption allegations, availability of electronic payment methods that help reduce corruption, the contribution of automation of operations in the respective department in reducing corruption, automation bridging loopholes exploited by corrupt offices.

4.2.2.1 Departmental Based Automation System

The study assessed the departmental-based systems and found that SAP was the most used system at the KPA (47.1%). This was followed closely by the Container terminal operation system, which accounted for 31.1%, Kilindini Waterfront Operating system at 9.8%, Integrated security system at 4.1%, Employee self-service systems at 3.1%, terminal operating system at 2.1%, and case 360 and Supplier Relation System at 1.0% respectively. This is demonstrated in figure 4.2 below

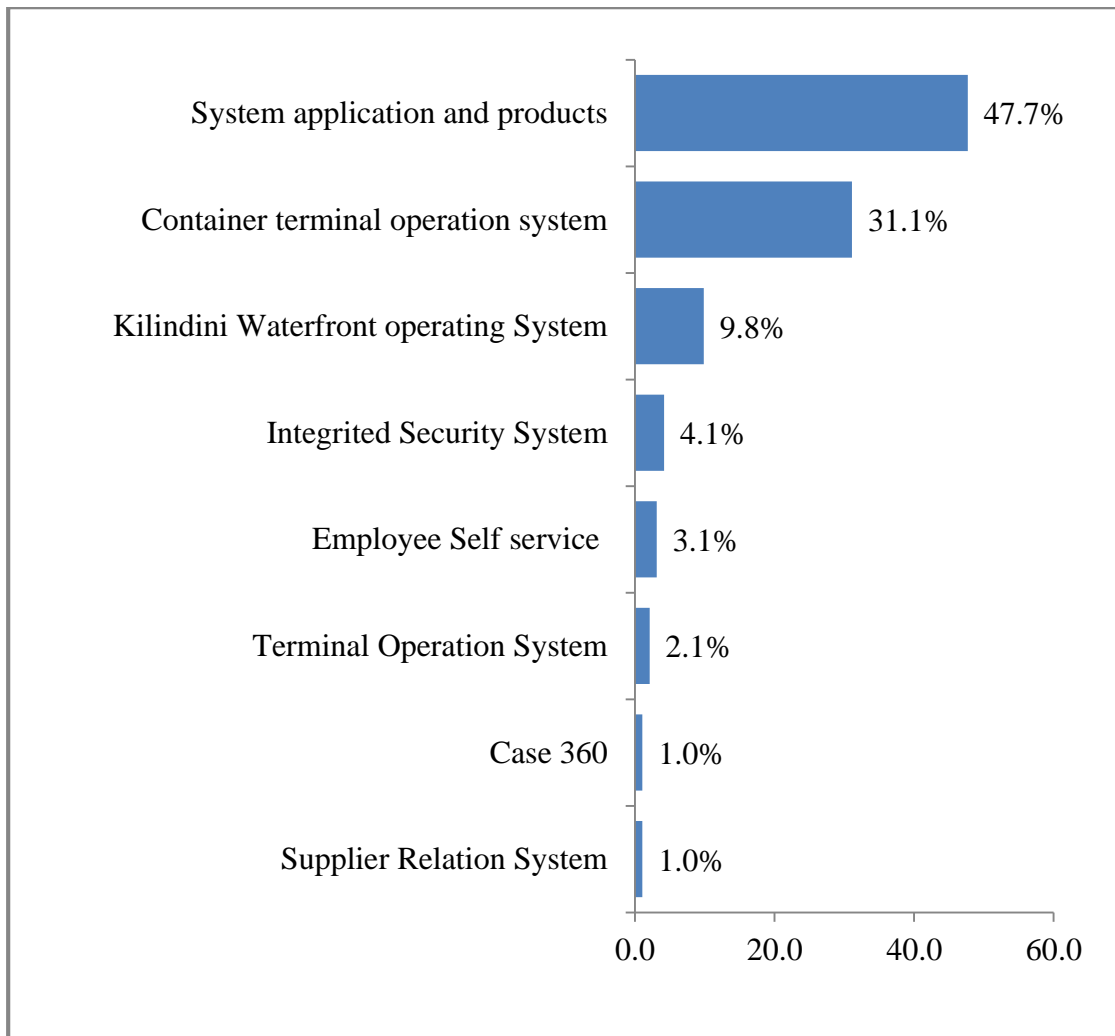


Figure 4. 2: Departmental Based Automation System

Source: Field Data (2022)

4.2.2.2 Frequently Used Systems

The study further analysed the automation systems adopted 10 years before the study period. Most respondents reported system application and products (51.6%), Kilindini waterfront operating System (38.8%), container terminal operation system (24.9%), and Integrated Security System (12.8%) among others in figure 4.3 below.

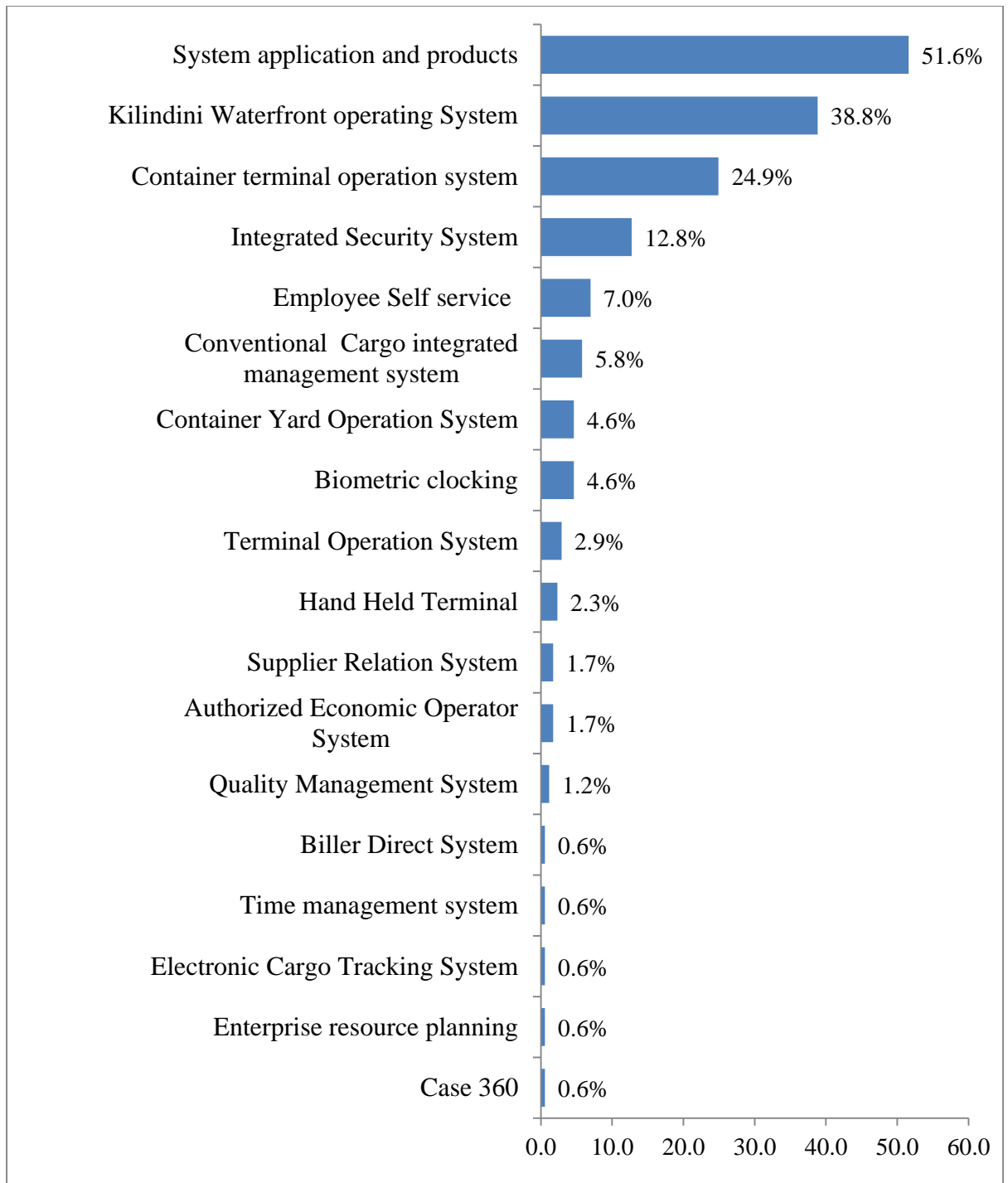


Figure 4. 3: Frequently Used Systems at KPA

Source: Field Data (2022)

4.2.2.3 Automation of Major Port Operations

The study sought to establish whether major operations at KPA had been automated. Most of the workers at the Kenya Port Authority agreed that major operations at the firm had been automated at the time of this study (42.2%), 32.3%

strongly agreed while 13.2% were neutral. It was also found that 4.4% reported strongly disagreeing, 4.1% disagree and 3.8% said they did not know. This finding implies that major operations at the KPA had been automated at the time of this study. this is demonstrated in Table 4.3 below.

Table 4. 3: Major Operations at the KPA have been Automated

		Frequency	Valid Percent
Major operations at the KPA have been automated	I don't know	13	3.8
	Strongly Disagree	15	4.4
	Disagree	14	4.1
	Neutral	45	13.2
	Agree	144	42.2
	Strongly Agree	110	32.3
Total		341	100.0

Source: Field Data (2022)

4.2.2.4 Presence of an Online Platform for Reporting Corruption

The research sought to find out if there existed an online platform/system to report Corruption at KPA. Most workers at the Kenya Port Authority agreed that KPA had an online platform for reporting corruption cases at the time of this study (37.2%), 20.6% strongly agreed with the existence of an online corruption reporting system, and 16.5% remained neutral. Further, 6.5% disagreed, 8.0% strongly disagreed and 11.2% reported that they did not know. This finding implies that KPA had an online platform for reporting corruption at the time of this study. Figure 4.4 presents the finding on the assessment of the online platform for reporting corruption at KPA.

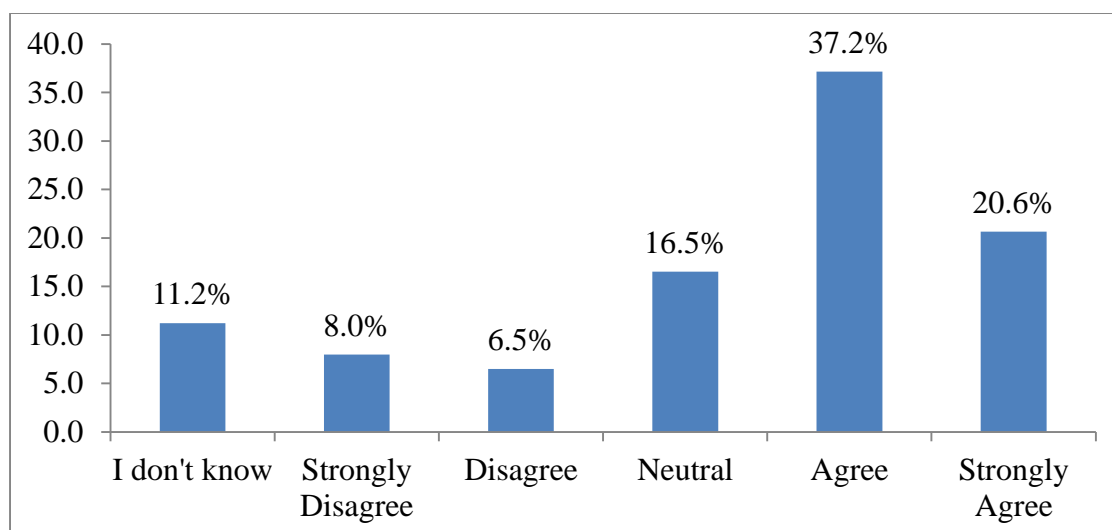


Figure 4.4: KPA has an Online Platform for Reporting Corruption

Source: Field Data (2022)

4.2.2.5 Investigation Corruption Allegations

The study further assessed if the KPA investigated corruption allegations. The findings on this subject are shown in Table 4.4 below. Most workers at the Kenya Port Authority agreed that KPA investigates corruption allegations (39.4%), 21.5% strongly agreed, and 23.0% remained neutral. Also, 7.2% disagreed, 6.0% strongly disagreed and 3.0% reported that they did not know. This finding implies that KPA investigates corruption allegations to have a satisfactory level among the workers.

Table 4.4: KPA investigates Corruption Allegation

	Frequency	Valid Percent
I don't know	10	3.0
Strongly Disagree	20	6.0
Disagree	24	7.2
Neutral	77	23.0
Agree	132	39.4
Strongly Agree	72	21.5
Total	335	100.0

Source: Field Data (2022)

4.2.2.6 Significance of automation system in reducing corruption in the department

They further assessed if automated operations in the various department helped reduce corruption. The findings on this subject are presented in Table 4.5 below. Most workers at the Kenya Port Authority agreed that automated operations in various departments helped reduce corruption (41.8%), 32.8% strongly agreed while 12.5% were neutral. A proportion of 8.1% disagreed, 2.4% strongly disagreed and another 2.4% of the respondents said that they did not know. This finding implies that automated operations in various departments helped reduce corruption.

Table 4. 5: Automated operations in our department help reduce corruption

		Frequency	Valid Per cent
Automated operations in our department help reduce corruption	I don't know	8	2.4
	Strongly Disagree	8	2.4
	Disagree	27	8.1
	Neutral	42	12.5
	Agree	140	41.8
	Strongly Agree	110	32.8
Total		335	100.0

Source: Field Data (2022)

4.2.2.7 Bridging loopholes exploited by corrupt officials

The study further assessed if automation at KPA had bridged loopholes exploited by corrupt offices. The findings on this subject are presented in figure 4.5 below. Most workers at the Kenya Ports Authority agreed that automation at KPA had bridged loopholes exploited by corrupt offices (43.8%), 25.8% strongly agreed while 12.3% were neutral. Further, 9.6% disagreed, 5.4% strongly disagreed and 3.0% reported that they did not know. This finding implies that automation at KPA had bridged loopholes exploited by corrupt offices.

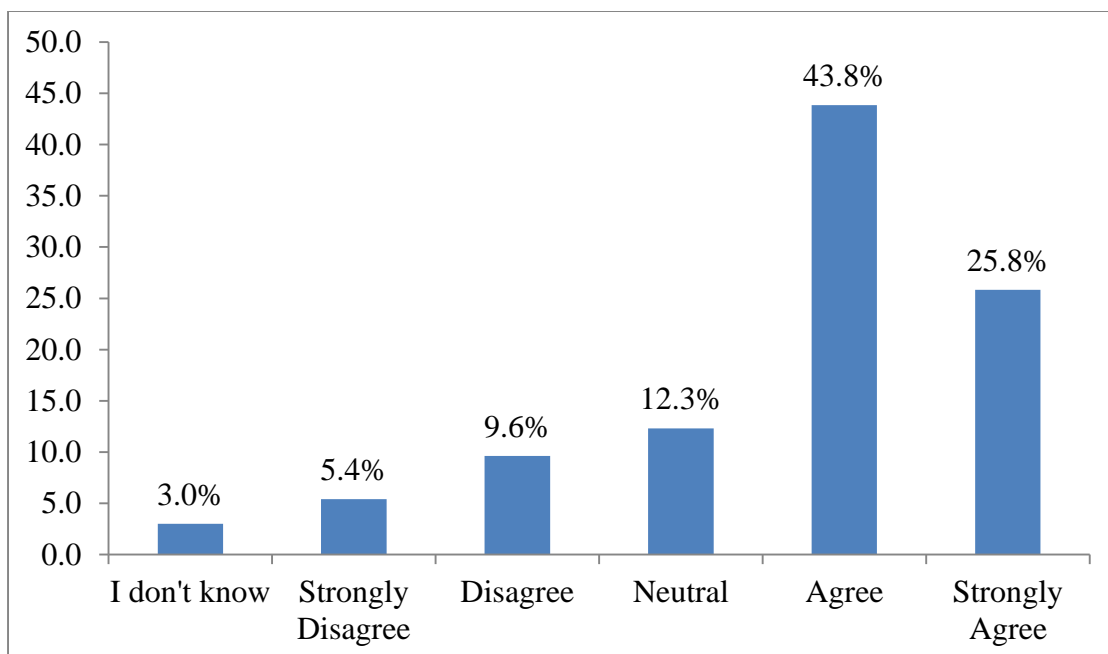


Figure 4. 5: Automation at KPA has bridged loopholes exploited by corrupt officials

Source: Field Data (2022)

Analysis of qualitative findings reviewed that there was significant use of the system by clearing agents among others. Citing some clearing agents,

I frequently use the Integrated Customs Management System (ICMS) to clear cargo for my clients almost every day. Clearing of cargo at the port is our day-to-day activity **(Source: Officer I)**.

Our members use biller systems to make payment for customs duties nearly every day; they also use cargo tracking systems to monitor the movement of the cargo destined for Kenya and outside market **(Source: Officer II)**.

An interview with a member of KRA indicated that KRA mainly interacted with the system to control the smuggling of cargo and prevent the diversion of cargo initially declared as transit cargo to the Kenyan market. Citing the customs officers 1:

The integrity of cargo movement from the port of origin to the port of discharge, to the warehouse, and finally to the declared owner is a matter of concern to us. We use Cargo tracking system for 24 hours every day to ensure no revenue lost as a result of misspecification of cargo destination to evade payment of customs **(Source: Officer I)**.

4.2.2.8 Correlation between Nature of System Automation and Reduction in Corruption

The study sought to establish the nature of the relationship between the independent variable (Nature of systems automation) and the dependent variables (reduction of corruption at KPA). This was done using correlation coefficients to test the linearity of the study variables. The study used Pearson Correlation (r) to test whether the relationship between the variables was significant or not at 95% level of confidence.

Table 4. 6: Correlation between nature of system automation and reduction in corruption

		Corruption reduction
Nature of system Automation	Pearson Correlation	.513**
	Sig. (2-tailed)	.000
	N	345

****.** Correlation is significant at the 0.01 level (2-tailed).

The correlation between nature of system automation in reduction of corruption levels at the KPA is implied by $r = 0.513$, with a p-value of 0.000, implying a strong, positive and significant relationship. Therefore, the Nature of system automation strongly influenced the reduction of corruption at KPA. For every unit increase in the Nature of system automation index, the reduction of corruption index at KPA increases by 0.513 units.

4.2.3 Strategies to support systems automation at the KPA in the reduction of corruption

The second objective of this study sought to assess the strategies adopted to support system automation at the port. The study assessed the aspects of customer support, system audit regular maintenance, and upgrades to ensure effective functioning

of the organization processes and continuous allocation of resources to support the system as strategies to support automation.

4.2.3.1 Strategies to Support Systems Automation at the KPA

The study further assessed the strategies adapted to support systems automation at the KPA to reduce corruption. These strategies include firstly, the introduction of Hand-Held Terminal (HHT, improving network on the network, hiring qualified system engineers, an alternative manual system in case the system failed, setting policies into place/customer charter/open-door policies, customer support, and ISO standards. On the other hand, there are systems to monitor the port for instance, CCTV/ use of the port pass to control access, allocation of finance to support system/ provision of computers, elimination of paperwork/ electronic processes/procurement among others.

The other systems focus on assigning roles and credentials/ having support users/introducing controls, use of biometrics in authentication to the system, system maintained / system upgrade, system audit/ monitoring to troubleshooting/ setting up a control room. Others create awareness of the available automated systems through the staff/staff training, provision of a manual used for operating systems, and performance appraisal (Scorecard). Others promote the use of cashless transfer, improve coverage system, support the use of VPN, create clearing reporting line, enable the use of blocks mark for SGR destined cargo and promote monthly sensitization on ethics and integrity.

There have been efforts to automate the process of hooking containers to LCDN, continuous acquisition of gadgets used by the systems, continuous business automation, staff training on the use of automation systems, and creation of interlinks between KPA and other government agencies. Creating system awareness among staff or staff training is also among the strategies used by KPA in enhancing the implementation of

automation of systems in the firm, followed by a system audit or monitoring for troubleshooting.

It was established that 21.1% of the respondents opined that Staff training is crucial in supporting systems automation. 12.5% believed that system audit is the most appropriate, 9.2% vouched for other factors that include controlled deployment and skill matching to responsibilities, and 7.9% believed system Maintenance and regular upgrade is the most appropriate. On the other hand, 7.2% believed in access control, and another 7.2% believed in the deliberate elimination of paperwork. Further, 6.6% had resource allocation as their preference, and 5.3% viewed the use of a port pass to control access as the most appropriate. 2.0% believed in setting up desirable policies, another 2.0% believed in setting up manual systems to support automated systems just in case of failure, and another 2.0% in hiring qualified systems engineers. Finally, 1.3 percent vouched for improved networks while another 1.3% believed in the introduction of the handheld terminal (HHT). This is as shown in figure 4.6 below.

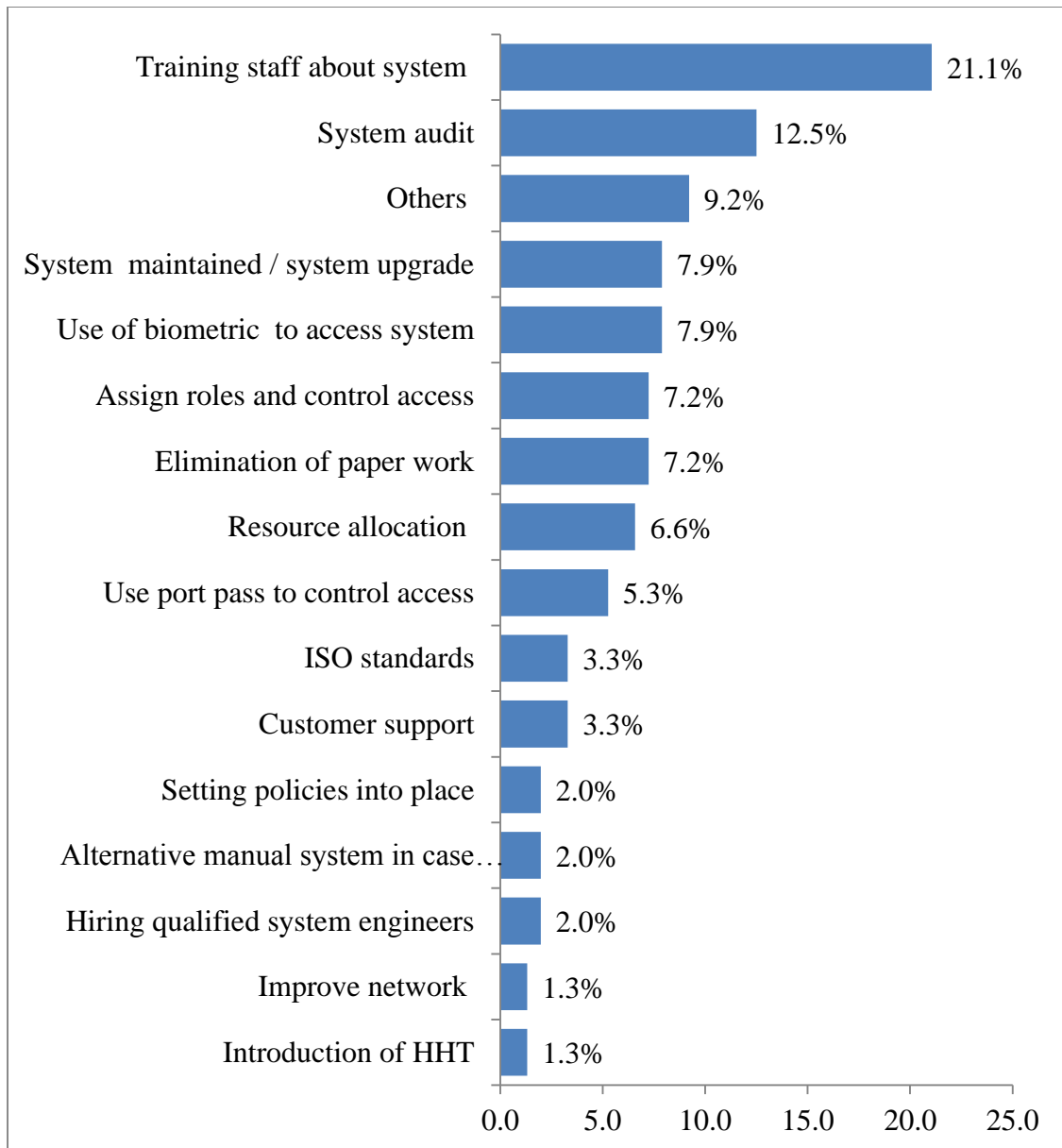


Figure 4. 6: Strategies to support systems automation at the KPA in the reduction of corruption

Source: Field data (2022)

The study rated the customer and staff training and sensitization on the use of various systems, customer support, system audit to ensure no interference with the operation of systems, regular maintenance of systems, and making the resource available to support system operations as crucial strategies to support systems automation.

4.2.3.2 Customers Training and Sensitization

The study assessed if KPA had been conducting customer training and sensitization on the use of various systems. It was observed that most of the workers agreed that KPA conducted customer training and sensitization on the use of various systems (38.3%), 27.4% strongly agreed while 15.8% were neutral. The study also found a proportion of 7.0% of disagreement, 6.7% of strong disagreement and 4.9% who reported to have no knowledge on the customer training and sensitization at KPA. This implies that KPA conducted customer training and sensitization on the use of various systems as a way of promoting automation whose goal is to reduce corruption. The finding is summarized in table 4.7 below.

Table 4. 7: KPA conducts customers training and sensitization on the use of various systems

				Frequency	Valid Percent
KPA conducts customers training and sensitization on the use of various systems	I don't know	Strongly Disagree	Disagree	16	4.9
				22	6.7
				23	7.0
				52	15.8
				126	38.3
				90	27.4
Total				329	100.0

Source: Field Data (2022)

4.2.4.3 Staff Training and Sensitization

The study assessed if the KPA conducted staff training and sensitization on the use of various systems and customer support. Most of the workers agreed that KPA conducted staff training and sensitization on the use of various systems and customer support (35.0%), 27.8% strongly agreed while 15.8% were neutral. Further, 7.0% disagreed, 6.7% strongly disagreed while 4.9 reported that they did not know. This finding implies that KPA conducted staff training and sensitization on the use of various

systems and customer support to reduce corruption. The finding is summarized in table 4.8 below.

Table 4.8: KPA conducts staff training and sensitization on the use of various systems and customer support

		Frequency	Valid Percent
KPA conducts staff training and sensitization on the use of various systems and customer support	I don't know	10	3.0
	Strongly Disagree	22	6.6
	Disagree	25	7.6
	Neutral	66	19.9
	Agree	116	35.0
	Strongly Agree	92	27.8
Total		331	100.0

Source: Field Data (2022)

4.2.3.4 System Audits

The study assessed if the KPA carried out a system audit to ensure no interference with the operation of systems. The finding is summarized in table 4.9 below. Most workers agreed that KPA carried out system audits to ensure no interference with the operation of systems (48.0%), 21.3% strongly agreed while 17.0% were neutral. It was noted that 7.6% of the participants disagreed, 6.6% strongly disagreed and 3.0% said they did not know. This implies that KPA carried out system audits to ensure no interference with the operation of systems as a way of promoting automation at the KPA to reduce corruption.

Table 4. 9: KPA carries out system audit to ensure no interference with the operation of systems

		Frequency	Valid Percent
KPA carries out system audits to ensure no interference with the operation of systems	I don't know	9	2.7
	Strongly Disagree	20	6.1
	Disagree	16	4.9
	Neutral	56	17.0
	Agree	158	48.0
	Strongly Agree	70	21.3
Total		329	100.0

Source: Field Data (2022)

4.2.3.5 Regular Maintenance of Systems

The study assessed if there was regular maintenance of systems in various departments at KPA. The finding is summarized in table 4.10 below. Most workers at the Kenya Ports Authority agreed there was regular maintenance of systems in various departments (44.9%), 21.5% strongly agreed while 17.5% were neutral. Further, 8.6% disagreed, 4.9% strongly disagreed and 2.5% reported that they did not know. This finding implies there was regular maintenance of systems in various departments as a way of promoting automation at the KPA in the effort to reduce corruption.

Table 4. 10: There is regular maintenance of systems in our department.

		Frequency	Valid Percent
There is regular maintenance of systems in our department.	I don't know	8	2.5
	Strongly Disagree	16	4.9
	Disagree	28	8.6
	Neutral	57	17.5
	Agree	146	44.9
	Strongly Agree	70	21.5
Total		325	100.0

Source: Field data (2022)

4.2.3.6 Resource Allocation to Support System Operations

The study assessed if the KPA made the resource available to support system operations. Most workers at the Kenya Port Authority agreed that KPA made the resource available to support system operations (49.2%), 23.1% strongly agreed while 16.4% were neutral. It was also noted that 4.3% disagreed, 5.2% strongly disagreed and 1.8% reported that they did not know. This finding implies that KPA made the resource available to support system operations as a way of promoting automation at the KPA to reduce corruption. This is shown in table 4.11 below.

Table 4. 11: KPA has made the resource available to support system operations.

		Frequency	Valid Percent
KPA has made the resource available to support system operations.	I don't know	6	1.8
	Strongly Disagree	17	5.2
	Disagree	14	4.3
	Neutral	54	16.4
	Agree	162	49.2
	Strongly Agree	76	23.1
Total		329	100.0

Source: Field Data (2022)

According to qualitative data collected from key informants, supporting system users, enhancing system security against the hackers, continuous monitoring, and prosecution of persons found attempting or enabling corruption will help in fighting corruption at KPA. Quoting Staff 1:

Initially there people who benefited from corrupt practices at the port through the exploitation of customers or colluding with customers to evade tax among other crimes, we strongly believe these people will continue to exploit loopholes within the systems to advance their corrupt practices, therefore there is need for continuous investment in technology, investigation of corruption allegations and imposition of severe penalties for persons found to interfere with the systems (**Source: Staff 1**)

A representative of the DPP argued the need for investigation and prosecution of all forms of corruption cases detected at the KPA. Quoting;

I think if the multiagency collaborated to fight corrupt practices, particularly persons sabotaging various systems for personal gain, the future of automation is bright in addressing the previous corruption issue not only at the KPA but also in other government offices (**Source: Contact person 1**)

4.2.3.7 Correlation between Strategies to Support Systems Automation at the KPA in the Reduction of Corruption

The study sought to establish the nature of the relationship between the independent variable (Strategies to support systems automation) and the dependent variables (reduction of corruption at KPA). This was done using correlation coefficients to test the linearity of the study variables. The study used Pearson Correlation (r) to test whether the relationship between the variables was significant or not at 95% level of confidence.

Table 4.12: Association between Strategies to support systems automation at the KPA in the reduction of corruption

		Corruption reduction
Strategies to support systems automation	Pearson Correlation	.429**
	Sig. (2-tailed)	.000
	N	345

** . Correlation is significant at the 0.01 level (2-tailed).

The correlation between Strategies to support systems automation in reduction of corruption levels at the KPA is implied by $r = 0.429$, with a p-value of 0.000, implying a strong, positive and significant relationship. Therefore, the Strategies to support systems automation strongly influenced the reduction of corruption at KPA. For every unit increase in the Strategies to support systems automation index, the reduction of corruption index at KPA increases by 0.429 units.

4.2.4 Effectiveness of systems automation in reduction of corruption levels at the KPA

The second objective assessed the effectiveness of systems automation in reducing corruption levels at the KPA. The study assessed automation's effectiveness in fighting corruption at the KPA. There was improved clearing time following the

automation of services. Automation reduced delays previously occasioned by corrupt individuals, provided the seamless flow of the clearing process, increased security of cargo cleared at the port, decreased in cost incurred in clearing cargo, and decreased the amount of time taken to clear cargo from the port.

4.2.4.1 Effectiveness of automation in the reduction of corruption

Figure 4.7 presents the findings on the respondents' perception of the effectiveness of automation in the reduction of corruption at KPA. Most workers at the Kenya Port Authority agreed that the adoption of automation at KPA helped in the reduction of corruption at the port (90%). On the other hand, 10% negated and stated that systems are as good as the users. This implied that automation at KPA was perceived by the majority to be effective in the reduction of corruption at the time of this study.

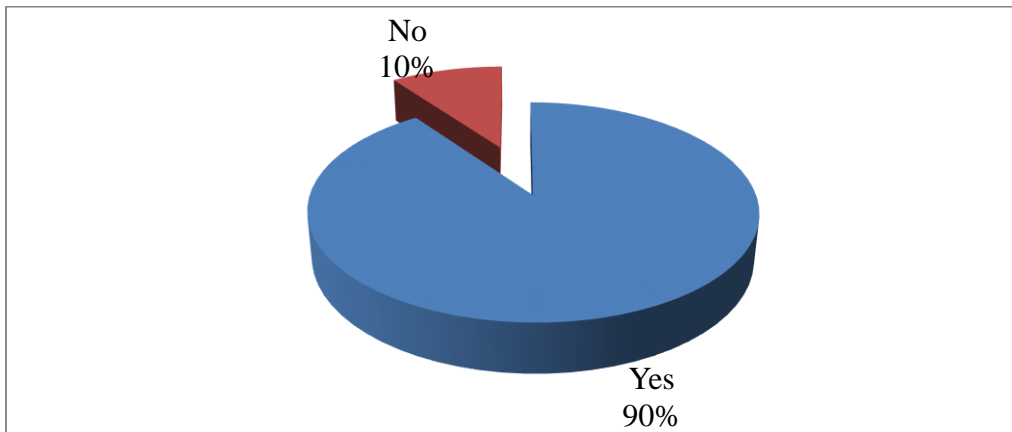


Figure 4. 7: Effectiveness of automation on the reduction of corruption

Source: Field Data (2022)

4.2.4.2 Presence of electronic payment methods that help reduce corruption

Figure 4.8 presents findings on the assessment of KPA having electronic payment methods that help reduce corruption. Most workers at the Kenya Port Authority strongly agreed that KPA had electronic payment methods that helped reduce

corrupt practices as shown by 42.6%, 38.5% agreed, and 9.5% were neutral. Further, 4.1% disagreed, 3.6% strongly disagreed and 1.8% reported that they did not know. This is because there is less interaction between the person clearing and the customer. This finding implies that KPA had electronic payment methods that helped reduce corruption.

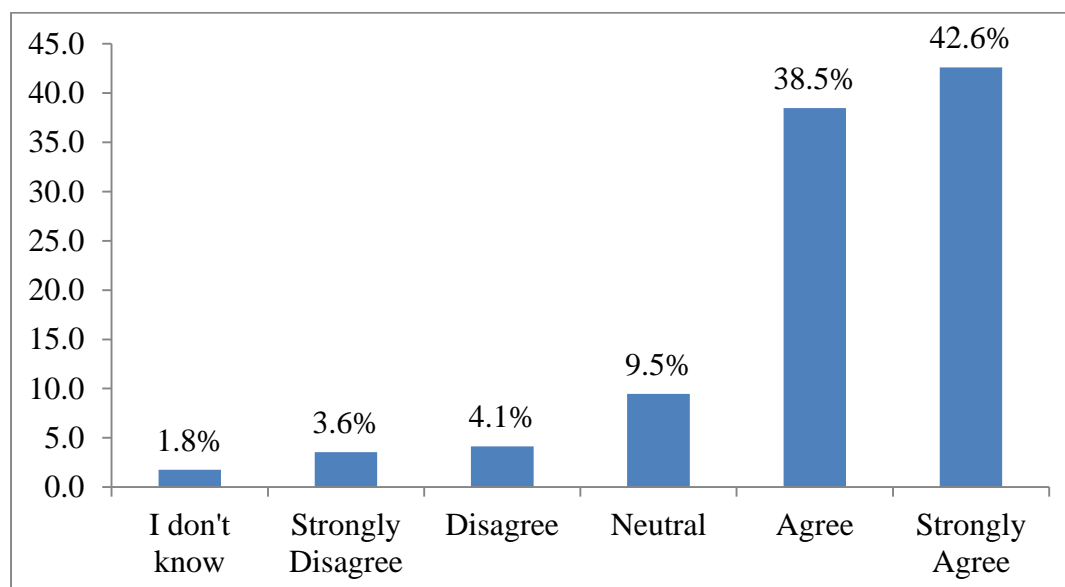


Figure 4. 8: KPA has electronic payment methods that help reduce corruption

Source: Field data (2022)

4.2.4.3 Clearing Time Following the Automation of Services

The study also investigated whether automation of services at KPA had influenced the clearing time. Most workers at the Kenya Port Authority agreed that automation of services at KPA had influenced the clearing time (40.6%), and 33.8% strongly agreed. On the other hand, 12.9% maintained neutrality on the question, 2.5% disagreed, 5.5% strongly disagreed and 4.6% responded that they do not know. This finding implies that the automation of services at KPA had influenced the clearing time. This is shown in table 4.13 below.

Table 4. 13: There improved clearing time following the automation of services

	Frequency	Valid Percent
I don't know	15	4.6
Strongly Disagree	18	5.5
Disagree	8	2.5
Neutral	42	12.9
Agree	132	40.6
Strongly Agree	110	33.8
Total	325	100.0

Source: Field data (2022)

4.2.4.4 Reduction of delays previous occasioned by corrupt individuals

The study assessed if there was a reduction of delays previously experienced through corruption practices following the adoption of automation practices. Most of the workers at the Kenya Port Authority agreed that Automation has reduced delays previously occasioned by corrupt individuals as shown by 49.8%, 24.9% strongly agreed while 15.8% were neutral. Further, 3.3% of the participants disagreed, 1.8% strongly disagreed and 4.3% did not know. This finding implies that Automation has reduced delays previously occasioned by a corrupt individual. Figure 4.9 presents the findings.

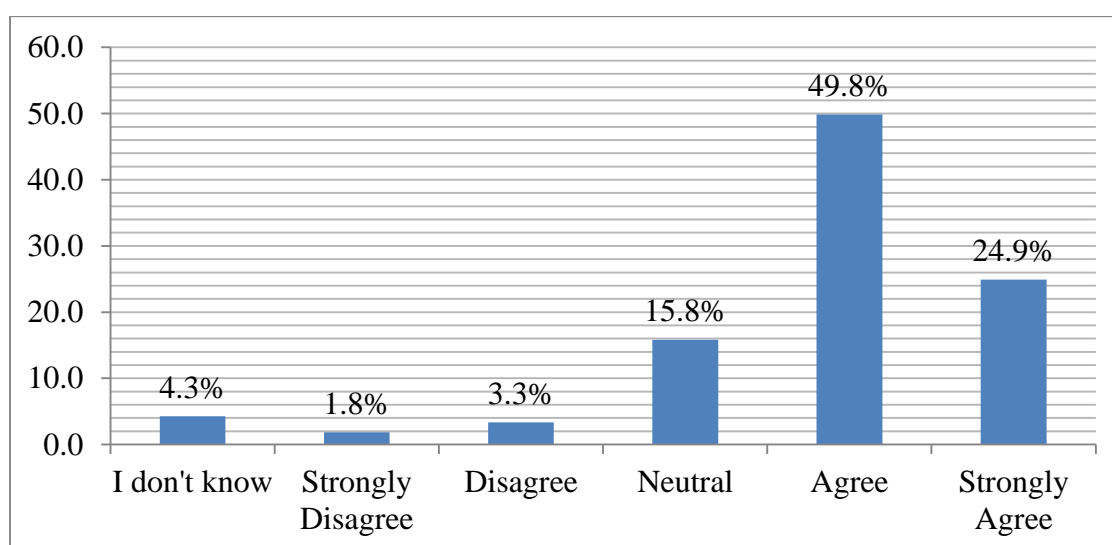


Figure 4. 9: Automation has reduced delays previous occasioned by corrupt individuals

Source: Field data (2022)

4.2.5.5 *The flow of the Clearing Process*

The research also sought to establish if there was a seamless flow of the clearing process following the automation of processes at KPA. Most workers at the Kenya Port Authority agreed there was a seamless flow of clearing process following the adoption of automated systems in KPA operations (44.2%), 19.9% strongly agreed while 19.9% were neutral. It was also noted 6.5% of the respondents' disagreed, 6.9% strongly disagreed and 2.5% reported that they did not know if automation influenced the flow of the clearing process. This finding implies that there was a seamless flow of the clearing process following the adoption of automated systems in KPA operations. Table 4.14 below presents findings on the assessment.

Table 4. 14: There is a seamless flow of the clearing process

		Frequency	Valid Percent
There is a seamless flow in the clearing process	I don't know	8	2.5
	Strongly Disagree	22	6.9
	Disagree	21	6.5
	Neutral	64	19.9
	Agree	142	44.2
	Strongly Agree	64	19.9
Total		321	100.0

Source: Field Data (2022)

4.2.4.6 *Cargo Security*

The other aspect assessed in this study in the context of system effectiveness was the cargo security during clearing at the port. The findings are summarized in figure 4.10 below. It was observed that most of the workers at the Kenya Port Authority agreed there was increased security of cargo cleared at the port following the automation of port operations (44.5%), 28.2% strongly agreed, and 19.9% remained neutral. Further, it was noted that 3.8% of the respondents disagreed, 7.5% strongly disagreed and 2.5% reported to have no knowledge about automation effect on the security of cargo being

cleared. This finding implies that automation has an influence on the increased security of cargo cleared at the port.

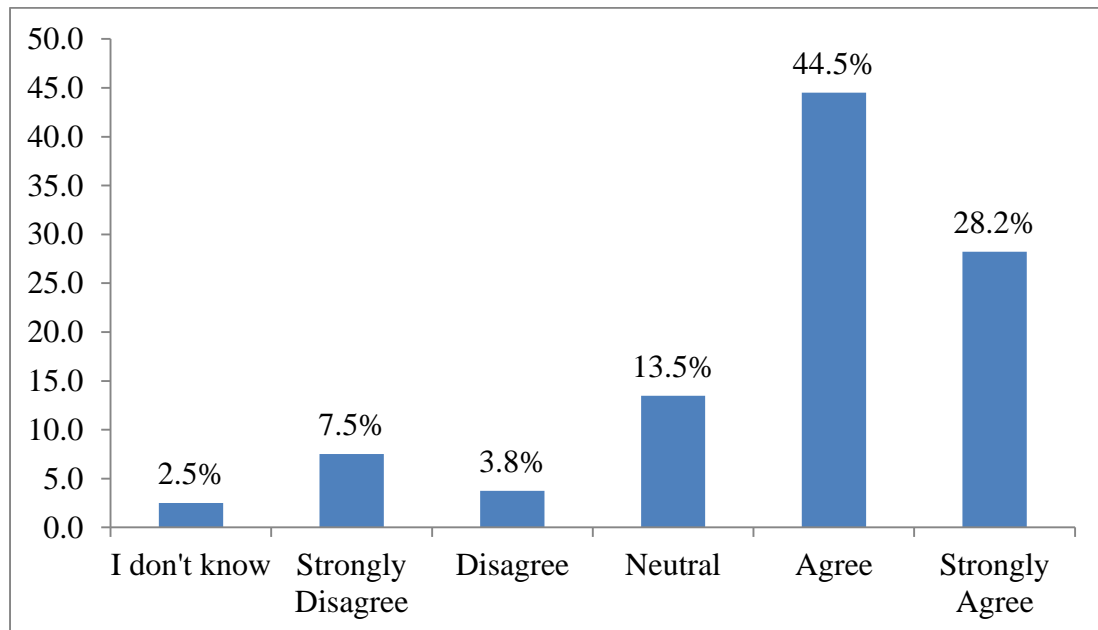


Figure 4. 10: There is increased security of cargo being cleared at the port

Source: Field Data (2022)

4.2.4.7 Cost Incurred in Clearing a Cargo

The study further investigated if the automation helped decrease the cost previously incurred in clearing cargo. These findings are summarized in table 4.15 below. Most workers at the Kenya Port Authority agreed there was a decrease in cost incurred in clearing cargo at the port following the automation of port operations (37.9%), 21.5% strongly agreed, and 25.2% remained neutral. It was also noted that 7.6% disagreed, 3.5% strongly disagreed and 4.4% did not know if cost incurred in clearing cargo had reduced because of automation. This finding implies that automation decreased the cost incurred in clearing cargo at the port.

Table 4. 15: There is a decrease in cost incurred in clearing a cargo

		Frequency	Valid Percent
There is a decrease in cost incurred in clearing a cargo	I don't know	14	4.4
	Strongly Disagree	11	3.5
	Disagree	24	7.6
	Neutral	80	25.2
	Agree	120	37.9
	Strongly Agree	68	21.5
Total		317	100.0

Source: Field data (2022)

4.2.4.8 Time Taken to Clear Cargo

Finally, the effectiveness of automation was investigated concerning a decrease in the time previously taken to clear cargo. Most workers at the Kenya Port Authority agreed that automation reduced the time taken to clear cargo at the KPA as shown by 38.1%. Also, 31.7% strongly agreed, and 16.2% were neutral. Further, 5.1% disagreed, 6.3% strongly disagreed, and 2.5% did not know if time taken to influenced positively time taken to clear cargo. This finding implies that automation decreased the time taken to clear cargo at the port. This finding is summarized in figure 4.11 below.

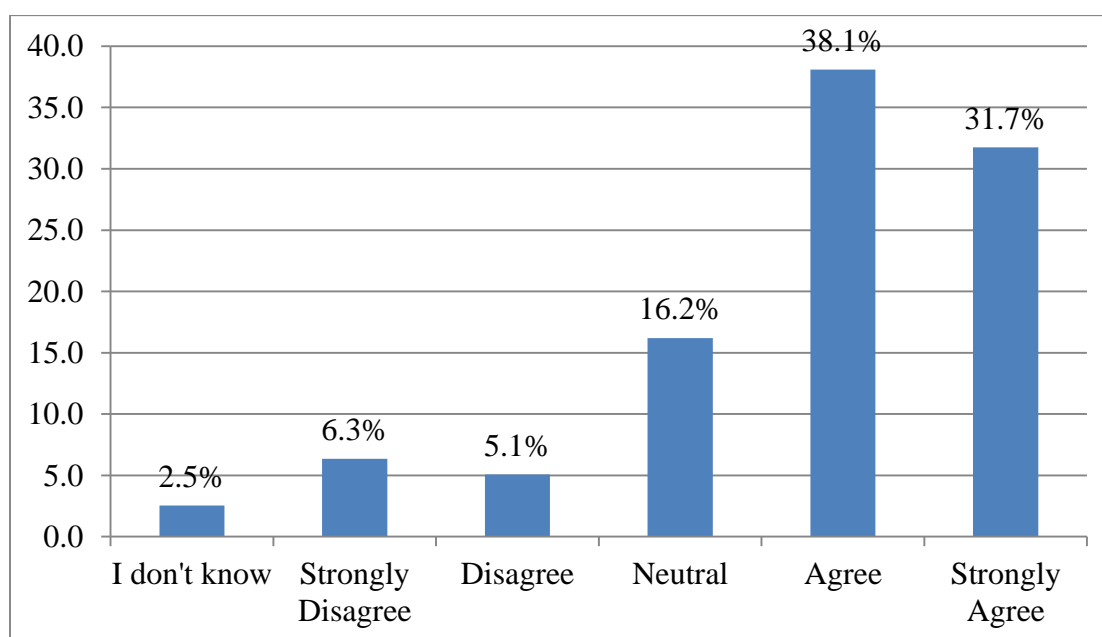


Figure 4. 11: Effectiveness of the automation on the reduction of time taken to clear cargo

Source: Field Data (2022)

The qualitative findings from the key informant showed a reasonable contribution of automation to fighting petty corrupt practices, reduction of delays at the port previous occasioned by human sabotage, reduced cost of cargo clearance, and security of cargo. The following are quotations from some interviewed officers;

Initially there were high claims from our members on the disappearance of cargo, extortion from KPA officers, and intentional delays occasioned by corrupt officers. However, this is slightly changing and we hope time shall come when most of the operations being handled by humans shall be taken up by system algorithms (officer II)

Cargo security has increased significantly and to a reasonable extent KRA has been able to enhance payment of customs duties and control cargo diversion (Officer 1)

4.2.4.9 Correlation between Effectiveness of Systems Automation in Reduction of Corruption Levels At the KPA

The study sought to establish the nature of the relationship between the independent variable (automation) and the dependent variables (reduction of corruption at KPA). This was done using correlation coefficients to test the linearity of the study variables. The study used Pearson Correlation (r) to test whether the relationship between the variables was significant or not at 95% level of confidence. Table 4.16 below demonstrated the findings.

Table 4. 16: Association between Effectiveness of systems automation in reduction of corruption levels at the KPA

		Corruption reduction
Effectiveness of systems automation	Pearson Correlation	.961**
	Sig. (2-tailed)	.000
	N	345

** . Correlation is significant at the 0.01 level (2-tailed).

The correlation between Effectiveness of systems automation in reduction of corruption levels at the KPA is implied by $r = 0.961$, with a p-value of 0.000, implying a strong, positive and significant relationship. Therefore, the Effectiveness of systems automation strongly influenced the reduction of corruption at KPA. For every unit increase in the Effectiveness of systems automation index, the reduction of corruption index at KPA increases by 0.961 units.

4.2.5 Perceived Reduction of Corruption at KPA

The study examined the reduction of corruption levels as a result of automation at the port. The study assessed agreement with notion that automation had led to reduction of bribery, embezzlement of funds, Kickbacks, nepotism and cronyism.

4.2.5.1 Reduction of bribery

The research sought to assess if systems automation at the port reduced bribery incidences. Most workers at the Kenya Port Authority agreed that automation reduced the bribery at the KPA as shown by 61.4%. Also, 14.8% strongly agreed. Further, 12.8% disagreed, 3.8% strongly disagreed, and 2.5% did not know if automation led to a reduction of bribery at the KPA. Table 4.17 shows responses on the agreement that that automation had led to reduction of bribery at the port.

Table 4. 17: Reduction of the bribery at the port

		Frequency	Valid Percent
Reduction of the bribery at the port.	I don't know	25	7.2
	Strongly Disagree	13	3.8
	Disagree	44	12.8
	Agree	212	61.4
	Strongly Agree	51	14.8
Total		345	100.0

Source: Field Data (2022)

4.2.5.2 Reduction of the embezzlement of funds at the port

The research sought to establish if systems automation contributed to a reduction of embezzlement incidences at the port. Most workers at the Kenya Port Authority agreed that automation reduced the embezzlement of funds at the KPA as shown by 62.3%. Also, 19.7% strongly agreed. Further, 11.3% disagreed, 3.2% strongly disagreed, and 3.5% did not know if automation led to a reduction of embezzlement of funds at the KPA. Table 4.18 shows responses to the agreement that automation had led to reduction of embezzlement of funds at the port.

Table 4. 18: Reduction of the embezzlement of funds at the port.

	Frequency	Valid Percent
Reduction of the I don't know	12	3.5
embezzlement of funds Strongly Disagree	11	3.2
at the port. Disagree	39	11.3
Agree	215	62.3
Strongly Agree	68	19.7
Total	345	100.0

Source: Field Data (2022)

4.2.5.3 Reduction of kickbacks at the port

The research further sought to establish if the increased automation of systems at the port reduced the chances of receiving kickbacks. Most workers at the Kenya Port Authority agreed that automation reduced the kickbacks at the KPA as shown by 61.7%. Also, 16.2% strongly agreed while 13.0 were neutral. Further, 3.8% disagreed and 5.2% strongly disagreed that automation led to a reduction of kickbacks at the KPA. Table 4.19 shows responses to the agreement that automation had led to reduction of kickbacks at the port.

Table 4. 19: Reduction of kickbacks at the port

		Frequency	Valid Percent
Reduction of kickbacks of funds at the port.	Strongly disagree	18	5.2
	Disagree	13	3.8
	Neutral	45	13.0
	Agree	213	61.7
	Strongly agree	56	16.2
Total		345	100.0

Source: Field Data (2022)

4.2.5.4 Reduction of the nepotism and cronyism at the port

The research finally sought to establish if the increased adoption of systems automation affected the reduction of nepotism and cronyism. Most workers at the Kenya Port Authority agreed that automation reduced the nepotism and cronyism at the KPA as shown by 62.0%. Also, 18.3% strongly agreed while 10.4 were neutral. Further, 4.1% disagreed and 5.2% strongly disagreed that automation led to reduction of nepotism and cronyism at the KPA.

Table 4.20 shows responses to the agreement that automation had led to a reduction of nepotism and cronyism at the port.

Table 4. 20: Reduction of the nepotism and cronyism at the port

		Frequency	Valid Percent
Reduction of the nepotism and cronyism at the port.	Strongly disagree	18	5.2
	Disagree	14	4.1
	Neutral	36	10.4
	Agree	214	62.0
	Strongly agree	63	18.3
Total		345	100.0

Source: Field Data (2022)

CHAPTER FIVE

DISCUSSION, SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This chapter comprise of the discussion, study summary, conclusions, recommendations, and suggestions for further research. The purpose of this research was to assess the contribution of systems automation in the reduction of corruption levels at the Kenya Ports Authority.

5.2 Discussion

In this section, the study discusses the findings obtained in chapter four. This is done in line with the study objectives.

5.2.1 Respondent Socio-Demographic Factors

Gender is a crucial social demographic factor in social-economic studies. The distribution of the respondent's gender in this study was fair. There is a higher male proportion in the labor force which is consistent with this study. According to OECD Labour Force Statistics (2015), the most active workforce comprises persons aged between 25 and 50 years. The study also found most of the workers were aged 36-45 years followed closely by those aged 26-35 years.

Education and training improve the productive capacity of a population; hence raising one's chances of being employed. Seeking formal employment requires certain levels of training. The person's level of education is strongly associated with individual judgment on issues affecting society. The study found most of the respondents had diplomas and bachelor's education qualifications, which accounted for the largest proportion of respondents at KPA. This finding is consistent with the KIPPRA (2018) study which found that most workers in the Kenya labor market comprise those with a

diploma and bachelor's qualifications. Most respondents reported that they had worked for 10 years at the time of the study. The study further assessed the responses based on the division worked. The study found most of the respondents worked in the operations division. This could have been affected by the nature of activities at the KPA which mainly operations were involving clearing and forwarding.

5.2.2 Nature of systems automation deployed at the KPA to reduce corruption

In this section, the findings are presented on the level of automation, an online platform for reporting corruption, investigations of corruption allegations, availability of electronic payment methods that help reduce corruption, the contribution of automation of operations in respective departments in reducing corruption, and the role of automation in bridging loopholes exploited by corrupt officers.

System automation is usually applied to improve customs performance. Automation is fundamental in the achievement of tax administration efficiency (Casey & Castro, 2015). Most of the workers at the Kenya Port Authority agreed or strongly agreed that major operations at the firm had been automated at the time of this study. Apart from performance, the implementation of system automation helps in reducing unethical practices. This was aided by other practices such as the implementation of the online platform for reporting corruption. The study found substantial agreement with the claim that KPA had an online platform for reporting corruption at the time of this study.

The study established that KPA investigated corruption allegations, an action that is critical in reducing corruption levels in an organization. According to Okoth (2014), investigation of corruption allegations helps in fighting corruption. The respondents at the Kenya Ports Authority strongly agreed that KPA had electronic payment methods that help reduce corruption. This finding is consistent with Setor,

Senyo and Addo (2021) who found online payment influenced the fight against corruption positively.

Automation affects different departments at KPA in a unique manner. Notably, different departments at KPA have different automated systems to address this challenge. The study found automated operations in various departments helped reduce corruption. The findings were consistent with Ojha and Palvia (2012) who averred that automation has significantly reduced corruption. Further, the increased automation of processes has been widely adopted to fight custom-related corrupt dealing at the ports (Abdumutallibjonovich, 2022). This implies that automated operations in various departments have the potential to reduce corruption. In this regard, the study found that automation at KPA had bridged loopholes exploited by corrupt officials. This echoes the findings of Adam and Fazekas (2018) who argued that the use of technologies in organizations bridged the loopholes used by corrupt officials in furthering their corrupt practices.

5.2.3 Strategies to support systems automation at the KPA in the reduction of corruption

Finally, the study assessed the strategies adapted to support systems automation at the KPA to reduce corruption. This was achieved through a rating of the customers' training and sensitization on the use of various systems, staff training and sensitization on the use of various systems, and customer support. On the other hand, system audit ensured no interference with the operation of systems, regular maintenance of systems in respective departments, and making the resource available to support system operations was considered in ensuring the success of automation. According to Nnaji and Karakhan (2020), the successful implementation of technology should incorporate training of the users on various aspects of the system. It was observed Kenya Ports

Authority trained customers and sensitized them on the use of combined systems as a way of promoting automation adoption at the KPA, as a corruption reduction tool, an aspect found critical in previous studies on the promotion of system adoption (Law, Chan & Wang, 2018).

Creating awareness among the primary users of the system is an essential ingredient in the implementation of any system (Sony, Antony, and Douglas, 2020). This study found that KPA conducted staff training and sensitization on the use of combined systems and customer support found consistent with Hallikainen, Bekkhus and Pan (2018) who averred that training the internal team on systems is a critical success factor. The study found that KPA carried out system audits to ensure no interference with the operation of systems. This implies that KPA carried out system audits to ensure no interference with the operation of systems as a way of promoting automation at the KPA to reduce corruption.

System maintenance and upgrade are required for optimal performance of the very systems. According to Foster and Rhoden, (2020), an effective system will demand regular maintenance and upgrade to ensure the effective functioning of the organization's processes. This study found there was regular maintenance of systems in various departments. This demands the continuous allocation of resources. The study established that KPA made the resources available to support system operations. This implies that KPA made the resources available to support system operations as a way of promoting automation at the KPA to reduce corruption.

5.2.4 Effectiveness of systems automation in reduction of corruption levels at the KPA

In this section, the study assessed automation and its effectiveness in fighting corruption at the KPA. The ability to improve clearing time following the automation

of services, the reduction in delays previously occasioned by corrupt individuals, and the seamless flow of clearing processes; there is increased security of cargo cleared at the port, a decrease in cost incurred in clearing cargo, and a decrease in the amount of time taken to clear cargo.

Automation was adopted to fight corruption in various countries' entry points. According to Ortiz (2021) automation has been critical in addressing issues of corruption. This study found adoption of automation at KPA helped in the reduction of corruption at the port. This finding implies that automation at KPA was perceived by my majority to be effective in reducing corruption.

Automation of services at KPA influences the clearing time. According to Mutinda (2021), increased automation significantly influenced the performance of operations at the port. Most workers at the Kenya Port Authority agreed that automation of services at KPA had influenced the clearing time. These findings imply that automation of services at KPA had influenced the clearing time which is consistent with Kabui and Mwaura, (2019) who opine that automation reduced the time used to clear cargo at the Kenya port. This has been influenced by the reduction of delays previously experienced through corruption practices following the adoption of automation practices, making the clearing process of cargo at the port seamless.

Apart from the reduction of time taken to clear the cargo and smoothness of the process, automation has also increased the security of the cargo being cleared from the port. Odago (2021) found out that the systems at the port aided in the tracking of cargo in transit reducing the smuggling of cargo. The finding was also consistent with Mutinda (2021) who found that automation enhanced cargo security. The study found that automation helped reduce the cost previously incurred in clearing cargo and finally found that automation reduced the time taken to clear cargo.

5.3 Summary of the Findings

In this section, the study presents the summary of the findings obtained in chapter four. This is done in line with the study objectives.

5.3.1 Socio-Demographic Factors

The study found the majority of the respondents were male aged between 26 and 45 years. The distribution of gender and age was consistent with the previous studies. Education and training improve the productive capacity of a population; hence raising one's chances of being employed. Seeking formal employment requires certain levels of training. Most of the respondents had diplomas followed closely by those with bachelor's qualifications. Most respondents reported that they had worked for 10 years at the time of the study. The study further assessed the responses based on the division worked. The study found most of the respondents worked in the operations division.

5.3.2 Nature of systems automation deployed at the KPA to reduce corruption

Most workers at the Kenya Port Authority agreed or strongly agreed that major operations at the firm were automated at the time of this study. Apart from performance, the implementation of system automation helps in reducing unethical practices. This was aided by other practices such as the online platform for reporting corruption. The study found substantial agreement with the claim that KPA had an online platform for reporting corruption at the time of this study.

The workers at the Kenya Port Authority strongly agreed that KPA had electronic payment methods that helped reduce corruption. At the KPA, automation affects different departments in a uniquely distinct way. These various departments have several automated systems to address this challenge. The study found that automated operations in various departments helped reduce corruption. Increased automation has been widely adopted to fight custom-related corrupt dealing at the ports.

Further, this study found out that automation at KPA had bridged loopholes exploited by corrupt officials.

5.3.3 Strategies to support systems automation at the KPA in the reduction of corruption

The study assessed the strategies adapted to support systems automation at the KPA to reduce corruption. The Kenya Ports Authority trained customers and sensitized them to various systems. The study established that KPA conducted staff training and sensitization on the use of automation systems, provided customer support, and carried out system audit to ensure no interference with the operation of systems. This implies that KPA carried out system audit to ensure no interference with the operation of systems in promoting automation, regular maintenance, and upgrade to ensure effective functioning of the organization processes and continuous allocation of resources to support the system.

5.3.4 Effectiveness of systems automation in reduction of corruption levels at the KPA

Finally, automation has been largely adopted in addressing corruption in various countries' entry points. This study established that the adoption of automation at KPA helped in the reduction of corruption at the port. The automation of services at KPA influenced the clearing time and delays previously experienced, occasioned by human discretion. The adoption of automation practices makes the clearing process of cargo at the port seamless. The study also found out that automation helps to reduce the cost previously incurred in clearing cargo.

5.4 Conclusion

The study concludes that most of the operations at the KPA had been automated. Mainly, automation increased paperless processes at the port, reducing human interaction which is the main cause of increased corrupt practices. Nearly all departments at the port had some form of an automated system in place.

The study concluded systems automation was effective in the reduction of corruption levels at the KPA. The automation improved clearing time following the automation of services, reduced delays previously occasioned by corrupt individuals, and ensured a seamless flow of the clearing process. Further, automation increased the security of cargo cleared at the port, decreased the cost incurred in clearing cargo, and decreased the amount of time taken to clear cargo.

The study further concluded that various strategies were adopted at the port to support systems automation at the KPA in the reduction of corruption. Strategies such as customer training and sensitization on the use of various systems, staff training and sensitization on the use of systems, and customer support. Further, system audit to ensure no interference with the operation of systems, regular maintenance of systems in diverse departments, making the resources available to support system operations adopted to strengthen the implementation of automation at the KPA.

5.5 Recommendations

The study recommends the management of KPA increase diversification of functions addressed by system automation; the automation improved clearing time following the automation of services, and the automated system reduced delays previously occasioned by corrupt individuals and ensured a seamless flow of the

clearing process. Automation further increased the security of cargo cleared at the port, decreased the cost incurred in clearing cargo, and decreased the time to clear cargo.

The study further recommends that KPA management adopt continuous review and adoption of several strategies to enhance the automation at the KPA to a reduction of corruption. This can be done by testing the effectiveness of each adopted strategy through research. Strategies such as customers training and sensitization on the use of systems, staff training and sensitization on the use of various systems and customer support, system audit to ensure no interference with the operation of systems, maintenance of systems, and allocating resource available to support system operations and strengthen implementation of automation at the KPA.

An increase in automation at the port increased the effectiveness of port operations and reduction of corrupt practices. The study recommends that the management of the Kenya Port Authority continue the automation of its major operations. There is a need for continuous investment in the latest technologies to increase efficiency and enhance system security.

5.6 Areas of Further Research

This study found that the systems automation at KPA influenced the reduction in corrupt practices at KPA by eliminating human to interaction in port operations which facilitated the corrupt practices. A further study can be conducted to assess application of artificial intelligence fighting corruption.

REFERENCES

- Abdumutallibjonovich, R. S. (2022). Initiatives of the world customs organization in the fight against corruption. *Berlin Studies Transnational Journal of Science and Humanities*, 2(1.8 Political sciences).
- Abrate, G., Erbetta, F., Fraquelli, G., & Vannoni, D. (2015). The cost of corruption in the Italian solid waste industry. *Industrial and Corporate Change*, 24(2), 439-465.
- Acciaro, M., Renken, K., & El Khadiri, N. (2020). Technological change and logistics development in European ports. *European Port Cities in Transition*, 73-88.
- Acemoglu, D., & Restrepo, P. (2018). Artificial intelligence, automation, and work. In *The economics of artificial intelligence: An agenda* (pp. 197-236). University of Chicago Press.
- Achim, M. V., Borlea, S. N., & Anghelina, A. M. (2018). The impact of fiscal policies on corruption: A panel analysis. *South African Journal of Economic and Management Sciences*, 21(1), 1-9.
- Adam, I., & Fazekas, M. (2018). Are emerging technologies helping win the fight against corruption in developing countries? *Pathways for Prosperity Commission Background Paper Series*, (21).
- Adam, I., & Fazekas, M. (2018). Are emerging technologies helping win the fight against corruption in developing countries? *Pathways for Prosperity Commission Background Paper Series*, 21, 2-28.
- Akanle, O., Ademuson, A. O., & Shittu, O. S. (2020). Scope and limitation of the study in social research. *Contemporary Issues in Social Research*, 105-114.
- Akanle, O., Ademuson, A. O., & Shittu, O. S. (2020). Scope and limitation of the study in social research. *Contemporary Issues in Social Research*, 105-114.
- Akhtar, S., Zameer, H., & Saeed, R. (2014). Impact of total quality management on the performance of service organizations in Pakistan. *International Journal of Academic Research in Economics and Management Sciences*, 3(6), 109.
- Akins, H. (2021). Violence on the home front: Interstate rivalry and pro-government militias. *Terrorism and political violence*, 33(3), 466-488.
- Aksu, D., & Aydin, M. A. (2018). Detecting port scan attempts with comparative analysis of deep learning and support vector machine algorithms. In *2018 International Congress on Big Data, Deep Learning and Fighting Cyber Terrorism (IBIGDELFT)* (pp. 77-80). IEEE.

- Alliance for Integrity (2018). Compliance and Digitalisation: How technology can foster transparency in African countries. Available from: https://www.allianceforintegrity.org/wAssets/docs/publications/Own-Publications/Compliance_and_Digitalisation.pdf
- Alvi, M. (2016). *A manual for selecting sampling techniques in research*. Sage Publications
- Ameen, A. A., & Ahmad, K. (2017). Information systems strategies to reduce financial corruption. In *Leadership, Innovation and Entrepreneurship as Driving Forces of the Global Economy* (pp. 731-740). Springer, Cham.
- Andersen, T. B. (2009). E-Government as an anti-corruption strategy. *Information Economics and Policy*, 21(3), 201-210.
- Andersen, T. B., & Rand, J. (2007). Does E-Government reduce corruption? *Department of Economics*, University of Copenhagen
- Ang, Y. Y. (2014). Authoritarian Restraints on Online Activism Revisited: Why “I-Paid-A-Bribe” Worked in India but Failed in China. *Comparative Politics*, 47(1), 21–40. Available from: <https://doi.org/10.5129/001041514813623100>
- Antonio, A., & Tuffl, D. (2014). The Gender Digital Divide in Developing Countries. *Future Internet*, 6(4), 673–687. Available from: <https://doi.org/10.3390/fi040673>
- Arifin, S. R. M. (2018). Ethical considerations in a qualitative study. *International Journal of Care Scholars*, 1(2), 30-33.
- Asiimwe, E. N., Wakabi, W., & Grönlund, Å. (2013). Using technology for enhancing transparency and accountability in low resource communities: experiences from Uganda. *ICT for Anti-Corruption, Democracy, and Education in East Africa*, 37, 37-51.
- Asogwa, B. E., Ezeani, C. N., & Asogwa, M. N. (2021). Status of electronic records management (e-RM) in African university libraries: experience from Nigerian universities. *Library Management*, 42(8/9), 515-530.
- Bac, M. (2001). Corruption, connections, and transparency: Does a better screen imply a better scene? *Public Choice*, 107(1), 87-96.
- Baldacchino, P. J., Duca, N., Tabone, N., & Grima, S. (2020). Corporate governance transparency in small listed entities: the case of Malta. *European Research Studies Journal*, 23(2), 23-44
- Baniamin, H. M. (2014). *Reducing corruption through e-governance: Rhetoric or reality? An empirical inquiry* (Master's thesis, The University of Bergen).

- Bardhan, P. (2006). The Economist's Approach to the Problem of Corruption. Available from: <https://doi.org/10.1016/j.worlddev.2005.03.011>
- Bauhr, M., & Grimes, M. (2014). Indignation or Resignation: The Implications of Transparency for Societal Accountability. *Governance*, 27(2), 291–320. Available from: <https://doi.org/10.1111/gove.12033>
- Beins, B. C. (2017). *Research method: A tool for life*. Cambridge University Press.
- Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010). Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies. *Government information quarterly*, 27(3), 264-271.
- Bhatnagar, S. (2003). Transparency and corruption: Does e-government help. *DRAFT Paper prepared for the compilation of CHRI*, 1-9.
- Bhattacharjee, A., & Shrivastava, U. (2018). The effects of ICT use and ICT Laws on corruption: A general deterrence theory perspective. *Government Information Quarterly*, 35(4), 703-712.
- Bhoomi. (2018). Parihara Input Subsidy. Retrieved 6 August 2018, from: <https://landrecords.karnataka.gov.in/service0/About.aspx?id=parihara>.
- Bimber, B. (2000). Measuring the Gender Gap on the Internet. *Social Science Quarterly* (Vol. 81). Available from: <http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=77BD859B3600FBB6B93F2DF06514ACC8?doi=10.1.1.170.2885&rep=rep1&type=pdf>.
- Bjørn, A., Owsianiak, M., Laurent, A., Olsen, S. I., Corona, A., & Hauschild, M. Z. (2018). Scope definition. In *Life cycle assessment* (pp. 75-116). Springer, Cham.
- Boer, C. A., Saanen, Y. A., Gunther, H. O., Kim, K. H., & Kopfer, H. (2012). Testing, tuning, and training terminal operating systems. A modern approach. In *International Conference on Logistics and Maritime Systems (LOGMS)* (pp. 25-35).
- Bott, M., & Young, G. (2012). The role of crowdsourcing for better governance in international development. *Praxis: The Fletcher Journal of Human Security*, 27(1), 47-70.
- Brette, O. (2003). Thorstein Veblen's theory of institutional change: beyond technological determinism. *European Journal of the History of Economic Thought*, 10(3), 455-477.
- Brito, J. (2007). Hack, mash, & peer: Crowdsourcing government transparency. *Colum. Sci. & Tech. L. Rev.*, 9, 119.

- Cain, K. B. P. (2001). Information, not technology, is essential to accountability: electronic records and public-sector financial management. *The Information Society*, 17(4), 247-258.
- Camarero Orive, A., Santiago, J. I. P., Corral, M. M. E. I., & González-Cancelas, N. (2020). Strategic analysis of the automation of container port terminals through BOT (business observation tool). *Logistics*, 4(1), 3-8.
- Carr, I., & Lewis, D. (2010). Combating corruption through employment law and whistle-blower protection. *Industrial Law Journal*, 39(1), 52-81.
- Casey, P., & Castro, P. (2015). Electronic Fiscal Devices (EFDs) An Empirical Study of their Impact on Taxpayer Compliance and Administrative Efficiency. International Monetary Fund. *Working Paper No. 15/73*
- Castells, M. (2000). Materials for an exploratory theory of the network society1. *The British journal of sociology*, 51(1), 5-24.
- Charoensukmongkol, P., & Moqbel, M. (2014). Does investment in ICT curb or create more corruption? A cross-country analysis. *Public Organization Review*, 14(1), 51-63.
- Chêne, M. (2012). Use of mobile phones to detect and deter corruption. *U4 Expert Answer*, Bergen.
- Chene, M. (2014). The impact of corruption on growth and inequality. *Transparency International*. 1-11
- Chohan, S. R., & Hu, G. (2020). Strengthening digital inclusion through e-government: cohesive ICT training programs to intensify digital competency. *Information Technology for Development*, 1-23.
- Conference for e-Democracy and Open Government. (n.d.). Measuring the promise of open data: Development of the Impact Monitoring Framework. Available from: <https://boris.unibe.ch/75031/1/CeDEM2016-Impact-Monitoring-Framework-V06.pdf>.
- Coombs, C., Hislop, D., Taneva, S. K., & Barnard, S. (2020). The strategic impacts of Intelligent Automation for knowledge and service work: An interdisciplinary review. *The Journal of Strategic Information Systems*, 29(4), 101-600.
- Cui, Y., Voyles, R. M., Zhao, X., Bao, J., & Bond, E. S. (2017, August). A software architecture supporting self-adaptation of wireless control networks. In *2017 13th IEEE Conference on Automation Science and Engineering (CASE)* (pp. 346-351). IEEE.

- Cuillier, D., & Piotrowski, S. J. (2009). Internet information-seeking and its relation to support for access to government records. *Government Information Quarterly*, 26(3), 441–449.
- Davies, T., & Fumega, S. (2014). Mixed incentives: Adopting ICT innovations for transparency, accountability, and anti-corruption. Available from: <https://www.cmi.no/publications/file/5172-mixed-incentives.pdf>.
- Delgado, J. M. D., Oyedele, L., Ajayi, A., Akanbi, L., Akinade, O., Bilal, M., & Owolabi, H. (2019). Robotics and automated systems in construction: Understanding industry-specific challenges for adoption. *Journal of Building Engineering*, 26, 100-868.
- Elbahnasawy, N. G. (2014). E-government, internet adoption, and corruption: an empirical investigation. *World Development*, 57, 114-126.
- Foster, M. N., & Rhoden, S. L. (2020). The integration of automation and artificial intelligence into the logistics sector: a Caribbean perspective. *Worldwide Hospitality and Tourism Themes*.
- Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, 35, 137–144. Available from: <https://doi.org/10.1016/j.ijinfomgt.2014.10.007>
- Gillwald, A., Milek, A., & Stork, C. (2010). Towards Evidence-based ICT Policy and Regulation: Gender Assessment of ICT Access and Usage in Africa. Available from: http://lirneasia.net/wp-content/uploads/2010/09/Gender_Paper_Sept_2010.pdf.
- Giotta, G. (2018). Teaching technological determinism and social construction of technology using everyday objects. *Communication Teacher*, 32(3), 136-140.
- Giri, S. (2019). Obstacles of Civil Service in Public Service Delivery in Nepal: E-Governance for Good Governance. *International Journal of Computer Science and Mobile Computing*, 8(3), 269-274.
- GISWatch. (2012). Global Information Society Watch 2012. Association for Progressive Communications and Humanist Institute for Cooperation with Developing Countries. Available from: http://giswatch.org/sites/default/files/giswatch12_web.pdf
- Gouvea, R., Li, S., & Montoya, M. (2022). Does transitioning to a digital economy imply lower levels of corruption? *Thunderbird International Business Review*, 64(3), 221-233.
- Greener, S. (2018). Research limitations: the need for honesty and common sense. *Interactive Learning Environments*, 26(5), 567-568.

- Grönlund, Å., & Flygare, A. M. (2011). The effect of eGovernment on corruption: Measuring robustness of indexes. In *International Conference on Electronic Government and the Information Systems Perspective* (pp. 235-248). Springer, Berlin, Heidelberg.
- Grönlund, Å., Heacock, R., Sasaki, D., Hellström, J., Al-Saqaf Editor, W., Strand, C., & Berggren, D. (2010). Increasing transparency and fighting corruption through ICT empowering people and communities-The Swedish Program for ICT in Developing Regions. Available from: <https://spidercenter.org/files/2017/01/Spider-ICT4D-series-6-ICT-for-anticorruption.pdf>
- Gupta, S., Davoodi, H., & Alonso-Terme, R. (1998). Does Corruption Affect Income Inequality and Poverty? Available from: www.imf.org/external/pubs/ft/wp/wp9876.pdf
- Gurin, J. (2014). Open Governments, Open Data: A New Lever for Transparency, Citizen Engagement, and Economic Growth. *SAIS Review of International Affairs*, 34(1), 71–82. Available from: <https://doi.org/10.1353/sais.2014.0009>
- Hallikainen, P., Bekkhus, R., & Pan, S. L. (2018). How OpusCapita Used Internal RPA Capabilities to Offer Services to Clients. *MIS Quarterly Executive*, 17(1).
- Hazzi, O., & Maldaon, I. (2015). A pilot study: Vital methodological issues. *Business: Theory and Practice*, 16(1), 53-62.
- Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence-based nursing*, 18(3), 66-67.
- Heeks, R. (1998). Information systems for public sector management. *Government Data: Understanding the Barriers to Citizen Access and Use*. Government Working Paper no. 10, 1-14
- Heeks, R. (2003). Most eGovernment-for-development projects fail: how can risks be reduced? *Institute for Development Policy and Management*. Government Working Paper no. 14, 1-14
- Heeks, R., & Bhatnagar, S. (1999). Understanding Success and Failure in Information Age Reform. Available from: https://www.academia.edu/3107583/Understanding_Success_and_Failure_in_Information_Age_Reform.
- Heilig, L., Schwarze, S., & Voß, S. (2017). *An analysis of digital transformation in the history and future of modern ports*. Proceedings of the 50th Hawaii International Conference on System Sciences

- Helbig, N., Ramón Gil-García, J., & Ferro, E. (2009). Understanding the complexity of electronic government: Implications from the digital divide literature. *Government Information Quarterly*, 26(1), 89–97.
- Hellström, J., & Bocast, B. (2013). Many “Likers” Do Not Constitute A Crowd: The Case of Uganda’s Not in My Country. ICT for anti-corruption, democracy, and education in East Africa, pp.27-36. Stockholm: Spider – The Swedish Program for ICT in Developing Regions. Available from: <https://spidercenter.org/files/2017/01/Spider-ICT4D-series-6-ICT-foranticorruption.pdf#page=24>
- Herbst, K. W., Harper, L., Kalfa, N., & ESPU Research Committee. (2018). A brief description of the study design. *Journal of Pediatric Urology*, 14(2), 135-136.
- Hilbert, M. (2011). Digital gender divide or technologically empowered women in developing countries? A typical case of lies, damned lies, and statistics. *Women’s Studies International Forum*, 34(6), 479–489. Available from: <https://doi.org/10.1016/j.wsif.2011.07.00>.
- Hossain, M. K., & Islam, M. Z. (2021). Good governance practices in procurement operations and quality procurement: a comparative study between public and private sector organizations in Bangladesh. *International Journal of Procurement Management*, 14(6), 796-820.
- International Telecommunications Union. (2017). ICT Facts and Figures 2017. Available from: <https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf>
- Ismyrlis, V., & Moschidis, O. (2015). The effects of ISO certification on the performance of Greek firms. *The TQM Journal*, 27(1), 150-162
- Jain, A., Singh, H., & Bhatti, R. S. (2018). Identification of key enablers for total productive maintenance (TPM) implementation in Indian SMEs: A graph-theoretic approach. *Benchmarking: An International Journal*.
- Junyong, I. (2017). Introduction of a pilot study. *Korean Journal of anesthesiology*, 70(6), 601-613.
- Kabathi, M. (2009): *Public Service besieged by corruption*, Adili. No 111, June edition
- Kabui, B. N., & Mwaura, T. G. D. P. (2019). Effect of Single Window System Procedures on Cargo Clearance Efficiency in Kenya: A Case for Mombasa Port.
- Kaufman, B. E. (2018). How capitalism endogenously creates rising income inequality and economic crisis: The macro-political economy model of early industrial relations. *Industrial Relations: A Journal of Economy and Society*, 57(1), 131-173.

- Kaufmann, D. (2013). The influence of causation and effectuation logics on targeted policies: the cases of Singapore and Israel. *Technology analysis & strategic management*, 25(7), 853-870.
- Kenya Anti-Corruption Commission. (2008). *Corruption Prevention Guidelines on ICT Systems In The Public Sector*. Available from: <http://www.eacc.go.ke/document/corruptionprevention-guidelines-on-ict-systems-in-the-public-sector/>
- Kenya Ports Authority. (2021). *History of the port of Mombasa*. Retrieved November 11, 2021, from <https://www.kpa.co.ke/AboutUs/Pages/KPA-History-Introduction.aspx>.
- Kim, K., & Kang, T. (2017). Does Technology Against Corruption Always Lead to Benefit? The Potential Risks and Challenges of the Blockchain Technology. Available from: <https://www.oecd.org/cleangovbiz/Integrity-Forum-2017-Kim-Kang-blockchain-technology.pdf>.
- Kleven, H.J., Knudsen, M.B., Kreiner, C., Pedersen, S., & Saez, E. (2011). Unwilling or Unable to Cheat? Evidence from a Tax Audit Experiment in Denmark. *Econometrica* 79(3), 651-92.
- Klitgaard, R. E. (1988). *Controlling corruption*. California. University of California Press.
- Kossow, N. (2020). Digital anti-corruption: hopes and challenges. In *A Research Agenda for Studies of Corruption*. Edward Elgar Publishing.
- Kossow, N., & Dykes, V. (2018). Embracing Digitalisation: How to use ICT to strengthen Anti-Corruption. GIZ. Available from: <https://www.giz.de/de/downloads/giz2018-eng ICT-to-strengthen-Anti-Corruption.pdf>.
- Krolikowski, A. (2014). *Can mobile-enabled payment methods reduce petty corruption in urban water provision?* *Water Alternatives* 7(1), 235-255
- Kshetri, N. (2017). Will blockchain emerge as a tool to break the poverty chain in the Global South? *Third World Quarterly*, 38(8), 1710–1732. Available from: <https://doi.org/10.1080/01436597.2017.1298438>.
- Kurfess, T. R. (2018). *Robotics and automation handbook*. CRC press.
- Kuriyan, R., Bailur, S., Gigler, B. S., & Park, K. R. (2012). Technologies for transparency and accountability. *Open Development Technology Alliance*.
- Lacity, M., & Willcocks, L. (2015). What knowledge do workers stand to gain from automation? *Harvard Business Review*, 19(6).

- Lacity, M., Willcocks, L., & Craig, A. (2015). Robotic Process Automation at Telefonica O2, the outsourcing unit working research paper series. Paper 16/01. Available at: <https://www.umsl.edu/~lacitym/TelefonicaOUWP022015FINAL.pdf> (Accessed 3rd December 2021)
- Lämmerhirt, D., Rubinstein, M., & Montiel, O. (2017). The state of open government data in 2017. *Creating meaningful open data through multi-stakeholder dialogue*.
- Law, R., Chan, I. C. C., & Wang, L. (2018). A comprehensive review of mobile technology use in hospitality and tourism. *Journal of Hospitality Marketing & Management*, 27(6), 626-648.
- Lee, P. T. W., Lam, J. S. L., Lin, C. W., Hu, K. C., & Cheong, I. (2018). Developing the fifth-generation port concept model: an empirical test. *The international journal of logistics management*.
- Legg, S., & Hutter, M. (2007). Universal intelligence: A definition of machine intelligence. *Minds and Machines*, 17(4), 391-444.
- Li, X., & Juhola, M. (2014). Country crime analysis using the self-organizing map, with special regard to demographic factors. *AI & SOCIETY*, 29(1), 53–68. Available from: <https://doi.org/10.1007/s00146-013-0441-7>.
- Linhartová, V. (2017). The role of e-government in mitigating corruption. *Scientific papers of the University of Pardubice. Series D, Faculty of Economics and Administration*. 40/2017.
- López-Iturriaga, F. J., and Sanz, I. P. (2017). Predicting Public Corruption with Neural Networks: An Analysis of Spanish Provinces. *Social Indicators Research*. Available from: <https://doi.org/10.1007/s11205-017-1802-2>.
- Majeed, M. T., & Malik, A. (2016). Does E-government Stimulate Press Freedom to Curb Corruption? A Cross-Country Study. *Pakistan Journal of Social Sciences (PJSS)*, 36(2).
- Martín-Soberón, A. M., Monfort, A., Sapiña, R., Monterde, N., & Calduch, D. (2014). Automation in port container terminals. *Procedia-Social and Behavioral Sciences*, 160, 195-204.
- Matti, S. A. (2010). The Democratic Republic of the Congo? Corruption, patronage, and competitive authoritarianism in the DRC. *Africa Today*, 56(4), 42-61.
- Mauro, P. (1995). Corruption and Growth. *The Quarterly Journal of Economics*, 110(3), 681–712. Retrieved from Available from: <https://eml.berkeley.edu/~saez/course131/Mauro95.pdf>

- Mauro, P. (1995). Corruption and Growth. *The Quarterly Journal of Economics*, 110(3), 681–712. Retrieved from Available from: <https://eml.berkeley.edu/~saez/course131/Mauro95.pdf>
- Mihas, P. (2019). Qualitative data analysis. In *Oxford research encyclopedia of education*.
- Mistry, J. J., & Jalal, A. (2012). An empirical analysis of the relationship between e-government and corruption. *International Journal of Digital Accounting Research*, 12.
- Mistry, J. J., & Jalal, A. (2012). An Empirical Analysis of the Relationship between e-government and Corruption. *The International Journal of Digital Accounting Research*, 12, 145–176.
- Mohamad, M. M., Sulaiman, N. L., Sern, L. C., & Salleh, K. M. (2015). Measuring the validity and reliability of research instruments. *Procedia-Social and Behavioral Sciences*, 204, 164-171.
- Moscato, M., & Muñoz, C. A. (2020). Automatic generation and verification of test-stable floating-point code. *arXiv preprint arXiv:2001.02981*.
- Mungiu-Pippidi, A. (2006). Corruption: diagnosis and treatment. *Journal of Democracy*, 17(3), 86–99. Available from: <https://www.journalofdemocracy.org/sites/default/files/MungiuPippidi-17-3.pdf>
- Munoz, C., & Mayero, M. (2001). *Real automation in the field. ICASE Interim Report 39 NASA*. CR-2001-211271, NASA Langley Research Center, NASA Langley Research Center.
- Musonza, T. (2017). *An investigation into the effectiveness of revenue collection systems on service delivery in local government authorities. A case of Bindura Municipality (2014-2016)* (Doctoral dissertation, BUSE).
- Muthee, N. M., & Mang'ana, R. (2021). Influence of system automation on service delivery at the Ministry of Public Service and Gender in Nairobi-Kenya. *International Academic Journal of Human Resource and Business Administration*, 3(10), 153-166.
- Mutinda M. J. (2021). *Effect of Electronic Cargo Tracking Systems (Rects) implementation on performance of customs and border control department in Kenya* (Doctoral dissertation, Moi University).
- Mutungu, F., Baguma, R., Ejiri, A. H., & Janowski, T (2021). Digital Anti-Corruption Typology for Public Service Delivery. *International Journal of Computer Applications*, 975, 8887.

- Natarajan, H., Krause, S., & Gradstein, H. (2017). Distributed Ledger Technology (DLT) and Blockchain Acknowledgments III. Available from: <http://documents.worldbank.org/curated/en/177911513714062215/pdf/122140-P-PUBLIC-Distributed-LedgerTechnology-and-Blockchain-Fintech-Notes.pdf>.
- Nnaji, C., & Karakhan, A. A. (2020). Technologies for safety and health management in construction: Current use, implementation benefits and limitations, and adoption barriers. *Journal of Building Engineering*, 29, 101212.
- Nyaga, N. S., Ndiku, M. T., & Mwai, N. Adoption and implementation of the integrated financial management information system on service delivery in Kenya national treasury.
- Nyholm, S. (2018). Attributing agency to automated systems: Reflections on human-robot collaborations and responsibility-loci. *Science and engineering ethics*, 24(4), 1201-1219.
- Odago, Z. O. (2021). *Effect of adoption of electronic cargo tracking system on excise revenue collection in Kenya: a case of Jomo Kenyatta International Airport* (Doctoral dissertation, Moi University).
- Ojha, A., & Palvia, S. (2012). E-Government and the Fight Against Corruption: Conceptual Model and Five Case Studies from India. *Journal of Information Technology Case and Application Research*, 14(4), 11-29.
- Ojo, J. S. (2019). e-Governance and Anti-Corruption War in Africa: The Nigeria Experience. In *e-Services*. IntechOpen.
- Okoth, S. H. (2014). Prosecute and punish: Curbing political and administrative corruption in Kenya. In *Challenges to democratic governance in developing countries* (pp. 211-226). Springer, Cham.
- Olszewski, D. (2014). Fraud detection using a self-organizing map visualizing the user profiles. *Knowledge-Based Systems*, 70, 324–334. Available from: <http://doi.org/10.1016/J.KNOSYS.2014.07.008>.
- Open Data Barometer: Global Report Fourth Edition. (2017). Available from: <http://opendatabarometer.org/doc/4thEdition/ODB-4thEdition-GlobalReport.pdf>
- Orive, A. C., & Cancelas, N. G. (2005). *Cadenas integradas de transporte*. Fundación Agustín de Betancourt.
- Ortiz, T. R. (2021). Bribery and Corruption at the Border: Mexico: An Outstanding Challenge to Be Overcome by the Mexican Government. *Global Trade and Customs Journal*, 16(9).

- Orwenjo, M. A., & Aila, F. O. (2018). Electronic procurement practices at Kenya power limited. *International Journal of Development and Sustainability*, 7(10), 2403-2413.
- Otzen, T., & Manterola, C. (2017). Sampling techniques on a population study. *Int. J. Morphol*, 35(1), 227-232.
- Oye, N. D. (2013). Reducing corruption in African developing countries: the relevance of E-Governance. *Greener Journal of Social Sciences*, 3(1), 6-13.
- Pacific Council on International Policy. (2002). Roadmap for E-government in the Developing World: 10 Questions E-Government Leaders Should Ask Themselves. Available from: http://www.itu.int/net/wsis/docs/background/themes/egov/pacifi_council.pdf
- Parasuraman, R., & Riley, V. (1997). Humans and automation: Use, misuse, disuse, abuse. *Human factors*, 39(2), 230-253.
- Park, C. H., & Kim, K. (2020). E-government as an anti-corruption tool: Panel data analysis across countries. *International Review of Administrative Sciences*, 86(4), 691-707.
- Park, C. H., & Kim, K. (2020). E-government as an anti-corruption tool: Panel data analysis across countries. *International Review of Administrative Sciences*, 86(4), 691-707.
- Patel, K. E., Godden, S. M., Royster, E. E., Timmerman, J. A., Crooker, B. A., & McDonald, N. E. (2017). Pilot study. *The Bovine Practitioner*, 48-57.
- Pathak, R. D., Singh, G., Belwal, R., & Smith, R. F. I. (2007). E-governance and Corruption developments and Issues in Ethiopia. *Public Organization Review*, 7(3), 195–208. Available from: <https://doi.org/10.1007/s11115-007-0031-6>
- Pathak, R.D., Singh, G., Belwal, R., Naz, R., & Smith, R.F.I. (2008). E-governance, corruption and public service delivery: A comparative study of Fiji and Ethiopia. *Journal of Public Administration and Governance*, 3(1), 65-79.
- Peeters, D., Krahmer, E., & Maes, A. (2021). A conceptual framework for the study of demonstrative reference. *Psychonomic Bulletin & Review*, 28(2), 409-433.
- Pfrang, S., Meier, D., Friedrich, M., & Beyerer, J. (2018). Advancing Protocol Fuzzing for Industrial Automation and Control Systems. *International Conference on Information Systems Security and Privacy* (pp. 570-580).
- Pomeranz, D. (2015). No taxation without information: Deterrence and self-enforcement in the value-added tax. *American Economic Review*, 105(8), 2539-69.

- Rahardja, U., Aini, Q., Graha, Y. I., & Lutfiani, N. (2019). Validity of test instruments. In *Journal of Physics: Conference Series* (Vol. 1364, No. 1, p. 012050). IOP Publishing.
- Rahi, S. (2017). Research design and methods: A systematic review of research paradigms, sampling issues and instruments development. *International Journal of Economics & Management Sciences*, 6(2), 1-5.
- Regional School of Public Administration (ReSPA). (2013). Abuse of Information Technology (IT) for Corruption. Retrieved from <https://respaweb.eu/download/doc/Abuse+of+Information+Technology+%28IT%29+for+Corruption.pdf/d867df158b864e8c843c15e5eece5016.pdf>
- Rendtorff, J. D. (2010). The concept of corruption: Moral and political perspectives. In A. Stachowicz-Stanusch (Ed.), *Organizational immunity to corruption: Building theoretical and research foundations* (pp. 111-119). Polish Academy of Sciences.
- Reyes Jr, V. C. (2018). Corruption, Automation Reforms, Patron-Client Networks, and New Media: Electoral Engineering and the May 2010 Philippine Elections. *Studia Politica. Romanian Political Science Review*, 18(2), 241-266.
- Rifai, M., Masitoh, S., Bachri, B. S., Setyawan, W. H., Nurdyansyah, N., & Puspitasari, H. (2020). Using Electronic Design Automation and Guided Inquiry Learning Model in Higher Engineering Education. *Universal Journal of Educational Research*, 8(7), 2946-2953.
- Roh, S., Tam, J., Lee, S. W., & Seo, Y. J. (2018). Risk assessment of maritime supply chain security in ports and waterways. 7(6), 300-306
- Salbu, S. R. (2001). Information technology in the war against international bribery and corruption: The next frontier of institutional reform. *Harvard Journal on Legislation*, 38(1), 67-101.
- Santos, C. H. D., de Queiroz, J. A., Leal, F., & Montevechi, J. A. B. (2020). Use of simulation in the industry 4.0 context: Creation of a Digital Twin to optimize decision making on the non-automated process. *Journal of Simulation*, 16(3), 1-14.
- Sassi, S., and Ben Ali, M. S. (2017). Corruption in Africa: What role does ICT diffusion play. *Telecommunications Policy*, 41(7-8), 662-669.
- Schlobinski, S., Denzer, R., Frysinger, S., Güttler, R., & Hell, T. (2011, June). Vision and requirements of scenario-driven environmental decision support systems supporting automation for end users. In *International Symposium on Environmental Software Systems* (pp. 51-63).

- Serrat O. (2017) Fighting Corruption with ICT: Strengthening Civil Society's Role. In: *Knowledge Solutions*. Springer, Singapore. https://doi.org/10.1007/978-981-10-0983-9_86
- Setor, T. K., Senyo, P. K., & Addo, A. (2021). Do digital payment transactions reduce corruption? Evidence from developing countries. *Telematics and informatics*, 60, 101-577.
- Setyobudi, C. R., & Setyaningrum, D. (2019). E-government and corruption perception index: a cross-country study. *Jurnal Akuntansi dan Auditing Indonesia*, 23(1), 11-20.
- Shah, B. (2010). *Increasing e-Government Adoption through social media: A case of Nepal*.
- Sharma, A. (2010). Crowdsourcing Critical Success Factor Model. Available from: <https://irevolution.fies.wordpress.com/2010/05/working-paper1.pdf>
- Sharma, G. (2017). Pros and cons of different sampling techniques. *International journal of applied research*, 3(7), 749-752.
- Sheikh, M. R., Ijaz-Ur-Rehman, S. B., Tariq, M., & Khalid, S. (2021). Digital Transformation Corruption and Economic Growth Nexus in Asian Countries. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies*, 12(6), 1-12.
- Sheryazdanova, G., & Butterfield, J. (2017). E-government as an anti-corruption strategy in Kazakhstan. *Journal of Information Technology & Politics*, 14(1), 83-94.
- Shim, D. C., & Eom, T. H. (2008). E-government and anti-corruption: Empirical analysis of international data. *Intl Journal of Public Administration*, 31(3), 298-316.
- Shramenko, N., & Muzylyov, D. (2019, June). Forecasting of overloading volumes in transport systems based on the fuzzy-neural model. In *Design, Simulation, Manufacturing: The Innovation Exchange* (pp. 311-320). Springer, Cham.
- Siedlecki, S. L. (2020). Understanding descriptive research designs and methods. *Clinical Nurse Specialist*, 34(1), 8-12.
- Silveira, L. (2016). Technologies Helping Us to Fight Corruption. http://seminario.rendiciondecuentas.org.mx/wp-content/uploads/2017/10/3.Technology-and-Corruption_World-Economic-Forum.pdf

- Sony, M., Antony, J., & Douglas, J. A. (2020). Essential ingredients for the implementation of Quality 4.0: a narrative review of the literature and future directions for research. *The TQM Journal*.
- Soper, D. (2007). ICT Investment Impacts on Future Levels of Democracy, Corruption, and E-Government: Acceptance in Emerging Countries Recommended. Available from: <https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1737&context=amcis2007>
- Srimarga, I. C. (2010). Open Data Initiative of Ministry of Finance on National Budget Transparency in Indonesia. Available from: www.opendataresearch.org/emergingimpacts
- Srinivasan, R., & Lohith, C. P. (2017). Pilot Study—Assessment of validity and reliability. In *Strategic marketing and innovation for Indian MSMEs* (pp. 43-49). Springer, Singapore.
- Srivastava, S. C., Teo, T. S., & Devaraj, S. (2016). You Can't Bribe a computer: Dealing with the Societal Challenge of Corruption Through ICT. *MIS Q.*, 40(2), 511-526.
- Subhajyoti, R. (2012). Reinforcing accountability in public services: An ICT enabled framework. *Transforming Government: People, Process and Policy*, 6(2), 135–148. Available from: <https://doi.org/10.1108/17506161211246890>
- Suleiman, M. M. (2017). A Review of Improving Good Governance through ICT Revitalization. Available from: <https://www.researchgate.net/publication/325668385>
- Swiderski, B., Kurek, J., & Osowski, S. (2012). Multistage classification by using logistic regression and neural networks for the assessment of the financial condition of a company. *Decision Support Systems*, 52(2), 539–547. Available from: <https://doi.org/10.1016/J.DSS.2011.10.018>
- Tacconi, L., & Williams, D. A. (2020). Corruption and anti-corruption in environmental and resource management. *Annual Review of Environment and Resources*, 45, 305-329.
- Talab, H. R., Maki, M. I., Mohammed, Y. N., Flayyih, H. H., & Ibrahim, A. M. (2019). The role of e-Government on corruption and its impact on the financial performance of the government: An empirical analysis on the Iraqi government. *Journal of Engineering and Applied Sciences*, 14(4), 1349-1356.

- Talab, H. R., Maki, M. I., Mohammed, Y. N., Flayyih, H. H., & Ibrahim, A. M. (2019). The role of e-Government on corruption and its impact on the financial performance of the government: An empirical analysis on the Iraqi government. *Journal of Engineering and Applied Sciences*, 14(4), 1349-1356.
- Theofanidis, D., & Fountouki, A. (2018). Limitations and delimitations in the research process. *Perioperative Nursing-Quarterly scientific, online official journal of GORNA*, 7(3 September-December 2018), 155-163.
- Thönes, S., & Stocker, K. (2019). A standard conceptual framework for the study of subjective time. *Consciousness and Cognition*, 71, 114-122.
- Torero, M., and von Braun, J. (2006). Information and communication technologies for development and poverty reduction: The potential of telecommunications. IFPRI Books. Available from: <https://ideas.repec.org/b/fpr/ifprib/0801880416.html>
- UN Department of Economic and Social Affairs. (2014). United Nations E-Government Survey 2014: E-Government for The Future We Want. Available from: www.un.org/desa
- Vargas, M. A. D. O., & Mancia, J. R. (2019). The importance and earnest of the researcher in pointing out the study limitations. *Revista brasileira de enfermagem*, 72, 832-833.
- Varpio, L., Paradis, E., Uijtdehaage, S., & Young, M. (2020). The distinctions between theory, theoretical framework, and conceptual framework. *Academic Medicine*, 95(7), 989-994.
- Vieira, R., Carreira, P., Domingues, P., & Costa, A. A. (2020). Supporting building automation systems in BIM/IFC: reviewing the existing information gap. *Engineering, Construction, and Architectural Management*.
- Vis, I. F., & De Koster, R. (2003). Transshipment of containers at a container terminal: An overview. *European journal of operational research*, 147(1), 1-16.
- Walport, M. (2015). Distributed Ledger Technology: beyond blockchain. [Video] Available from: <https://youtu.be/4sm5LNqL5j0>
- Wang, P., Mileski, J. P., & Zeng, Q. (2019). Alignments between strategic content and process structure: the case of container terminal service process automation. *Maritime Economics & Logistics*, 21(4), 543-558.
- West, D. M. (2006). Global E-Government, 2006. Available from: www.INSIDEPOLITICS.org

- Wickberg, S. (2013). *Technological innovations to identify and reduce corruption*. Transparency International
- Willcocks, L., & Lacity, M. (2016). Robotic Process Automation: The next transformation lever for shared services (Paper 16-01). *The Outsourcing Unit Working Research Paper Series*.
- World Bank. (2007, September 17). Bank, UN Join in Stepped-Up Drive to Help Countries Recover Looted Assets. Retrieved November 10, 2021, from http://web.worldbank.org/archive/website01290/WEB/0_-3650.HTM
- World Bank. (2014). Report on the Session Digital Records Management: Good Practices for Anti-Corruption Authorities 3rd Biennial Meeting of the World Bank's International Corruption Hunters' Alliance. Available from: http://siteresources.worldbank.org/publicsectorandgovernance/resources/285741-1343934891414/8787489-1344020463266/8788935-z399321576201/digitalrecordsmgt_icha_13jan2015.pdf.
- World Bank. Operations Evaluation Department. (2004). *Mainstreaming Anti-Corruption Activities in World Bank Assistance: A Review of Progress Since 1997*. World Bank.
- Yurkevich, E. V., & Stepanovskaya, I. A. (2021, May). Controlling the security of the airport airspace using the digital twin. In *Journal of Physics: Conference Series* (Vol. 1864, No. 1, p. 012128). IOP Publishing.
- Zipparo, L. (1998). Factors that deter public officials from reporting corruption. *Crime, Law and Social Change* (30), 273-287. Retrieved from: <https://doi.org/10.1023/A:1008326527512273-287>.

APPENDICES

Appendix I: Commitment Letter

James Kaluma Stephen

Department of Governance, Peace, and Security

Africa Nazarene University

P.O. Box 53067 – 00200

Nairobi, Kenya

Dear Sir/ Madam,

RE: REQUEST FOR DATA

I am a Master's student in the Department of Governance, Peace and Security Studies researching the *Contribution of Automated Systems in Reduction of Corruption Levels in State Corporations: A Case of Kenya Ports Authority*.

The purpose of this letter is therefore to kindly request your voluntary participation in this study by objectively filling out the attached questionnaire. The information gathered shall be treated confidentially and shall be used for this research only.

Your assistance will be highly appreciated.

Yours sincerely,

Kaluma James Stephen

Reg. No 17J03EMGP022

Appendix II: Questionnaire

Participant information sheet

I am Kaluma James, a Master of Governance, Peace and Security Studies student at Africa Nazarene University. I am researching the “Contributions of systems automation in reduction of corruption levels at the Kenya Ports Authority.” I, therefore, invite you to participate in this research as a respondent. The purpose of this information sheet is to ensure that your rights as a participant in this research are upheld. Please note the following:

- 1) Your participation is voluntary. If you refuse to participate, there is no penalty.
- 2) You may discontinue participating at any time or leave out any questions that you do not feel comfortable answering.
- 3) The questionnaire is to be answered within 12 hours after it is given out. However, you may take your time because the collection of the same will be within 48 hours after it is given out.
- 4) The questionnaire has four sections; sections A, B, C, and D. Section A entails basic information, section B explores the aspect of systems automation, section C explores the effectiveness of systems automation and section D concerns the strategies to support systems automation. Information submitted in this questionnaire will be treated with the utmost confidentiality.
- 5) The researcher wishes to inform the respondents that he will provide counseling to those affected by corruption or intimidated by corrupt networks in a significant way.

Thank you for your cooperation,

My contacts are:

Email Kalumajames@gmail.com

Mobile phone +254725 392 060

This questionnaire contains four regions, which will take you a few minutes to complete. Please respond correctly to the item provided. This is an exercise meant for academic purposes and all data gathered from respondents will be held with strict confidentiality.

SECTION A: RESPONDENT'S BASIC INFORMATION

1. What is your gender?

Female Male

2. How old are you?

Below 25 years 26-35 years 36-45 years
46-55 years Above 55 years

3. What is your level of Education?

Certificate Diploma Degree Masters
 PHD

4. For how long have you worked at KPA?

Less than 2 years 2 to 5 years 6 to 9 years
10 years and above

5. Which division do you work?

a) Human resource and admin division b) Finance division
c) Corporate services division d) Operations division
e) Infrastructure division f) Engineering Division
g) Legal services division

6. What automated systems do you use in your department/division.....

SECTION B: SYSTEM AUTOMATION

7. What are the major automated systems adopted by KPA over the last 10 years?

- a)
- b)
- c)
- d)

8. For this question, please respond by ticking the appropriate box the extent to which you agree with each of the statements that follow using a scale of 1-6 where 6 = Agree Strongly, 5=Agree, 4=Neutral, 3= Disagree, 2= Disagree Strongly, 1= I don't Know

	1	2	3	4	5	6
a) Major operations at the KPA have been automated						
b) KPA has an online platform for reporting corruption						
c) KPA investigates corruption allegations						
d) KPA has electronic payment methods that help reduce corruption						
e) Automated operations in our department help reduce corruption						
f) Automation at KPA has bridged loopholes exploited by corrupt individuals						

SECTION C: STRATEGIES TO SUPPORT SYSTEMS AUTOMATION

9. What other strategies have been adopted to support the automation in your department?

- a)
- b)
- c)
- d)
- e)
- f)

10. For this question, please respond by ticking the appropriate box the extent to which you agree with each of the statements that follow using a scale of 1-6 where 6 = Agree Strongly, 5=Agree, 4=Neutral, 3= Disagree, 2= Disagree Strongly, 1= I don't Know

	1	2	3	4	5	6
KPA conducts customer training and sensitization on the use of various systems						
KPA conducts staff training and sensitization on the use of various systems and customer support						
KPA carries out system audits to ensure no interference with the operation of systems						
There is regular maintenance of systems in our department.						
KPA has made the resource available to support system operations.						

SECTION D: EFFECTIVENESS OF THE SYSTEMS AUTOMATION

11. Do you think systems automation is effective in fighting corruption at the KPA?

Yes

No.

12. What are the reasons for your response the question 9 above?

- a)
- b)
- c)
- d)

13. For this question, please respond by ticking the appropriate box the extent to which you agree with each of the statements that follow using a scale of 1-6 where 6 = Agree Strongly, 5=Agree, 4=Neutral, 3= Disagree, 2= Disagree Strongly, 1= I don't Know

	1	2	3	4	5	6
a) There is improved clearing turnaround time following the automation of services						
b) Automation has reduced delays previously occasioned by corrupt individuals						

c) There is a seamless flow in the clearing process						
d) There is increased security of cargo being cleared at the port						
e) There is a decrease in cost incurred in clearing a cargo						
f) There is a decrease in the amount of time taken to clear a cargo						

SECTION E: PERCEIVED LEVELS REDUCTION OF CORRUPTION AT KPA

14. For this question, please respond by ticking the appropriate box the extent to which you agree with each of the statements that follow using a scale of 1-5 where 5 = Agree Strongly, 4=Agree, 3=Neutral, 2= Disagree, 1= Disagree Strongly

	1	2	3	4	5	6
a) Automation at KPA has helped reduced bribery at the port over the last five years						
b) Automation at KPA has helped reduced embezzlement of funds at the port over the last five years						
c) Automation at KPA has helped reduced Kickbacks at the port over the last five years						
d) Automation at KPA has helped reduced Nepotism and Cronyism at the port over the last five years						

.....end.....

Thank you for your participation

Appendix III: Interview Guide

Participant information sheet

I am Kaluma James, a Master of Governance, Peace and Security student at Africa Nazarene University. I am researching the “Contributions of systems automation in reduction of corruption levels at the Kenya Ports Authority.” I, therefore, invite you to participate in this research as a respondent. The purpose of this information sheet is to ensure that your rights as a participant in this research are upheld. Please note the following:

- 1) Your participation is voluntary. If you refuse to participate, there is no penalty.
- 2) You may discontinue participating at any time or leave out any questions that you do not feel comfortable answering.
- 3) The interview schedule has two sections; sections A and B. Section A entails basic information while section B explores various aspects of systems at KPA. Information submitted in this interview schedule will be treated with the utmost confidentiality.
- 4) The researcher wishes to inform you, the respondent, that he will provide counseling to those affected by corruption or intimidated by corrupt networks in a significant way.

Thank you for your cooperation,

My contacts are:

Email Kalumajames@gmail.com

Mobile phone +254725 392 060

This interview schedule contains two sections, which will take you a few minutes to complete. Please respond correctly to the item provided. This is an exercise meant for academic purposes and all data gathered from respondents will be held with strict confidentiality.

Section A: Basic Information

1. What is the name of your organization? (please tick in the box)

- a) Clearing firm /Kenya International Freight and Warehousing Association (KIFWA)

(Specify the name of clearing firm)

- b) KRA
- c) East African Community
- d) Transparency International
- e) African Parliamentarians' Network Against Corruption
- f) Ethics and Anti-Corruption Commission
- g) Asset Recovery Agency
- h) Directorate of Criminal Investigations
- i) Central Bank of Kenya
- j) Directorate of Public Prosecution
- k) Office of Auditor General
- l) Office of the Attorney general

2. How long have you worked in your organization?

.....

3. What is your current designation/role?

.....

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is Guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014

CONDITIONS

1. The License is valid for the proposed research, location and specified period
2. The License any rights thereunder are non-transferable
3. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies
5. The License does not give authority to transfer research materials
6. NACOSTI may monitor and evaluate the licensed research project
7. The Licensee shall submit one hard copy and upload a soft copy of their final report (thesis) within one year of completion of the research
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice

National Commission for Science, Technology and Innovation
off Waiyaki Way, Upper Kabete,
P. O. Box 30623, 00100 Nairobi, KENYA
Land line: 020 4007000, 020 2241349, 020 3310571, 020 8001077
Mobile: 0713 788 787 / 0735 404 245
E-mail: dg@nacosti.go.ke / registry@nacosti.go.ke
Website: www.nacosti.go.ke

Appendix V: Letter from Nazarene University

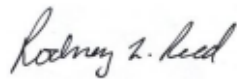


3rd March 2022

RE: TO WHOM IT MAY CONCERN

James Kaluma Stephen (17j03emgp022) is a bonafide student at Africa Nazarene University in the School of Humanities and Social Sciences, Governance, Peace and Security Studies department. He has finished his course work and has defended his thesis proposal entitled: - *“Contribution of Systems Automation in Reduction of Corruption Levels at the Kenya Ports Authority”*.

Any assistance accorded to him to facilitate data collection and finish his thesis is highly welcomed.



Prof. Rodney Reed.

DVC, Academic & Student Affairs

Appendix VI: Port Map



Appendix VII: Plagiarism Report

CONTRIBUTION OF SYSTEMS AUTOMATION TO THE REDUCTION OF CORRUPTION LEVELS AT THE KENYA PORTS AUTHORITY

ORIGINALITY REPORT

17 %	15 %	4 %	8 %
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Kenyatta University Student Paper	1 %
2	ir.jkuat.ac.ke Internet Source	1 %
3	link.springer.com Internet Source	1 %
4	erepository.uonbi.ac.ke:8080 Internet Source	1 %
5	www.govtransparency.eu Internet Source	1 %
6	repository.ju.edu.et Internet Source	1 %
7	Submitted to Saint Paul University Student Paper	1 %
8	Submitted to Africa Nazarene University Student Paper	1 %

ir-library.ku.ac.ke