



**UNIVERSITY OF NAIROBI**

**FACULTY OF BUILT ENVIRONMENT AND DESIGN**

**DEPARTMENT OF ARCHITECTURE**

**EFFECTIVENESS OF E-DEVELOPMENT PERMIT SYSTEM IN THE  
MANAGEMENT OF DEVELOPMENT APPLICATIONS AND APPROVALS IN  
NAIROBI CITY COUNTY**

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**W50/34805/2019**

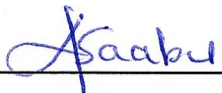
**THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS  
FOR THE AWARD OF THE MASTER OF URBAN MANAGEMENT DEGREE**

**UNIVERSITY OF NAIROBI**

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## DECLARATION


I, the undersigned, declare that this is my original work and has not been submitted to any other institution, or university other than the University of Nairobi for award of a degree.

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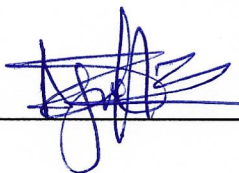
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## **DEDICATION**

This work is dedicated to my wife Emily Kagendo and daughter Lisa Kendi for their support, understanding, sacrifices, patience and encouragement during the education journey. I also dedicate this work to all enthusiast of effective development approvals systems and urban management.

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## ABBREVIATIONS AND ACRONYMS

AAK	Architectural Association of Kenya
APSEA	Association of Professional Societies in East Africa (APSEA)
BORAQS	Board Of Registration of Architects and Quality Surveyors
CoG	Council of Governors
CPD	Continuous Professional Development
EBK	Engineers Board of Kenya
E-DPS	e-Development Permit System
E-PS	Electronic Permit System
IEK	Institution of Engineers of Kenya
KCAA	Kenya Civil Aviation Authority
KEPSA	Kenya Private sector Alliance
KIP	Kenya Institute of Kenya
KPDA	Kenya Property Developers Association
KRA	Kenya Revenue Authority
NAWASCO	Nairobi Water and Sewerage Company
NCCG	Nairobi City County Government
NEMA	National Environment Management Authority
NIUPLAN	Nairobi Integrated Urban Development Plan
NLC	National Land Commission
NPDMS	Nairobi Planning and Development Management System
NRS	Nairobi Revenues Service
OECD	Organisation for Economic Co-operation and Development
PLUPA	Physical and Land Use Planning Act No. 13 of 2019
PPRB	Physical Planners Registration Board
TAM	Technology Acceptance Model
UPTC	Urban Planning Technical Committee
UTAUT	Unified Theory of Acceptance and Use of Technology
WRA	Water Resource Authority

## ABSTRACT

Digitization and automation have emerged as preferred solutions to challenges affecting city development management and application processes. Nairobi City County Government is a pioneer in automating development application processes in Kenya. The County has used digital e-Permit Systems in managing development application and permits. The System has experienced changes, suspension, modification and redeveloped severally over the years. Despite the widespread adoption of the e-Permit System as the ideal platform for digitizing development permits, its effectiveness is unknown. Its impact on timelines, cost, legality, ethics, and adequacy is yet to be established. The lack of empirical evidence about the effectiveness of the e-Permit Systems in Kenya and various challenges facing the existing E-Permit Systems implies that their continued implementation is not based on contextualized evidence and the actors might be implementing defective systems. The recent changes in development laws, singularity and exclusivity nature of the System, observed challenges and risks, popularity implementation trends and lack of comprehensive studies necessitated the study. This study investigated the effectiveness of the utilization of Electronic Permit System in the management of developments applications and approvals within Nairobi City County. The research employed a single case study research design. Data was collected from 42 Architects, 17 Physical Planners, and 2 Structural Engineers using the NPDMS for development applications. Five reviewers from NCCG also gave their views about the system's effectiveness. Qualitative and quantitative data was collected using questionnaires and interviewing methods. The data was then analysed using qualitative and statistical approaches. The study established safety, convenience, interactivensess, adaptability, trackability, progressiveness, adequacy and scalability as the primary characteristic of an effective e-permit system. About half of NPDMS users had a positive user experience with the system. Significant gaps were identified in operationalisation and adherence of the Physical and Land use Planning Act,2019 and provisions of allied regulations in the System. The study established that there is lack of specific and adequate regulations governing procurement, development, operations and maintenance of the e-Permit System. Other challenges established by the study includes: lack of documented up to date approving standards, limited and ineffective communication channels, opaque circulation processes, inadequate interface functions, ineffective subsystems and linkages and lack of adequate qualified County professionals in the System. Proposals for regulation framework were developed in recommendations section. Other mitigation measures to make the system more effective includes: preparation of System Timelines Charter, increased trackability, AI integration, increased system interface adequacy, increase system interactivensess and stability, periodical reviews, training and capacity building, creation of effective subsystems and linkages, proper data management, accessible back up and hosting of the System in government data centres. The study findings did not support the study proposition that, the Nairobi e-Permit System has increased effectiveness in development application and management. This implies that the Nairobi City County and its partners need to implement the proposed intervention measures to optimize the positive gains made by the e-Permit System and mitigate the inefficiencies.

## DEFINITION OF TERMS USED IN THE STUDY

The operational definition of the terms used in this study are defined below:

**Development applications:** A formal request for consent from proponents to the county government to execute a proposed development. They include requests for change/extension of use of land, extension and renewal of lease, land subdivision and amalgamation, and construction permits.

**e-Development Permit System:** An electronic, internet-based application that facilitates the submission and processing of development applications.

**e- Permit System:** An electronic, internet-based application that facilitates the submission and processing of development applications.

**System effectiveness:** The degree to which the e-permit system meets the desired the results in facilitating the submission and processing of development applications. It was measured by its efficacy, adequacy, and reliability.

**System efficacy:** The extent to which the e-Development Permit System produces the desired/expected results at within a reasonable time frame, at reasonable costs, and with little complexity.

**System adequacy:** The ability of the e-Development Permit Systems to carry out all the functions of develop application submission and processing, including the accommodation of all targeted users.

**System reliability:** The probability of the e-Development Permit System performing tasks accurately during a specific time period without the need for repairs and with no unnecessary delays.

## CHAPTER ONE: INTRODUCTION

### 1.1 Introduction

This chapter introduces the thesis topic. It provides the background of the phenomenon under investigation, including a highlight of the problem warranting the study. The chapter also details the research objectives, study questions, justification, scope, assumptions and limitations, and definition of terms.

### 1.2 Background of the Research

Due to existing problems in city development management and development application processes, digitisation and automation are emerging as preferred solutions. Like in other aspects of society, the use of technology has proven effective in urban planning and building permission processes (Olsson *et al.*, 2018; Kiruparan *et al.*, 2012; Johar *et al.*, 2007; Al-Hussein *et al.*, 2006; Eirikana *et al.*, 2018; Macrorie *et al.*, 2021). Electronic permitting (e-permitting) is one of the digitisation applications that help streamline the development application process. It refers to a set of computer-based tools and services that help developers, Planners, Engineers, and Architects to submit applications on computer systems and get approvals without the burden of delivering physical documents. E-permitting systems reduce permit time, improve customer service, and enhance staff efficacy. The quality of decision-making is also enhanced (Olsson *et al.*, 2018; The World Bank, 2015; Molfetas and Wille, 2018; The World Bank, 2019).

The digitization of development permit application processes plays a significant role in improving a country's ease of doing business. The World Bank bases the Doing Business Rank on ten indicators. One of these indicators – dealing with construction permits – is related to development applications. These indicators account for factors such as costs incurred, time taken to complete a process, and number of procedures required. In 2020, Kenya was ranked 105<sup>th</sup> (score of 67.6/100) in the dealing with construction permits indicator (The World Bank Group, 2020). The ranking was a significant improvement from the 2016 ranking of 149<sup>th</sup> (score of 59.7/100) (The World Bank, 2016). The improvement of this ease of doing business indicator can partly be attributed to the implementation of e-permit systems across different counties. As explained by the World Bank, the economies that score highly on ease of doing business have common characteristics, including the widespread use of electronic systems. In

particular, the use of electronic development permitting systems is attributed to improved ease of doing business (The World Bank, 2020).

The lack of automated systems for handling city planning tasks remains one of the major challenges facing countries around the world. The problem is more pronounced in developing countries where the majority of operations are done manually (Kiruparan *et al.*, 2012). The lack of automation results in increased inefficiencies in service delivery by increasing the time and resources required to complete a task. Process-oriented fields like urban planning and building permission processes are the most affected by these shortcomings of manual systems. Such processes involve multiple players from industry and authorities that are required to complete different phases (Olsson *et al.*, 2018). The process also entails tedious and complex processes that often overwhelm city officials and inconvenience private developers and the general community. For instance, development applications are taken through committees and/or technical evaluations that assess their appropriateness based on various data, such as current development context, land information, zoning provisions and planning requirements. When city officials are tasked with multiple applications, delays and poor decisions are occasioned (Johar *et al.*, 2007; Al-Hussein, 2006).

The national and county governments in Kenya are increasingly adopting technological applications to enhance service delivery. One of the areas where technological advancements have taken shape is in urban areas management. In particular, county governments use it in development control, security, transportation systems, and licensing. Over the last decades, several counties have made major strides in automating development application. Nairobi City County Government (NCCG) is the pioneer of this trend. The e-permit system in Nairobi was first developed for the Nairobi City Council (now Nairobi City County) in 2009 (became functional in 2011). The system largely targeted Architects in processing construction permits (The World Bank Group, 2019). After adding to the functionalities of this system, the county unveiled the Nairobi City County e-Development Permit System (e-DPS) in 2016. E-DPS caters for Physical Planners, Architects and Structural engineers.

The e-DPS was designed to minimize the physical contact between users (Developers, Physical Planners, Architects and Structural Engineers) and County Government officials. The web-based software application has a registration platform for Planners, Architects and Structural Engineers, which allows them to access other processes on the system. Once registered, the experts can submit development applications for review and approvals, make online payments

for the applications and monitor the approval process. The Expert gets notified electronically whenever key milestones of the application process are completed or when additional actions are required. From the NCC side (backend), the e-DPS allows county officials to review the development applications and issue permits. The system also has the capability of generating reports related to development approvals. It also facilitates monitoring and implementation of activities, including inspection of ongoing projects and capturing inspection data on mobile devices. Development control officers are linked with the system data which can provide project location data, ownership, site characteristics, other approvals or application on the same site. It provides an arena for circulations and comments by other sectors and agencies such as public health, environment departments among others. It also provides arena for comparative appraisal of what is implemented on ground and what is applied for or approved in the system. The e-DPS is a critical source of data because it archives all data submitted and/or created, providing an important resource for future development related issues (NCCG, 2021).

The history of permit systems in Nairobi development applications and approvals has been characterised by three system namely: Manual System, e-Development Permit Management System (eDPMS) and Nairobi Planning and Development Management System (NPDMS).

### **1.2.1 Manual System**

This was utilized prior to the online system. It was characterized by manual submission, circulation, filing, issuance of permits and related documents. The manual system was however adoptive and easy to operate without need of IT skills. It was not vulnerable to digital down times. Confidentiality would be maintained because the file access control could be controlled at specific locations and offices.

As confirmed with the County, key challenges manifested in the manual system included; rampant loss of files and documentations, encroachment middlemen and quacks in the processes and opaque processes. It was difficult to track files and processes while records were vulnerable to destruction by fire, water and severe weather conditions as well as the wear and tear.

### **1.2.2 Nairobi County eDPMS**

The development of e-permit systems in Nairobi City County was part of the Government of Kenya efforts to strengthen its regulatory framework in urban management. The government initiated the process in 2009 following a broad participatory process led by the Ministry of Transport, Infrastructure, Housing and Urban Development and the Ministry of Land and

Physical Planning. Kenya sought to have a regulatory framework that would ensure long-term safety, productivity and resilience in the built environment. Although the process was initiated in Nairobi, the World Bank anticipated that more counties would take up this initiative to improve the ease of doing business (The World Bank Group, 2019). Kiambu, Kisumu, Mombasa, Kajiado, and Kilifi County governments have since implemented development e-permit systems. Other county governments are also in the process of developing similar systems.

eDPMS played a great role between 2009-2021 in managing development Application and permits. It provided 3 module targeting Physical Planners, Architects and Engineers. Functions performed by the system included; Change of User, Amalgamation, Subdivision, Amalgamation with Subdivision, Extension of Lease, Renewal of Lease, Building Plans, Structural Plans. Basically, the system had 9 major steps: 1. Submission, 2. Pre-vetting, 3. Invoicing, 4. Payments, 5. Payments Confirmation, 6. Circulation, 7. Pre-Agenda, 8. Agenda/technical meeting, and 9. Agenda Ratification. Initially payment confirmation was carried out automatically on payments but due to rampant fraud in manipulating the system a mandatory manual payment confirmation step was added.

Figure 1-1: Home page of the eDevelopment Permit System



### 1.2.3 Nairobi Planning and Development Management System (NPDMS)

With transfer of Planning functions to Nairobi Metropolitan Services in 2021, the ePDMs was abandoned and NPDMS system was introduced in conjunction with KRA. Additional steps such as application launching, plot number validation and mandatory registration of customers



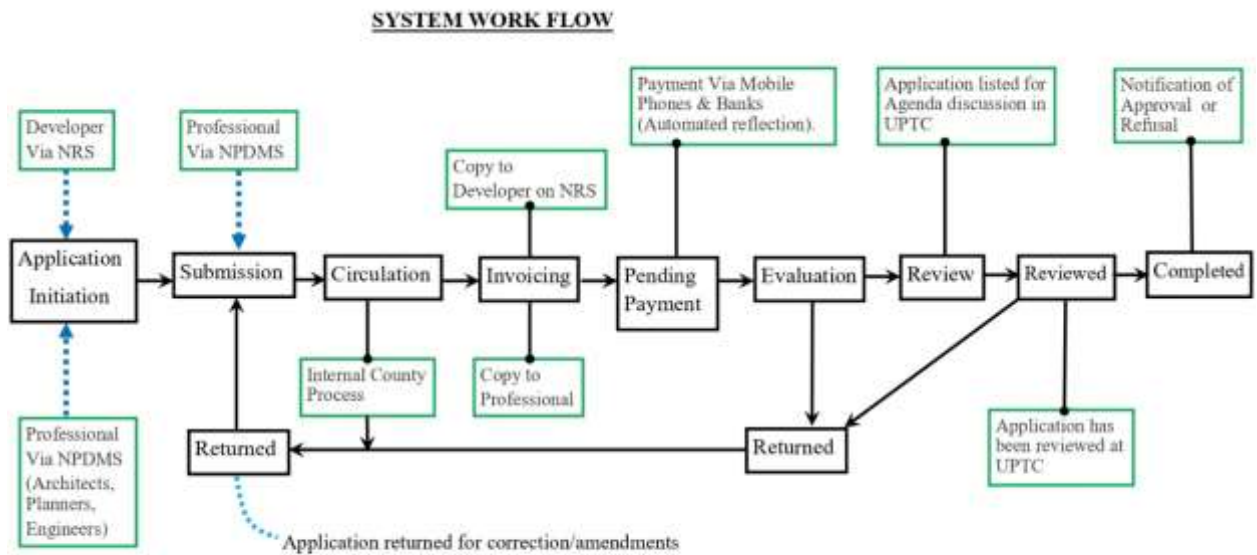
to Nairobi Revenue Services (NRS) system was incorporated in the NPDMS. There were major changes on the layout, application launching criteria, application requirements, submission forms, payments, security and application tracking among others. NPDMS introduced two launching methods whereby an application can be launched by the developer on NRS system or by the Professional on NPDMS. On both approaches the professional has to finalize the submission after the launch. The NPDMS introduced use of One Time Password (OTP) in login in and sending status to both Professional and the developer in a bid to improve security by limiting access to authorised persons.

Several challenges were experienced on migration from eDPMS to NPDMS. These include; dealing with pending applications at different approval stages, change of interface, change of staff, application and approvals and formats. One of the roles of the system is to be an archive for various development applications and approvals within the City. Institutional memory is vital in future developments. Shift between systems during different political and management dispensation is a key concern for urban managers. The system efficiency in this context is part of the aspects that this study would like to assess and develop recommendations.

It has been indicated that, NPDMS utilizes the KRA and Ardhisasa system data base. These components/data bases form parts of the system and they have implication on entire development application and permit system. Preliminary findings indicated that faults or inadequacies in either of the component affects the effectiveness of the entire system. For instance, exclusive use of Ardhisasa database in validating plot numbers when applying for development application implies that only plot numbers within the Ardhisasa database can be submitted. This aspect excludes developers with untitled land, share certificates, allotment letters, temporary occupation licence and other plots not in Ardhisasa were excluded. Numerous land owners especially in Dandora, Utawala, Eastleigh and other estates in Eastlands part of Nairobi were therefore excluded on obtaining development approvals despite their legitimate rights and needs. The use of KRA PIN to initiate development meant that only the PIN used shall be captured as the owner on invoices, receipt and approvals. This set up does not adequately accommodate the various type of ownership in Kenya such as partnerships, share based, administration, subleases among others. One owner name appears on the documentation whereas the land is jointly owned has implication of other post approval processes e.g., in land subdivision, extension and renewal of leases. It also has implications on financial claims, compensation, entitlement and may result to conflicts in perceived or deliberate fraud among parties.

This study intends to assess the implications of these changes comprehensively in lenses of effectiveness of the system in developments management in Nairobi. The research investigated whether the changes and improvements applied have been effective and how they have impacted the various stakeholders in development application and approvals sector

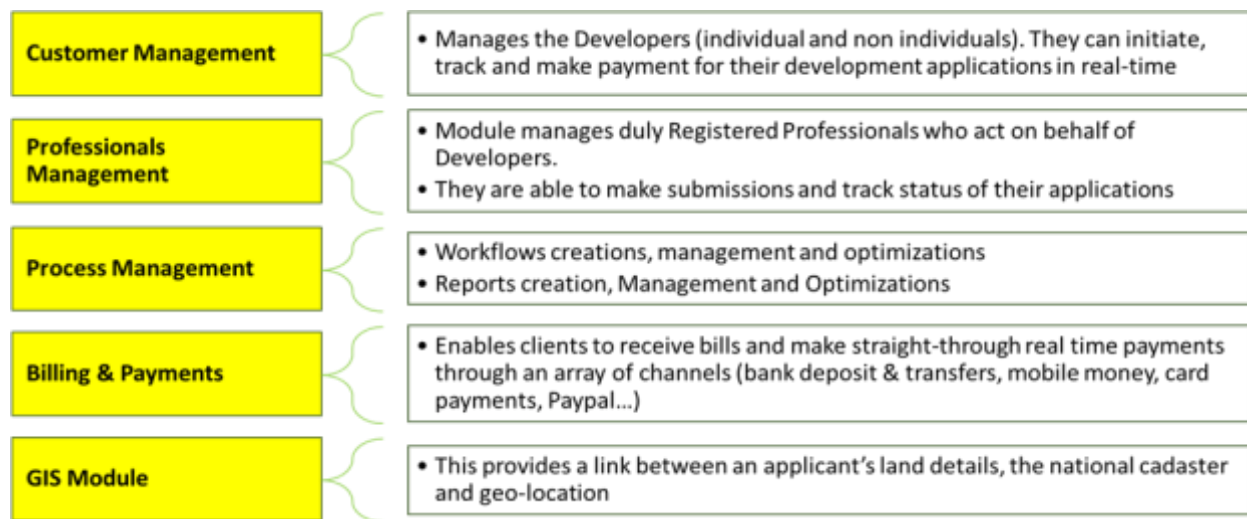
Figure 1-2: General work flow



Source: Author,2023

The planning functions were later transferred back to the Nairobi City County government after lapses of NMS term. The NPDMS has however been retained. This system provides a comprehensive reporting module that includes financials, activities and audit trail. It is integrated to core national data validators such as KRA, National Registration Bureau (NRB), Ministry of Lands, Business Registration Services (BRS) among others (NCC,2023). The professionals are validated from their regulatory bodies i.e., BORAQS, EBK and PPRB.

Figure 1-3: System Reporting Modules



Source; Nairobi City County 2023

### 1.3 Problem Statement

Despite the widespread adoption of the e-permit systems as the ideal platform for digitizing development permits, its effectiveness is unknown. Its impact on timelines, cost, legality, ethics, and adequacy is yet to be established. While there are indications that these systems might be contributing to the increased ease of doing business in Kenya, there is no empirical evidence to support this assertion. Researchers have established that in some cases digitization of services may exacerbate the problems that the digital platforms are intended to address. For instance, system breakdown, lack of supportive technology and communication system, and poor design of digital systems may contribute to increased inefficiencies through delays (Al-Shboul *et al.*, 2014; Anjoga *et al.*, 2016). The possible shortcomings of government electronic systems necessitate the investigation of their efficiency. The Nairobi electronic system has manifested down times, closure, hacking claims, loss of data in numerous times leading the researcher to ask whether there might be a more effective models of implementation.

The system has recently become very popular and has been duplicated in other counties such as Kiambu, Mombasa, Kajiado and Kilifi. This trend continues to occur despite the lack of a comprehensive, empirical study done to investigate its effectiveness. It is observed that, despite launch of e-Permit System several years back, Kajiado and Kilifi counties still partially process development application and approvals manually. Between August 2022 and November 2022, the Kiambu Edams experienced sustained challenges which led to its closure and Kiambu County reverted to manual approval system. The Nairobi system has also been suspended,

replaced and malfunctioned severally within various county administrations. This manifests that there might be fundamental issues on the system which requires systematic study and recommendations emanating from the study.

The lack of empirical evidence about the effectiveness of the e-permit systems in Kenya implies that their continued implementation is not based on contextualized evidence. Currently, the trend by counties to digitize their development application systems appears to be based on the universal consensus that digital systems are more effective. Worse still, counties are adopting the approach used in Nairobi County without a clear understanding of how well it addresses the Kenyan development application contextual factors. Consequently, these counties might be implementing a flawed system that fails to recognize the benefits envisioned in the digitization of these services. Even if the system has resulted in benefits, there is no evidence to guide its improvement for maximum benefits. As noted in the 2020 World Bank report, Kenya still ranks 105<sup>th</sup> out of 190 countries on the ease of obtaining construction permits indicator. To achieve a better rank, improving the design and functionality of e-permit systems will be necessary.

There has been recent change of key laws and regulations in development application and approvals with enactment of the Physical and Land Use Planning Act No. 13 of 2019 and its Regulations (2021). The E-system is not only an IT tool but also a tool to operationalize legal and institutional requirements applicable in development application and approval in Nairobi City County and within the republic of Kenya. This study purposes to fill the knowledge gap by assessing whether the current e-Permit system aspects are compliant with the recent legal, policy and regulatory provisions. These includes use of statutory forms formats, Statutory timelines, statutory offices/ responsibilities, material requirements, fees, decision communications mode, liaison committee, appeal and other processes provided by planning laws and regulations. The study also queried whether there may be faulty or in adequacies on the current laws and regulations operationalizing the e-permit.

Dynamism and change management in law, needs, political leadership and time has been witnessed in relation to the e-Permit System. Each administration keeps on changing system developers, system components, system administrators and system rights holders. It is worthy assessing the system in search for probable stable operation environment parameters and frameworks. Being the solitary method to apply, vet and approve developments in the city,

identification of such parameters is beneficial to city managers and developers. This study seeks to attain this and provide a guide for best practises.

The E-Permit Systems have progressively replaced the manual system previously used in the Nairobi City. Various stakeholders, such as Physical Planners, Architects, and Structural Engineers have to exclusively utilize the system for their operations. The system has changed the approaches, procedures, requirements, stakeholders and various aspects of development application and approval. This research seeks to assess the effectiveness of this shift of operations in management of development applications and approvals. Since it is the only legitimate way to practice in Nairobi, the system's efficiency, adequacy and reliability ought to be studied and appropriate recommendations made.

#### **1.4 Research Objectives**

The main objective of the study was to evaluate the effectiveness of the utilization of online portals in the management of developments applications and approvals within Nairobi City County. Accordingly, the specific objectives of the study were:

- i. To document the characteristics of an Effective Electronic Permit System and use them to highlight deficiencies of the existing E-Permit System at Nairobi City County.
- ii. To evaluate the effectiveness of the Electronic Permit System in relation to efficacy, adequacy, reliability, cost, legality and operation framework in Nairobi City County.
- iii. To identify challenges faced by the Electronic Permit System users.
- iv. To recommend possible interventions that can mitigate the challenges facing the Nairobi Electronic Permit System and improve its effectiveness in facilitating processing of development applications and approval.

#### **1.5 Research Questions**

The research examines the following questions:

1. What are the characteristics of an effective electronic permit system? Additionally, does the Nairobi e-Permit System reflect these characteristics?
2. Has the use of the Electronic Permit System been effective in management of development applications and permits in Nairobi? Additionally:
  - a. Is the NPDMS adequate in meeting permit application requirements?
  - b. What is the effectiveness of the NPDMS in the permit application process?
  - c. Is the NPDMS a reliable system for permit application?

- d. Does the NPDMS ensure data security, ethics, and compliance with Physical and Land Use Planning Act ,2019, its accompanying regulations and other existing laws?
  - e. What are the emerging issues, challenges, risks, and needs due to utilization of the Electronic Permit System?
3. What are the challenges faced by the Electronic Permit System users?
  4. What are the possible interventions that can mitigate the challenges facing the Nairobi Electronic Permit System and facilitate effective processing of development applications and approvals?

## **1.6 Proposition Statement**

The following research proposition statement guided the research study in explaining the relationship between the Electronic Permit System and management of development applications and permits in Nairobi; The utilization of Electronic Permit System has increased the effectiveness of development application and approval management in Nairobi City County.

## **1.7 Study Justification and Significance**

### **1.7.1 Study Justification**

The development and implementation of e-Development Permit Systems by national and county governments should be guided by empirical evidence supporting their effectiveness in enhancing service delivery. Currently, the implementation of e-Development Permit Systems is based on the theoretical belief in their effectiveness. In the Kenyan context, there is no empirical evidence supporting the continued replacement of manual development permit application processes/systems with e-Development Permit Systems whereas the systems continue to face down times, suspensions and sometimes total collapse as in the case of Kiambu County. In counties that the systems are already in place, their effectiveness in facilitating development application processes is unclear. The e-Development Permit Systems is a relatively new phenomena in Kenya. Comprehensive study on the aspect is lacking yet it is rapidly being adopted county governments across Kenya.

### **1.7.2 Study Significance**

This study will hopefully guide the Nairobi City County and its development partners to identify loopholes and improve service delivery regarding development applications and

approvals. It uses the Nairobi e-DPS to assess the effectiveness of e-Development Permit Systems while looking for potential areas of improvement. The findings of this study will help NCCG to streamline service delivery to Physical Planners, Architects and Structural Engineers on the e-Development Permit System. It will also assist other counties in bench marking with Nairobi to better understand the e-system and how to make it more effective. Counties that are yet to implement e-Development Permit System will have a clear guide on how to develop an effective system without suffering long-winded ‘teething’ problems. The research can form a basis for lobbying for better services or addressing specific issues by various stakeholders in development management. Architects, planners, surveyors, city administrators, professional associations, and e-platform developers can rely on the findings to advocate for positive changes in the digitization of development permit application in counties across the country. The research will also assist system managers to identify, consolidate and implement applicable legal requirements in development management.

## **1.8 Scope and Limitations and Assumptions**

### **1.8.1 Scope**

This section provides the study Spatial Scope and Variables Scope.

#### **Spatial Scope:**

The study was carried out within Nairobi City County. Therefore, the study does not explore the effectiveness of the previous e-permit or permit systems of other counties and territories. The system is anchored within the Urban Planning department of Nairobi City County Government,

#### **Variables scope**

This study focused on effectiveness of the e-permit system in development applications and permits in Nairobi. The study focused on the following variables:

*Table 1-1: Variables*

	<b>Variable</b>	<b>Sub variables</b>
i.	Efficacy	Timelines, interactiveness, ease of use and processes
ii.	Adequacy	Adaptability, interface robustness, usability, navigation, scalability
iii.	Reliability	System accessibility, technical dependability, accuracy and stability

iv.	Cost	Statutory fees, emerging cost, operation cost, opportunity cost
v.	Legality	Adherence to Constitution, PLUPA 2019,
vi.	Operation Framework	Staffing, skill and qualifications, professionalism, Approval meeting scheduling, service charter, communications and liaisons, basis for decision making, zoning plans

*Source: Author, 2023*

### **1.8.2 Study Limitations**

Being a relatively new phenomena there is very little data and studies available on the subject. Available data may be in piecemeal. Therefore, the researcher sampled various stakeholders who use the system regularly to ensure that wide perspectives are obtained. The study was constrained by research budget and a busy timeline.

Being a closed system, access to the system interface is challenging. However, the researcher is an authorized system user being a registered Physical Planner. Appropriate protocols were followed to get permit on data and the system attributes.

### **1.8.3 Study Assumption**

The study relied on willingness of participants to provide impartial information regarding the study. The researcher took adequate time to explain the study's purpose to the participants. Respondents were assured of the confidentiality of the information provided. The study assumed that there is adequate interest from stakeholders and users of the e-Development Permit System to make the system efficient. It is also assumed that the recommendations from the study can be adopted to make other similar systems efficient.

## **1.9 Study Area**

The study was carried out within Nairobi City County, the capital city of Kenya and largest city in Kenya. The city had approximated population of 4.4 million in the 2019 national census (KNBS, 2019). It is estimated that it contributes 21.7% of Kenya's GDP. It comprises of 17 sub-counties and 75 wards. Land is comprised of both leasehold and freehold land tenure. The development applications and permits in Nairobi are centralised, although some components such as enforcement are cascaded to ward level, approvals are centralised at City Hall.

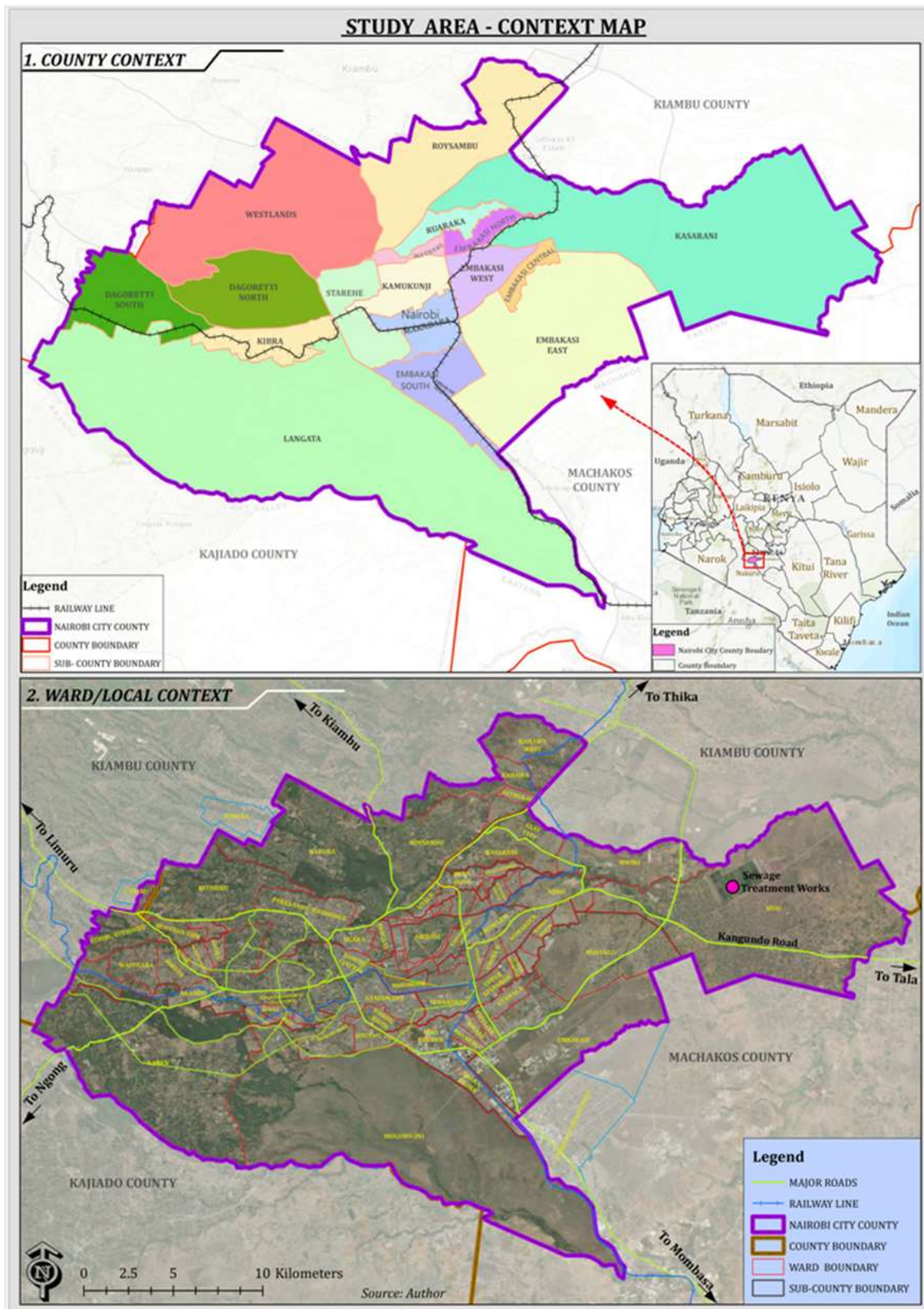


The populous city is faced by myriad of challenges in development management. These include; dilapidated and stressed infrastructure and services, outdated zoning plans, sections of untitled land, illegal and substandard developments, encroachment and land dispute, unemployment, insecurity, traffic congestion among others.

Plans such as NIUPLAN, Urban Resilience etc have been formulated to mitigate some of the challenges. In regards to development management, various methods have been utilized in development application and approvals: Manual, EPDMS and the current NPDMS. For purposes of development approvals, Nairobi is divided into 20 zones. These are further divided into three categories – A, B and C – in the Finance Act for purposes of fees charging. The applicable zoning was approved in 2004. This has since been surpassed by developments trends in the city. For instances in zone 3,4,5 where maximum floors are indicated as 4 floors, we have 10+ floors. Approvals in the city have been done via precedents, discretion and justifications by developers.

Several efforts have been made to update the zoning plans. Latest being the 2021-2022 which has updated minimum plot sizes and significantly increased building floors in most of the zones. It has also made substantial statement on provision of infrastructure and services in the city. It has also divided the 20 zones into subzones to enhance localization of development control standards. By the time of writing this report the zoning regulations had undergone public participation and were at County Assembly for approval.

Figure 1-4: Nairobi County Map



Source: Author, 2023

### **1.10 Organization of the study**

The study is organized in five chapters. Chapter one introduces the study, providing information about the background, problem statement, objectives, research questions, justification and significance, scope and limitations, assumptions, justification, and study area. Chapter two consist of literature review. The empirical reviews consist of Development Permit Application Systems, Effectiveness of E-Government Platforms in Development Management, Effective characteristic e-permit system and best practices, International Case Studies for E-Permit Systems, legal and theoretical underpinnings. Research gaps and Conceptual framework is also discussed.

Chapter three discusses the research design, data matrix, target population, sampling procedure and sample size, data collection methods, data analysis and presentation of findings, validity, reliability and ethical issues

Chapter four presents the study findings as collected using questionnaires, checklists and interviews. It interprets and discusses the study findings. The study objectives inform the analysis, presentations, interpretations and discussions. The section explains data processing and interpretation according to the study goals. The fifth chapter contains a summary of the study findings, discussions, recommendations, and areas of further study.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter presents the theoretical frameworks comprising of empirical literature, study variables, research gaps and Conceptual framework. Literature review targeted documents and information in regards to best practices in e-permit system, legal provision in development applications and approval management, challenges and emerging issues in electronic permitting among other attributes of the study.

### **2.2 Review of Empirical Studies**

#### **2.2.1 Development Permit Application Systems**

Development application systems refer to systems that facilitate the application of development application permits. These permits largely involve the subdivision or utilization of land resources, as well as developments on said land (Eirinaki *et al.*, 2018). Traditionally, building applications were done manually. However, in recent years permit application systems have been digitized. Both developed and developing countries are embracing information systems to support urban development. Such systems are based on user requirements and the procedures involved in the development permit application and processing procedures (Wahed, 2017).

The lack of automation of development permit application and approval is a major challenge facing developing countries. According to Kiruparan *et al.* (2012), the lack of automation of services is a significant problem in town planning in developing countries. Urban planning activities in these countries are characterized by high inefficiencies. Olsson *et al.* (2018) concurs with this argument by explaining the high costs and delays experienced when providing public services manually. This challenge is more evident in activities with multiple interdependent procedures. The move towards the digitization of building permits in Kenya is linked to the ease of doing business. Over the last five years, Kenya's rank on World Bank's ease of doing business has improved significantly (The World Bank, 2020).

#### **2.2.2 Effectiveness of E-Government Platforms in Development Management**

The implementation of e-government systems in development management is targeted at improving operational efficiency. According to the Organisation for Economic Co-operation and Development (OECD), electronic systems in the issuance of development permits reduce

the regulatory and administrative burdens faced in these processes. These systems improve the efficiency of processing applications by reducing the time required to make and process applications. They also reduce government bureaucracy and red tap by minimizing interactions between applicants and government agents (OECD, 2021). E-Permit Systems also improve efficiency in development applications through the consolidation of related processes. Manual systems are comprised of multiple sub-processes that have to be completed at different government offices, thereby increasing the time and cost for completing the application process. Digitization enables the implementation of single-window clearance systems that ensure that all sub-processes are done on the same platform (OECD, 2019).

However, e-Permit Systems often raise concerns. According to Al-Shboul *et al.* (2014), the implementation of e-government services is hampered by multiple challenges, which are largely related to its effectiveness. One of the major challenges facing these systems is the requirement of large financial resources. The implementation of e-government services is expensive, especially in the short-run, which diminishes the net benefits. Besides, lack of human expertise to handle these systems, as well as resistance of public employees, may lead to challenges in the delivery of services. Lastly, e-government services are prone to cybercrimes, which expose users to data privacy and security risks (Al-Shboul *et al.*, 2014). Another major challenge facing e-government services is the lack of support infrastructure, especially in developing countries. For instance, slow internet connections, low computer literacy, and high cost of information technology may lead to poor utilization of e-government services (Anjoga *et al.*, 2016).

The effectiveness of e-government services can be improved through active efforts by the government to ease their utilization and reduce their vulnerabilities. Milić *et al.* (2016) argues that the government has a responsibility to ensure a secure access to e-government services as a way of protecting users and gaining their trust. According to them, any government initiative to digitize must be accompanied by an effort to gain the confidence of users for it to be successful. Similarly, Shareef (2016) notes that the security of information on e-government platforms is a major concern that affects the ability of these systems to function to their capacity.

### **2.2.3 Effective characteristic e-permit system and best practices**

Previous works have made efforts in understanding system efficiency which has led to innovations and constant updates. both in management, engineering and information

Technologies. Review on various automation objectives has been geared towards; increased speed in delivery, ease of operations, saving time and cost, creating robust interlinkages, increasing scope and modernization of operations. According to Amaravadi and Lessard (2017) the following are characteristics of a good system;

- a) **Functionality:** An effective structured fulfilling the intended needs for users. The primary test for a good system involves assessing its ability to fulfil the purpose for which it was designed at present and in the future.
- b) **Infrastructure:** Effective systems facilitate the seamless flow of information and/or goods within their scope. The infrastructure consists of the organizational structures and systems needed for the system to function. Impediments to the flow of information/goods leads to poor functioning.
- c) **Easy Connectivity:** Effective systems have ease of connectivity, an idea related to coupling and modularity. Easy connectivity ensures free information exchange with systems outside the system's environment. The feature allows the system to harness assets from other systems to enhance versatility.
- d) **Adaptable/Versatile:** Effective systems are adaptable and versatile. It should be easy to modify based on changing user needs. The system should be adaptable to multiple potential scenarios. The characteristic ensures that the system has adequate functionality, ensuring the system can meet changes in the operating environment.
- e) **Reliability:** Reliability entails the system's ability to meet user needs when needed. A system should have high reliability, measured as the percentage times that the system is operational.

World Bank (2019) Dealing with Construction Permits report identifies clarity, consistency, transparency, adaptability, flexibility and adequacy as good characteristics of development permit system. The report highlights that clarity of roles and responsibilities as vital in approval systems. Unclear regulations create confusion and increase the opportunities for corruption, disputes, and delays. The report recommends that applicants must have predetermined documents and preapprovals requirements before applying for a permit to avoid situations where the permit-issuing authority can arbitrarily impose additional requirements. The system also needs to be adaptable to keep up with economic and technological change.

Reviewers and approvers of development applications must have a technical background in planning and architecture. Similarly, the inspectors who ensure safety standards for buildings should be certified and have the necessary technical qualifications. Such parameter formed

study subject, questions and subjects for observation and assessment in regards to Nairobi City County e-permit system.

## **2.3 International Case Studies for E-Permit Systems**

### **2.3.1 Electronic Building System: UAE Case Study**

The United Arab Emirates government formed a taskforce in 2010 to streamline the process for issuing building permits. The primary target for the project was to reduce the steps involved in the application process, reducing costs involved, and unifying operations. Local municipalities were responsible with the implementation process because they are responsible for issuing building permits. Systems users are required to create a username and a password to enable future log ins. Only eligible clients can create accounts on the system. The system provides all building permits applications and processes. Users can use any web browser to access the system and make applications. Besides, it offers a video conferencing option where applicants can discuss their drawing with reviewers. Besides, applicants can track the application process, view notes, make appointments, and complete payments (Wahed and Ismail, 2022).

The UAE building permit application system is simplified to involve six steps only. First, applicants register the construction project on the system. Second, they request approval and vacancy, aimed at obtaining site approvals. During the process factors such as infrastructural status, service availability, and existence of buffer zones is reviewed. The third step involves preparatory and preliminary approvals. Approvals from service departments related to water, electricity, and roads are obtained at this stage. The fourth step involves obtaining approval for shop drawings by the contractor. In the fifth step, the relevant authorities review all requirements and engineering buildings. In the last step, the authorities issue the building permit after the applicant has paid the fees to carry out work on the site. Consultants or contractors can complete the last step (Wahed and Ismail, 2022).

The UAE e-permit system is highly successful in improving the permit application process. In particular, it reduced the time taken to process applications. Besides, the overall costs incurred by applicants are significantly lower when compared to the manual process. The e-permit process also ensures streamlining of services. The system played a major role in enhancing the country's competitiveness in the region (Wahed and Ismail, 2022).

### **2.3.2 Electronic Building System: Netherlands Case Study**

Building application processes in the Netherlands include any works involving building, repairing, modifying, moving, converting, removing, improving, and demolishing structure. Change of use application are also included in the building permit application process. In the past, the country used about 25 separate permits for construction, planning, environmental management, and listing buildings. A single one-stop-shop permit systems replaced these systems to cover all activities. Building permits are processed by the municipalities or the Ministry of Infrastructure and the Environment (Wahed and Ismail, 2022).

Users are required to create an account on the e-permit system to enable future log in activities. Once they log in, applicants can access information on procedures and steps involved the application process. Links related to building permit issuance are also provided on the website. Applications are made on the website, with the option of getting support about the process. Users obtain automatic confirmation receipts after uploading the required files. The municipality then assesses the applications commences the approval process. Assessors can add comments on the files added as required. Applicants are automatically notified about the final decision after review (Wahed and Ismail, 2022).

The e-permit system in the Netherlands is highly effective in minimizing the resources expenses to process applications. Unlike the earlier system, the current system involves less time and effort by both applicants and reviewers. Besides, it reduces the complexity involved when dealing with multiple applications. Integrating information and communication technology in the system in the process was critical to the system's success (Wahed and Ismail, 2022).

### **2.3.3 Electronic Building System: Greece Case Study**

Greece introduced an electronic building permit system (e-Poleodomia) in 2006 as part of the efforts by European Union (EU) member states to transition to a paperless permit application system. The system aimed to centralize all building services that were under the local authorities within the country. It sought to address four main challenges. Firstly, it targeted standardizing procedures and printing forms for all local authorities. Secondly, the system would install an IT system for internal process flow management. Thirdly, the government targeted to enable easy tracking of building requests and citizen records. Lastly, the system would enable a seamless transition from a manual to a digital system. The Greek government



predicted that the system would achieve faster and better services, reduced processing time, and limited physical citizens' presence at the local authorities' offices (Bellos *et al.*, 2015).

The Greek e-permit system implementation was subdivided into three main project phases. The first project phase entailed the electronic protocol, building permit control and management, and managing illegal building and construction. The second phase aligning system with laws and regulations corresponding with building permission processes. The third and last phase involved the development of a GIS system to digitize maps and urban material. However, e-Poleodomia was unsuccessful due to poor implementation. The first project phase was completed albeit with delays. However, the second and third phases were not fully delivered (Bellos *et al.*, 2015).

The failure of the Greek e-permit system was primarily attributed to its rough design from the beginning. The implementation did not follow the Project Management Body of Knowledge (PMBOK) framework, leading to poor feasibility analysis and application of best practices. Besides, users were inadequately trained about the system's use, leading to resistance. Employees also lacked motivation because they were not obliged to use the system. Lastly, the system there was poor coordination between engineers and municipal staff involved in the building permit process (Bellos *et al.*, 2015).

In summary key qualities of a good system includes; trackability, safety, convenience, clarity, consistency, transparency, interactiveness, adaptability, progressiveness, adequacy, functionality and scalability.

## **2.4 Legal Provisions**

Development applications and approvals in Kenya and Nairobi are covered under the Physical and Land use Planning Act No 13 of 2019. Other regulations relating to zoning and policies include the zoning ordinance of 2004 which is outdated, NIUPLAN and the Nairobi City County development management policy which is currently under review at the County assembly, The E-Permit system lack specific law or regulation anchorage.

### **2.4.1 The Constitution of Kenya**

The constitution of Kenya makes fundamental provisions which should be adhered and manifested on the E-permit system in terms of structure and use.

Article 2 on outlines "good governance, integrity, transparency and accountability" as the national values and principles of governance. Article 35(1) grants each citizen the right of

access to government-held information and information under another person's possession that is necessary in exercising a right or fundamental freedom. Article 35(2) guarantees the right to accurate information, where untrue or misleading information is corrected or deleted.

Article 36 provides the right to freedom of association. Each citizen has a right to form, join or participate in the activities of all associations. Membership to associations is voluntary, implying that membership cannot be withheld or withdrawn unreasonably. Each individual has a right to appeal deregistration to an association. Article 46(1) guarantees consumer rights to goods and services of good quality; information that aids them to gain full benefits of consumed products: health, safety, and economic protections; and compensation for loss or injury resulting from defective products.

Article 47 guarantees the right to expeditious, lawful, reasonable, and procedurally fair administrative action that is expeditious, efficient, lawful, reasonable and procedurally fair. An individual should get written reasons for action if an administrative action adversely affects right or fundamental freedom. Article 50. (1) also guarantees the right to a fair public hearing in a court or other impartial tribunals and bodies. Article 67(2) tasks the NLC with the monitoring and oversight responsibilities over countrywide land use planning. Therefore, it is vital to consult and seek recommendations from NLC for such instruments which operationalize instruments land use laws and approvals in build environment.

Chapter six of the constitution provides for leadership and integrity issues in Kenya. These are applicable to the utilization of the E-permit system. Article 73 guides state officers about exercising authority. Authority must be exercised following the Constitution, demonstrating respect, bringing honour, and promoting public confidence. Authority assigned to state officers only task them to serve the people. The Article also outlines the guiding principles of leadership and integrity. The primary principles are personal integrity, competence and suitability; objective and impartial decision-making; selfless service; accountability; and discipline and commitment.

#### **2.4.2 Physical and land use Planning Act No.13 of 2019 and its regulations**

This is the anchorage law for development control and management in Kenya. The law provides for various statutory requirements and regulations. It provides key issues in development application and management;

- a. Provides for different type of applications and permissions

- b. Provide for criteria of preparation including relevant professionals
- c. Provide key considerations in development approval
- d. Provide for submission criteria and requirements
- e. Provides for circulation framework and forms
- f. Provides for public participation
- g. Provides for timelines for public notices, application, circulations, approval, appeal and various decision communication
- h. Provides for appeal and dispute resolution mechanism
- i. Provides for statutory forms and instruments for development application and management
- j. Provides for statutory offices, committees and authorities

Section 56 assigns the role of development control to county governments. County governments are also guided by the Urban Areas and Cities Act, 2011 (No. 13 of 2011) and the County Governments Act, 2012 (No. 17 of 2012) in conducting their duties. The primary duties under development control include prohibiting or controlling developments to ensure proper and orderly development of its area and reviewing and approving development applications. Section 58 states that individual should apply for development permission to the relevant county executive committee member. Development permissions are subject to meeting all requirements, including submitting plans and particulars and paying applicable fees. Section 58 (6) states that failure to receive a written response after applying for development permission within 60 days informs the assumption that permission has been granted.

Section 60 provides for circulation of Development application to relevant authorities. The county executive member must provide all applications made to the relevant authorities and agencies within a week. The authority or agency reviews comments on the relevant matters in the development application. The comments must be submitted within 14 days after the county executive committee member submits it to the relevant agency or authority.

Section 18 establishes the office of County Director of Physical and Land use planning. Section 20 outlines the responsibilities that include communicating decisions of development permission applications and issuing development permission and other development control instruments.

Section 62 (1) requires issuance of submission certificate by the approving authority on submission. The Physical and Land Use Planning Act 2019 development control Regulation provides for standard forms for application, approval, appeal, advertisements, public notices and enforcement among others.

Whichever method is used (manual or e-permit) in Kenya the provisions of Physical and Land Use Planning Act 2019 and its regulations ought to be adhered to. The Act and its Regulations provide some of the parameters and components to be assessed in the research. Comparison on these regulations and the nature of the system informs the system's legality and adequacy.

The study sought to establish whether all development application typology envisioned on the law and related regulation are adequately provided in the system. These includes change of use, change of density, subdivision, amalgamation, building plans, section property as provided in the regulations,

The study sought to answer the following questions in this regard:

Is there mechanism to ensure that materials submitted in the system by the relevant professionals are as envisioned in the law? Are key requirements for submission such as ownership documents, adverts, scheme among others as required in the regulations provided for in the online submission frame? Is there mechanism for circulation to other departments and agencies provided in system? Is there mechanism for public participation as provided under section 58 (7) of the Act adequately provided in the system? How are dispute resolution and appeal mechanism provided in the system?

This assessed to what extent these functions, offices and committee integrated in the online system. It assessed the statutory requirements for submission certificates and timelines as provided in Act. It also evaluated the formats of statutory forms and materials in the online portal vis a vis what is provided in the law.

### **2.4.3 The Kenya Information and Communications Act (KICA)**

The Kenya Information and Communications Act (KICA), is the primary law governing electronic transactions in Kenya. In 2020, The Business Laws (Amendment) Act changed laws regarding electronic signing to ease doing business in Kenya. The Act and various institution have roles in regards to electronic system. Part Vi (a) provides for electronic transactions. Section 83c. Regarding electronic transactions and cyber security, the Act tasks the Commission with facilitating electronic transactions and commerce; promoting reliability of

electronic records and transactions; promoting efficient service delivery in the public sector; reducing fraudulent electronic records and transactions; and developing a framework to guide the prosecution of cybercrime. Section 83g of the Act provides that electronic formats meet the “in writing” requirement. The electronic document must remain available for use in the future. In addition, section 83h of the Act, provides that electronic records must be maintained in the format they were shared for them to meet the value retention of documents condition.

Section 84c. provides that:

*any person who knowingly or intentionally conceals, destroys or alters, or intentionally or knowingly causes another person to conceal, destroy or alter any computer source code, computer programme, computer system or computer network, where the computer source code is required to be kept or maintained by law for the time being in force, shall on conviction be liable to a fine not exceeding three hundred thousand shillings or imprisonment for a term not exceeding three years, or both.*

Development approvals are high worthy transaction, maybe the consequences of illegally releasing such approval to the third part wouldn't be threatening with such lenient consequences.

The extent of application, localization, implementation and adherence of these roles and provisions in regards to Nairobi e-Permit System has not been established. It is possible that the system contravenes already set regulations hence, the processes and products from it can be questionable. It is also possible that the nature of the system requires more specific legislation to enable efficacy and adequacy in its expected role. The study sought to establish the application of these legal provisions in the e-permit environment in relation to effectiveness.

#### **2.4.4 Legal provision control of practice**

The system is a tool utilized by in a controlled professional. Therefore, the professional attributes, duties, restriction and standard should be manifested in the system and subsystems. Section 21 of the Physical Planners Registration Act of 1996, Section 3(1) of the Architects and Quantity Surveyors Act, Section 50 (1) and (2) of the Engineers Registration Act of 2011 bars unqualified and unregistered professional to practice planning, architecture and engineering. The system should therefore ensure that only qualified professionals make

submissions. The quality of works, ethical issues of taking over works of other people. knowingly lying should be able to be enforced in the system

#### **2.4.5 The Statutory Instruments Act No.23 of 2013**

The objective of this Act is to provide a comprehensive regime for the making, scrutinizing, publishing and operating statutory instruments. The Act stipulates multiple approaches for ensuring these functions are met. It requires regulation-making authorities to consult before making statutory statements. Each statutory element must have high standards to promote their effectiveness, clarity, and intelligibility. Besides, the Act promotes improved public access to these instruments. It also provides a mechanism for parliamentary scrutiny of statutory instruments, period review and repeal.

There is lack of specific and clear regulations on the governance and operations of the E-permit system. The nature of the E-permitting system operates as a statutory instrument to enable implementation of the Physical and Land use planning Act and other development laws. The e-permit system makes rights, liberties, obligations and processes dependent insufficiently defined administrative powers and non-reviewable decisions as manifested on preliminary findings

Section 6 of the Act provides for the provision of a regulatory impact statement if a statutory instrument is predicted to impose huge costs on a community. Section 7 outlines the content of such statements. It stipulates the required information, including statement of objectives, statement about the legislation's impact, state of other practicable means of meeting the set objectives, and a cost assessment, among others. The Section also mandate an assessment of the economic, environmental, and social impacts within the assessment of costs and benefits. The Cabinet Secretary is tasked with tabling statutory instruments in parliament for debate and approval.

#### **2.4.6 The Kenya National Digital Master Plan 2022-2032**

The Kenya National Digital Master Plan 2022-2032 seeks to leverage the contribution of information and communication technologies (ICT) in economic development. The plan advances the strategies proposed in the Kenya National ICT Master Plan 2014–2017. The earlier plan was based on three previous policies: e-Government Strategy 2004, the National ICT Policy of 2005, and the Master Plan 2013. The 2022–2032 Master Plan identifies four pillars to strategically position Kenya in the competitive global economy:

- A. Digital infrastructure – To enhance access to services
- B. Digital government service, product and data management – To facilitate the provision of government services and information to citizens.
- C. Digital skills: To improve digital competency in the country’s workforce and citizenry
- D. Digital innovation, enterprise and business: To boost innovation in enterprises and business operating models.

E-permit services fall within the second pillar of the Master Plan – digital government service, product and data management. The pillar targets implementing policies, practices and procedures that ensure effective and efficient use of digital services and data. The move seeks to streamline workflows and processes to improve service delivery. The initiatives targets offering opportunities through online services, cloud computing, and big data. As part of the implementing the Master Plan, the Kenyan government seeks to enhance user satisfaction; data security and protection; standardization of government processes and procedures; system and database integration; service streamlining; and high awareness among the citizenry. Besides, the initiative aims to improve sustainability in offering government services by reducing the financial and human resources required to offer services. The national and county governments play critical roles in realizing the set goals.

## **2.5 Theoretical Frameworks**

This section presents the theories that informed the fundamental basis of the study. The theoretical review of the study was undertaken through the use of the Unified Theory of Acceptance and Use of Technology, Technology Acceptance Model and Systems theory, as explained below;

### **2.5.1 Unified Theory of Acceptance and Use of Technology**

The Unified Theory of Acceptance and Use of Technology (UTAUT) seeks to explain user’s acceptance and utilization of information technology. The theory posits that users’ intention to use technology is influenced by four main factors: performance expectancy, effort expectancy, social influence, and facilitating conditions. Gender, age, experience, and voluntariness of use act as moderating factors that influence the strength of each construct. Users are more likely to use information technology if they perceive it as providing benefit and meeting or exceeding their expectation of performance. Users also use technology more if it is easy to understand and apply. Technology use is also positively impacted if it is perceived to improve one’s social

status and when the facilitating conditions, such as support infrastructure, are available (Chao, 2019; Momami, 2020).

The theory is relevant to the current study considering its application in explaining the intention to utilize electronic systems and the public sector. Ayaz and Yanartas (2020) investigated the applicability of this theory in electronic document management systems in public institutions. Their study found that performance expectancy and social influence factors were the primary influencing factors of the utilization of this technology. Based on these findings, this theory can enable better understanding of effectiveness of the e-Development Permit System model based on users' intention to use it. Users' intention to use this technology would imply that they perceive it as having high performance expectancy and a positive influence on the social status of the profession. However, the relationship between this framework and the research question is indirect.

### **2.5.2 Technology Acceptance Model**

The Technology Acceptance Model (TAM) is closely related to UTAUT. Similar to UTAUT, TAM investigates the process through which users accept and utilize new technology. According to the theory, within a technology ecosystem, the actual system is an end-point. The behavioural intention of people using technology is determined by how they perceive it. Perceived usefulness and perceived ease-of-use are viewed as the most influential factors determining how and when users utilize a technology. Perceived usefulness is the degree to which the user perceives the system as enhancing their performance. On the other hand, perceived ease-of-use refers to the degree to which the user of the technology perceives the system as requiring no effort to operate. It also includes other barriers for operating technology (Diop *et al.*, 2019).

This theoretical framework is relevant to the research topic in that it highlights some of the effectiveness measures that are perceived positively by users. From the theory, measures like effectiveness, reliability, and adequacy are contained within the two factors proposed by the theory as influencing behavioural intention to use the technology. This theory can help in determining the important measures that should be improved to enhance the effectiveness of e-Development Permit Systems. However, similar to UTAUT, TAM's relationship to the research problem is indirect.



### 2.5.3 General Systems Theory

The general systems theory is perhaps the most applicable framework for the research topic. Systems theory is a very fundamental tenet of the Information systems field (Amaravadi and Lessard 2017). Bertalanffy developed systems theory based on observations from biology and physics. A biological organism consists of many sub-organisms. Each sub-organism plays a critical role ensuring the organism remains alive. The theorist defined a system as anything composed of subsystems working towards the common goal of producing outputs from inputs. The theory argues that, systems are made up of multiple individual parts and subsystems and that the whole is greater than the sum of its parts. The theory argues that a complex system can be understood by analysing its sub-systems. Whenever one component of the system is changed, it has the potential of affecting other parts as well (Hofkirchner and Schafranek, 2011). The parts making up a system are interrelated and interdependent.

The interaction of components within a system enables the identification of a boundary-maintaining process. A system is influenced by its environment, precisely marked by its structure and purpose, and expressed by its functioning (Laszio Krippner, 1998). The general systems theory is highly relevant to the research topic because an e-Development Permit System can be characterized as a system matching the proposition of the general systems theory. The system consists of multiple components, such as self-registration, permit application portal, online payment component, and permit issuance among others. Each of the components of the system interact with each other to make the system better than the sum of individual components. For instance, the capacity of the system to accept online permit applications submissions interacts with the online payment component and permit issuance component to ensure that permit applicants do not need to visit county offices. If one of the components was removed, the functionality of the system would be changed.

The sum of these components ensures for a seamless permit application and approval process. The system is supported by an IT infrastructure, technology-savvy professionals, and reviewers. It functions within the Nairobi City development context, the environment. The theory is applicable to the research topic because it demonstrates how changing one component can influence the effectiveness of the system. Similarly, this study is focused on identifying areas of improvement and recommending changes to specific components

The theory also assists in unpacking various subsystem in the NPDMS. In this context System interface, Land rates system, statutory payment, KRA Data base, Ardhisasa database, PPRB

database, BORAQS database, Hardware, staff/reviewers, data storage capacities and Internet as some of components and subsystems which could have impacts on the effectiveness of the Electronic Permit system.

## **2.6 Research Gaps**

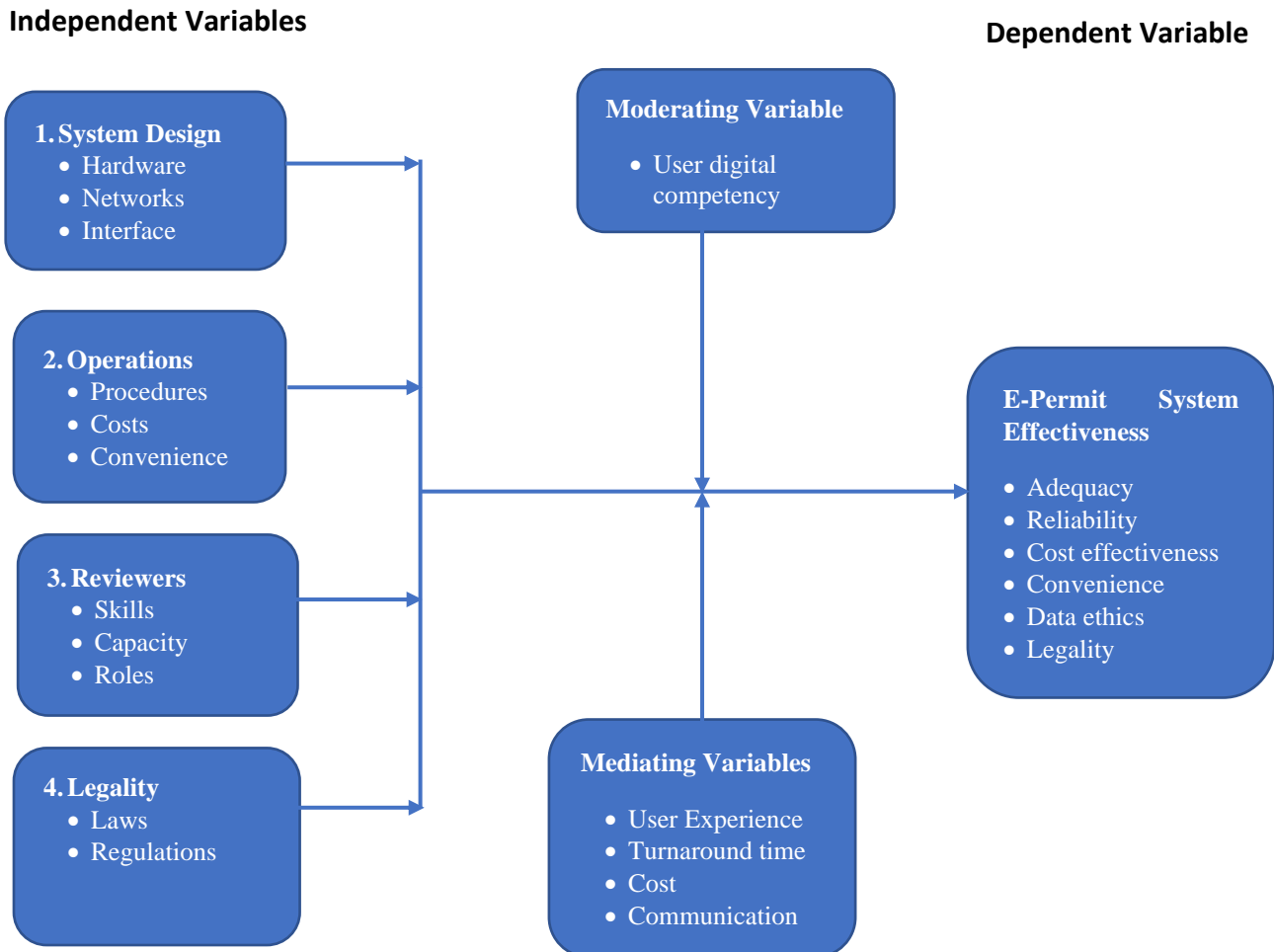
Similar studies have been carried out in Kenya by Muoki (2021), Wamuyu (2019) and Abdallah (2016). Muoki (2021) focuses on challenges hindering the implementation of the one stop shop model for construction projects approval in Kenya. Wamuyu (2017) researched the building approval processes on construction project delivery, focusing on time and cost measures. Abdallah (2016) focused on Influence of automation of building plans approval process on performance of employees at the planning department of Kisumu City-Kenya.

The three studies however didn't focus on in-depth evaluation of NPDMS and its effectiveness in development applications and approval as addressed by this study. Issues of system interfaces and regulations framework were also not studied in-depth by the three studies.

## 2.7 Conceptual Framework

The interrelationship between independent, moderating, mediating, and dependent variables is detailed in the Figure 2.1 below:

Figure 2-1: Conceptual Framework



Source: Author, 2023

The study had four independent variables: system design, operations, reviewers, and legality. The system design refers to the hardware, software and networks supporting the EPDMS functioning. On the other hand, operations refer to the system’s procedures, costs, and convenience. Reviewers were used to identify the skills, competencies and roles of the county officials involved in reviewing development applications. Lastly, legality was used to refer to the system’s compliance with the existing Physical planning and land use laws in Kenya.

On the other hand, the e-Permit System’s effectiveness was the dependent variable. It constituted all aspects that influence user experience when using the system, including cost effectiveness, convenience, reliability, adequacy, data ethics, and legality. Efficacy was

assessed by evaluating the components that influence the time taken, ease of system uses and complexity of process. Adequacy was assessed on the ability of the system to ensure that all processes and applications are met without the need for additional manual procedures or use of other electronic systems. It was measured based on the ability to meet the functional needs of all users and statutory requirements. Reliability was determined by assessing accessibility, accuracy and technical dependability of the system. Cost was assessed on impacts on statutory fees, cost on emerging processes and needs due to use of the e-Permit System. Legality was assessed by evaluating e-Permit System adherence to applicable laws and regulations in Kenya and Nairobi City County, Assessment on adherence to statutory timelines, forms and instruments formats, presence of statutory offices, committees, procedures, appeal process, public participation and legal provisions was also carried out. While establishing the effectiveness on operations framework, evaluation was done on presence of up-to-date zoning plans, operation regulations, adherence to zoning guidelines, conformity of developments, qualified personnel and professionalism.

The study argued that the effectiveness of the e-Permit System as a platform for submitting building and land use applications is dependent on the system's design, operations, reviewers' skills and competencies, and legality. The relationship between the independent and dependent variable is influenced by user experience turnaround time, cost, and communication during online application process. On the other hand, the strength of the relationship between the dependent and independent variables depends on users' digital competency.

## **CHAPTER THREE: STUDY METHODS**

### **3.1 Introduction**

This chapter presents research design, data need matrix, target population, sampling techniques, data collection methods, data analysis and presentation methods. It also presents reliability, validity and ethical issues during the study.

### **3.2 Research Design**

The study used Survey design. The research employed a single case study by focusing on Nairobi City County NPDMS. A case study is a type of research involving the understanding of a complex phenomenon based on an in-depth analysis of a real-life context. It is one of the most powerful research designs to achieve practical and theoretical ends because it deals with a distinctive situation. It offers a level of flexibility because the approach used can be designed to fit the specific case and research question. It is appropriate when investigating phenomenon whose results rely on multiple data sources. This research design is widely applied in research areas involving rapid changes, such as research in technology (Ebneyamini and Moghadam, 2018).

The research used a case study approach because it suits the research area and the nature of data required. The study seeks to evaluate the effectiveness of a technology in urban development management. This is a relatively new area in Kenya but it is fast-evolving, making a case study methodology suitable. This research design ensured that comprehensive data about the use of e-Development Permit System in Nairobi County is obtained and synthesized. Since multiple changes are being witnessed in the application of technology in offering government services, a case study research design is suitable in obtaining in-depth contextual information in an efficient manner. The findings can then be used to inform practice. In the current study, the findings were used to inform the improvement of the Nairobi e- Permit Systems and the development of effective e-permit systems in other Kenyan counties. This study administered 61 structured questionnaires to Architects, Physical Planners and Structural engineers practising in the system.5 interviews were also carried out with Nairobi city county Staff.

The study employed a combination of both quantitative and qualitative data collection and analysis approaches. This approach is premised on the understanding that collecting qualitative and quantitative data allows the research to use all available information about a topic and achieve methodological synergy. This approach is appropriate for research studies that do not

fit the strict definition of either type of study. Quantitative data is objective and allows the research to have a strong voice when reaching conclusions. On the other hand, qualitative data ensures that participants can answer question in detail, thereby providing more depth to the research problem (Mugenda and Mugenda, 1999).

This study approach was preferred because the phenomenon under study is neither, solely qualitative nor quantitative. The effectiveness measure is a combination of both qualitative and quantitative indicators. While measures like time and costs can be obtained using quantitative methods, others like the users' perceptions on system adequacy can only be measured qualitatively. Combining the two approaches also helps to obtain contextual elements that might determine the efficacy of the system. For instance, the recommendations offered for improving the system are likely to be informed by lived experiences of the users, which are specific to the context in which the system is being used.

### 3.3 Data Needs Matrix

Table 3-1: Data Needs Matrix

Objective	Research Question(s)	Data Needed	Collection Methods/Tools
To document the characteristics of an Effective Electronic Permit System and use it to highlight deficiencies of the existing E-Permit System at Nairobi City County	What are the characteristics of an effective e-Development permit system?	Secondary data about the elements of an effective e-permit system	Literature review
	Has effective characteristics of an e-permit system been reflected on Nairobi e-Permit System?	Primary data from County officials and system users Data Rating by system users	Field investigations – interviews, questionnaires and observation Assessment of system interface
To evaluate the effectiveness of the use of e-Permit System in relationship to legality, cost, efficacy, adequacy, reliability and operation framework in Nairobi City County	Has the use of the Electronic Permit System been effective in management of development applications and permits in Nairobi? Additionally:	Data about the interaction between the e-permit systems and execution of development application procedures	Field investigations – interviews and questionnaires
	a. What is the user experience for practitioners applying for permit applications on the NPDMS?	Primary data about implication of the system to	Interviews and questionnaires Interface assessment

	b. Is the NPDMS adequate in meeting permit application requirements?	cost, timelines, system stability, adequacy, reliability, interface and ease of use		
	c. What is the effectiveness of the NPDMS in the permit application process?			
	d. Is the NPDMS a reliable system for permit application?			
	e. Does the NPDMS ensure data security, ethics, and compliance with PLUPA,2019 ant its regulations?		Review of PLUPA,2019 ant its regulations, System investigation Analysis of primary data	
	f. What are the emerging issues, challenges, risks, and needs due to utilization of the Electronic Permit System?			
	g. What are the emerging issues, challenges risks and needs due to utilization of the e-Development Permit system?			Primary data about the current shortcomings of the e-permit system.
				Field investigations – interviews and questionnaires
To identify challenges faced by the Electronic Permit System users.	What are the challenges facing Electronic Permit System users?		Interviews and questionnaires	



<p>To discuss possible interventions that can mitigate the challenges facing the Nairobi e-permit system and improve its functional effectiveness in facilitating the processing of development applications and approval in Nairobi City County.</p>	<p>What are possible interventions that can mitigate the challenges facing the Nairobi County e-permit system and facilitate the processing of development applications and approvals in Nairobi City County?</p>	<p>Recommendations from users, reviewers and best practises</p>	<p>Synthesis of the analysed data and expert opinions.</p>
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*Source: Author,2023*

### 3.4 Target Population

The study targeted users of the e-Development Permit System in Nairobi. There were three main users identified: Physical Planners, Architects and Structural Engineers. Members of this population were subjected to inclusion/exclusion criteria (see section 3.5) before sampling was done. These have various roles in the system:

*Table 3-2: Professionals on NPDMS and their roles*

<b>Particulars</b>	<b>No. of professionals in the system</b>	<b>Application types /roles in the system</b>	<b>No. of Applications assigned in the system</b>
Architects	444	Building Permit	4
		Building Occupation certificate	
		Construction site board	
		Boundary wall	
Structural Engineers	86	Structural Plans	1
Physical Planners	50	Change of use-Administrative	13
		Change of use-Technical	
		Extension of use	
		Renewal of lease	
		Extension of lease	
		Land Subdivision	
		Land Amalgamation	
		Advertisement-large format	
		Master Plan	
		Subdivision Final approval	
		Amalgamation Final Approval	
		Subdivision certificate	
		Amalgamation Certificate	

*Source: Author, 2023*

County officials were also targeted for interviews. It was established that the following technical officers had access to NPDMS are: 8 Planners ,3 Engineers ,1 Architects,2 Public health officers,3 development control officers,1 fire officer,2 Assistant planning officers

### 3.5 Participants and Sampling

Participants in the study were sampled from the study population after subjecting it to inclusion/exclusion criteria. For a planner, architect, or structural engineer to be eligible, they had to be registered on the Nairobi e-Development Permit System, having been active members for at least six (6) months. The participants must also have had submitted at least ten (10) permit applications on the system at the time of data collection. On the other hand, reviewers were required to have at least six months experience as users (working for the county) of the system to qualify in the study. They were also to be involved in at least one aspect of the permit approval process.

The sampling of users was done using the stratified random sampling approach. Stratified random sampling is a two-step probabilistic sampling process. In the first stage, the population was divided into mutually exclusive strata (groups). Each member of the population belonged to one, and only one, stratum. Each stratum contains members of the population that share distinct characteristics that are of importance to the study problem (Yang and Banamah, 2014). The study population was divided into three strata: planners, architects, and structural engineers.

The second step of the stratified sampling approach entails employing a probabilistic approach to select participants from each stratum. In this study, participants in each stratum were selected using the simple random sampling approach. Simple random sampling involves the random selection of participants from the population until the required number is met. The total sample size was determined using the formula for recruiting participants in surveys as suggested by Taherdoost (2017) as follows:

$$\text{Sample size (n)} = \frac{p(1-p)z^2}{E^2}$$

Where:

p = Expected proportion of users reporting high effectiveness of e-permit system

z = Standard normal variate (corresponding to the level of confidence)

E = Percentage maximum error required

For the study, the expected proportion of users reporting high effectiveness of the Nairobi e-permit system was assumed at 50% (0.5) due to the lack of previous studies assessing similar systems in Kenya. On the other hand, the level of confidence was taken as 90%, meaning that the *p*-value is taken as 0.1. At this level of confidence, the corresponding Z value is 1.65. On the other hand, the value of d (error) is 10% (0.1). Using these values:

$$\text{Sample size (n)} = \frac{0.5 \times (1 - 0.5) \times 1.65^2}{0.1^2} = 68$$

The share of the sample size allocated to planners, architects, and structural engineers was determined based on their proportion of the total population and the number of functions each carry out on the e-permit system. First, the population-applications combination was determined by multiplying the population size for each user with total applications as depicted in the table below.

*Table 3-3: Population-applications Combination*

<b>Particulars</b>	<b>Professionals in the system</b>	<b>Applications categories</b>	<b>User-application combination</b>
Architects	444	4	1,776
Structural Engineers	86	1	86
Physical Planners	50	13	650
Total	580	18	2,512

*Source: Author, 2023*

The formula for determining the share of participants for each user was as follows:

$$\text{Specific sample size (s)} = \frac{\text{Individual user-application}}{\text{Total user-application}} \times 68$$

Using this formula, the participants from each profession are as follows:

$$\text{Architects' sample} = 1776/2512 \times 68 = 48$$

$$\text{Structural engineers' sample} = 86/2512 \times 68 = 2$$

$$\text{Physical planners' sample} = 650/2512 \times 68 = 18$$

The convenience sampling approach was used to select participants among internal users (reviewers) of the e-permit system. Convenience sampling is an approach based on the ‘close to hand’ selection criteria. Participants are included in the study if they are available and willing

to participate for as long as they meet inclusion/exclusion criteria. It is a useful selection approach when the study population is small (Mugenda and Mugenda, 1999). The sampling approach was used because there are few internal users of the Nairobi e-Development Permit Systems (8 planners, 3 engineers, 1 architect, 2 public health officers, 3 development control officers, 1 fire officer, and 2 assistant planning officers). The study targeted 10 internal users (reviewers),

### **3.6 Data collection Method**

The study relied on both primary and secondary data to answer the research questions. Primary data was obtained using standardized semi-structured and interviews guides. In this study, the interviews contained pointers to questions but the questions were generated depending on the specific roles of the interviewees and adjusted as needed. The semi-structured nature of the interviews entailed close-ended interview questions (definite answers) but with room for further clarification and follow-up (Melton et al., 2007). This interview design enabled adjusting questions to fit the role played by the interviewees.

#### **3.6.1 Data collection tools**

Standardized semi-structured questionnaires was utilized for Architects, Planners and Structural Engineers while interview guides targeted the County officials. The Semi-standardized questionnaires contained pre-structured questions that applied to all participants or a group of participants. Structuring the questionnaires ensured uniformity in the questions answered. However, certain questions gave the respondent the freedom to answer as they see fit. Semi-structured questionnaires were chosen because they ensured relatively easy analysis while at the same time not limiting the responses that respondents could provide (Sarantakos, 2012). Semi-standardized questionnaires were selected for their ease in analysis considering that they are targeted to the largest proportion of participants. The questionnaires were administered through the Google Forms® application.

Secondary data to supplement the primary data was obtained from published scholarly articles. Published scholarly articles were used to obtain data about the characteristics of an effective e-Development Permit Systems. The study relied primarily on scholarly journal articles. The NCCG website was used to obtain data about the key stages of an approval; application, pre-vetting stage, invoicing, payment and payment confirmation, submission, circulations, pre-

agenda, agenda, agenda ratification, issuance of approvals, stamping and signature and collection. constituting 50% of total internal users.

### **3.6.2 Data collection approach**

Data collection commenced with the review of secondary data sources. Scholarly publications were searched on the internet and scholarly databases (Proquest, Google Scholar, and the University library) and reviewed. The publications that meet the inclusion criteria were used. This process was followed by the collection of primary data. Participants were selected from the study population using the sampling approach described above. The questionnaires were then distributed to the selected Physical Planners, Architects, and Structural Engineers. The researcher administered the questionnaire by sending a link to the Google Form questionnaire to all respondents via email. Two research assistants made face-to-face follow-ups with respondents in their respective offices to ensure timely responses. Research assistants were only required to remind the participants and offer assistance where needed.

Data from the reviewers was collected using the interviewing approach. Face-to-face interviews were scheduled with the participants. Semi-structured interview questions were used to give an allowance for follow-ups on the responses provided.

### **3.7 Data Analysis and Presentation of Findings**

Data analysis was done using a combination of qualitative and quantitative approaches. Data from interviews was analysed using the thematic analysis method. This is a qualitative analysis approach that groups responses from different participants based on recurring themes. Grouped data is then analysed by reviewing repetitive patterns. Data from the questionnaires was analysed using Ms. Excel. Quantitative analysis entailed obtaining measures of central tendency (mean, median and mode) and descriptive statistics. The results of the study were tabulated or diagrammed in pie charts for ease of presentation and use. A detailed narrative explanation of tabulated data was included.

### **3.8 Validity and Reliability**

The validity and reliability of the questionnaire was determined to ensure that the instrument delivered credible data. The degree to which items in the questionnaire measure what they claim to was determined using the inputs of peer experts and research supervisors. The researcher also conducted a pilot study to test the validity of the research tools and instruments.

### **3.9 Ethical issues in the study**

The researcher ensured that all participants were adequately informed. A voluntary and informed consent declaration was included in the questionnaires. Participants were treated with the utmost privacy and discretion to guarantee anonymity and confidentiality in the study.

## CHAPTER FOUR: RESULTS AND DISCUSSION

### 4.1 Introduction

This chapter presents the study findings as collected using questionnaires, checklists and interviews. It interprets the findings of the study and discusses the findings. The analysis, presentations, interpretations and discussions of the findings are in accordance with the three objectives of the study.

### 4.2 Response rate

The table below illustrates the response rate of each category of the respondents: Out of the sample size of 68 participants, 61 successfully responded translating to an overall response rate of 84.61%.

Table 4-1: Response rate per category

	<b>Category of Respondents</b>	<b>Target responses</b>	<b>Received responses</b>	<b>Response rate</b>
<b>Questionnaires</b>	Architect	48	42	87.5%
	Planners	18	17	94.44%
	Structural engineers	2	2	100%
<b>Subtotal</b>		<b>68</b>	<b>61</b>	<b>89.71%</b>
<b>Interviews</b>	Reviewers	10	5	50%
<b>Total</b>		<b>78</b>	<b>66</b>	<b>84.62%</b>

Source: Author, 2023

According to Mugenda and Mugenda (2003), a response rate of 50% is considered adequate for analysis and reporting, 59% is good and that of 69% and above is very good. This implies that the study response of 84.62% is very good and suitable.

### 4.3 Participants' Demographics

The study recruited a total of 68 participants from a total of 580 users. Sixty-one users responded to the questionnaire, constituting an 89.71% response rate. The participants constituted 42 (68.9%) Architects, 17 (27.9%) Physical Planners, and two (3.3%) Structural Engineers (see Figure 4-1). Over four-fifths (80.3%) of the respondents were male while the



rest were female. Lastly, all respondents were aged 26-65years. Most respondents (39.3%) were aged 26-35 while 37.7% were within the 36-45 age group. The rest (23%) were aged 46-65 (See Figure 4-2).

Figure 4-1: Participants distribution by profession

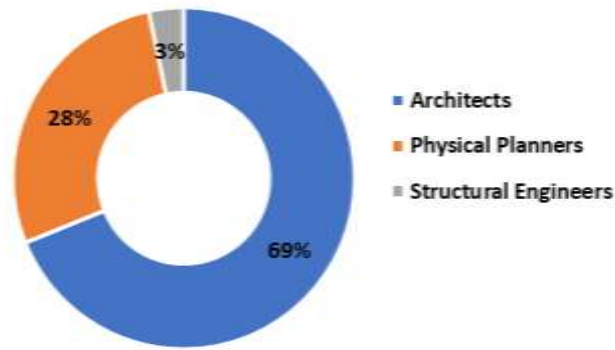
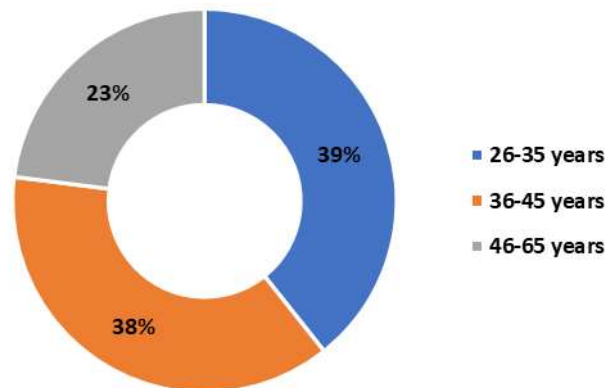


Figure 4-2: Participants distribution by age.



#### 4.4 Characteristics of an Effective Electronic Permit System.

The study literature review and best practices documented that an effective e-Permit system should manifest and institutionalise the following characteristics: Safety, Convenience, Interactiveness, Adaptability, Trackability, Progressiveness, Adequacy and Scalability. When asked to rate the NPDMS based on above qualities, 57.3% of users gave a rating of 4 or 5 on a 1-5 scale. Convenience was the highest rated quality, with over three-quarters (75.4%) of users rating it a 4 or 5. Security and safety came a close second at 72.2%. Scalability and adaptability were the poorest rated qualities. Table 4-2 shows how the users rate different aspects as relates to the system.

Table 4-2: Rating of different qualities of the NPDMS

Quality	1 (very poor)	2	3	4	5 (excellent)	Average Weighted (Score/5)
Security and safety aspects	4.9%	3.3%	19.7%	23%	49.2%	4.09
Convenience	4.9%	3.3%	16.4%	29.5%	45.9%	4.08
Interactiveness	8.2%	14.8%	32.8%	34.4%	9.8%	3.23
Adaptability	6.6%	13.1%	37.7%	36.1%	6.6%	3.23
Adequacy	4.9%	11.5%	16.4%	32.8%	34.4%	3.80
Progressiveness	6.6%	8.2%	19.7%	32.8%	32.8%	3.77
Scalability	8.2%	16.4%	39.3%	26.2%	9.8%	3.13
Average	6.3%	10.1%	26.0%	30.7%	26.9%	3.62

Source: Author, 2023

The findings are in line with the proposition of the Unified Theory of Acceptance and Use of Technology (UTAUT) which posits that users' intention to use technology performance expectancy, effort expectancy, social influence, and facilitating conditions. This is also similar to the Technology Acceptance Model (TAM) which provided that behavioural intention of people using technology is determined by how they perceive it especially in terms of effectiveness, reliability, and adequacy.

#### 4.5 E- Permit System efficacy, adequacy, reliability, cost, legality and operation framework.

This section presents results of effectiveness parameters in experience, adequate, reliable, data security, ethics, and compliance with existing laws, emerging issue as asked by sub questions of this objective.

##### 4.5.1 User Experience

When asked about their user experience when submitting application on the NPDMS, most users reported positive experiences in their interactions. Notably, 32 respondents (52.5%) rated the ease of navigating the system as 'easy' or 'very easy.' An additional 31.1% rated the ease of navigation as 'fair,' while 16.4% argued it was difficult. None of the users regarded system interface navigation as very difficult (See Figure 4-3). Similar results were reported when assessing the effectiveness of the system's front-end interface in undertaking roles. Thirty-six

(59%) users considered the interface as effective or highly effective. Only five (8.2%) respondents found the system ineffective or very ineffective (see Figure 4-4). Consistently, 30 (49.2%) argued that the system design and development was either good or excellent. Only eight (13.1%) found that system’s design ‘bad’ or ‘poor (See Figure 4-5).

Figure 4-3: Ease of navigating system’s interface

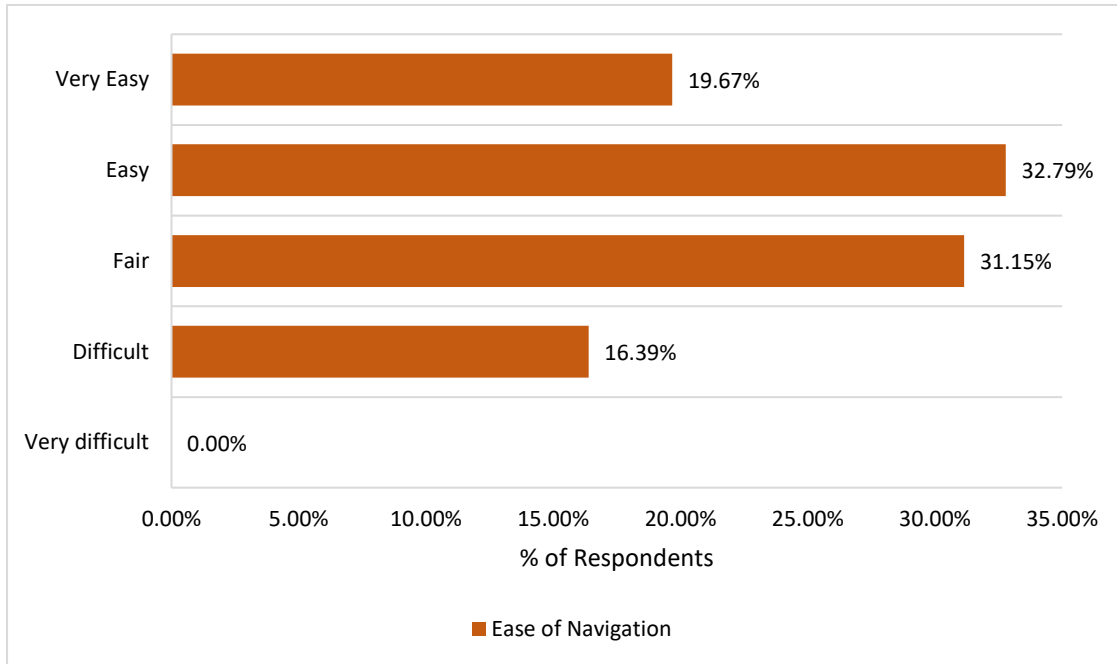


Figure 4-4: Effectiveness of front-end interface in permit application.

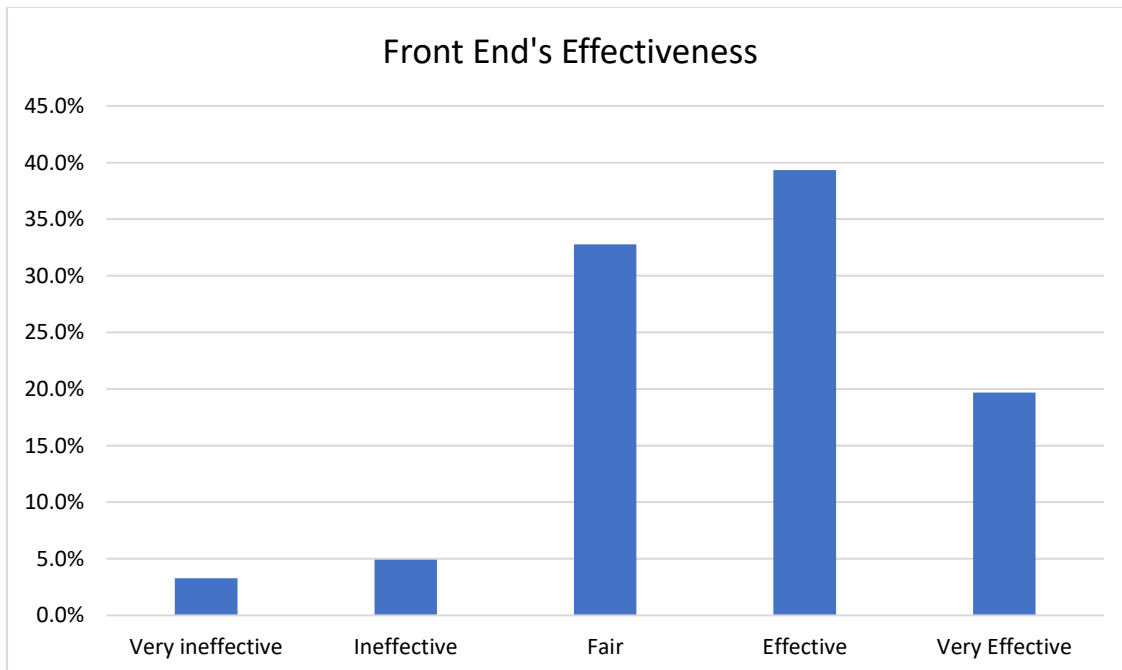
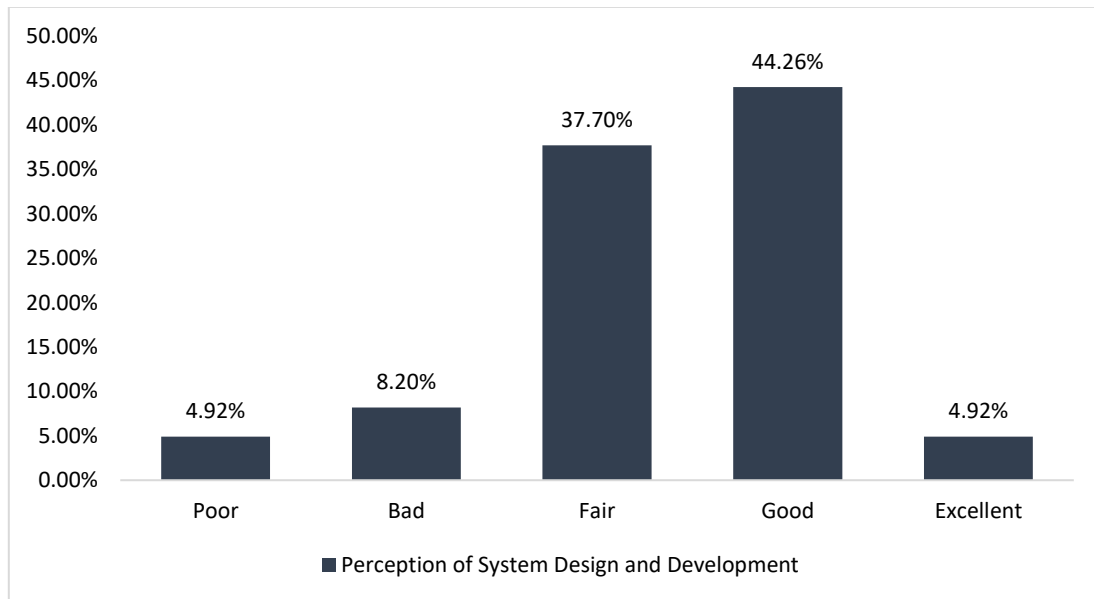


Figure 4-5: Perception of NPDMS system design and development



When asked the comparative advantages of the e-platform over the manual system, the respondents indicated the following:

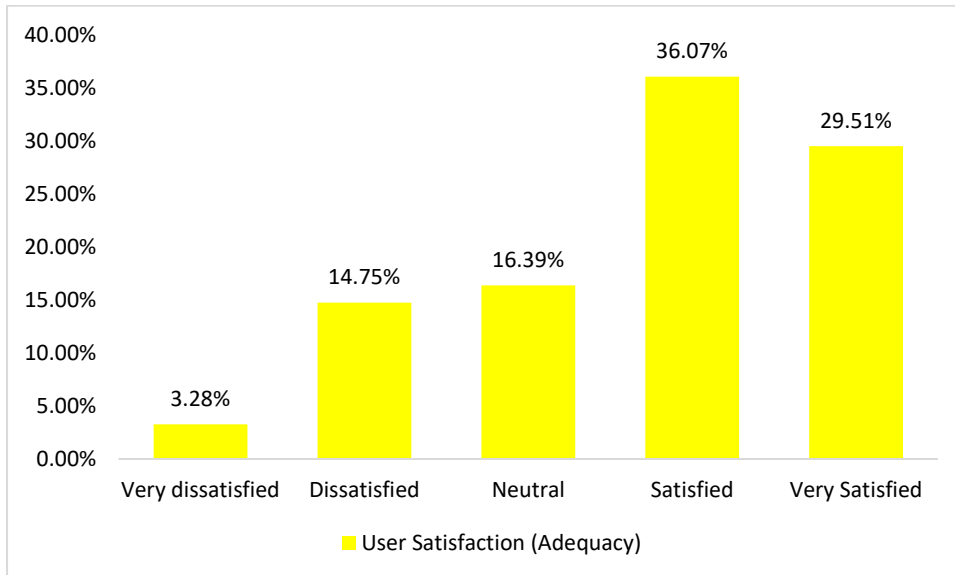
- a. The e-permit system is more convenience and effective as it allows faster submission and follow up from any geographical area and time.
- b. There is easier tracking, increased transparency on the processes, reduced human interaction with the E-Permit System implementation
- c. Time saving as there is no need for physical appearance to City Hall
- d. E-permit is cheaper than manual submissions. It cut travel and printing cost
- e. Ease of access as the applications can be made and monitored remotely
- f. Environmentally Sustainable -less printing, less travel
- g. Increased efficiency in permit application processes and accountability
- h. There are reduced incidences of corruption with e-permit system as there is reduced physical interactions.
- i. Some items require interactive approach rather than automation during technical stage

#### 4.5.2 NPDMS Adequacy

NPDMS users rated the system's adequacy quite highly on certain issues but reported concerns in others. When asked about the adequacy of the options provided in the system in facilitating the submission and processing of different applications, about two-thirds (65.6%) reported they were satisfied or very satisfied. Only 18.1% of the respondents reported being dissatisfied or

very dissatisfied. The rest (29.2%) were neutral about their satisfaction with the system’s adequacy. It was therefore clear that there is a gap and need to optimize the system for higher rating.

Figure 4-6: Users’ satisfaction with system’s adequacy to complete applications.



On the contrary, users rated the system’s communication capabilities poorly. Only 24.6% of respondents rated the NPDMS as effective or highly effective in communicating and getting feedback from Nairobi County. On the contrary, 31.1% of users found the system’s communication capabilities as very ineffective or ineffective. The rest of the respondents (44.3%) found the system’s adequacy in communication fair (See Figure 4-7). Besides, nearly a quarter (24.5%) of respondents found it impossible or difficult to retrieve communication, feedback, and comments exchanged on the platform during the application and approval process (See Figure 4-8).

Figure 4-7: NPDMS’ Adequacy in communicating and getting feedback

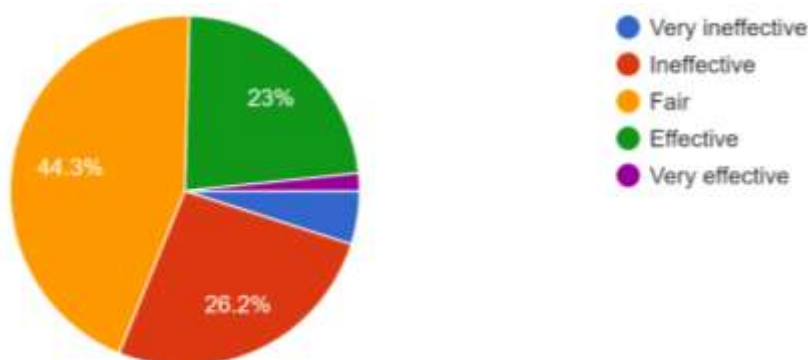
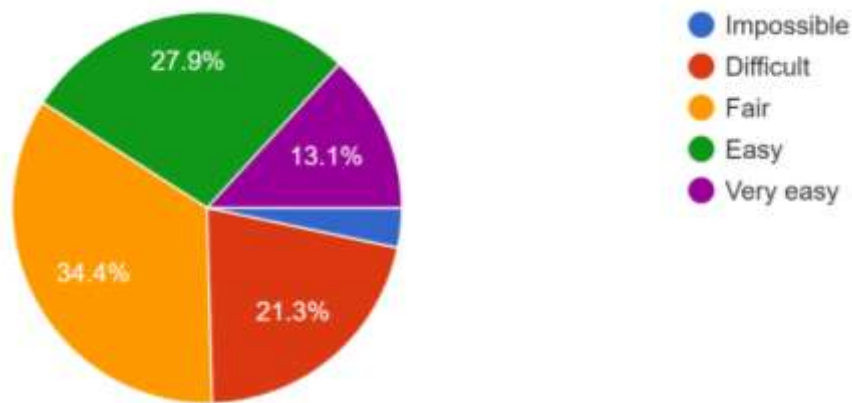
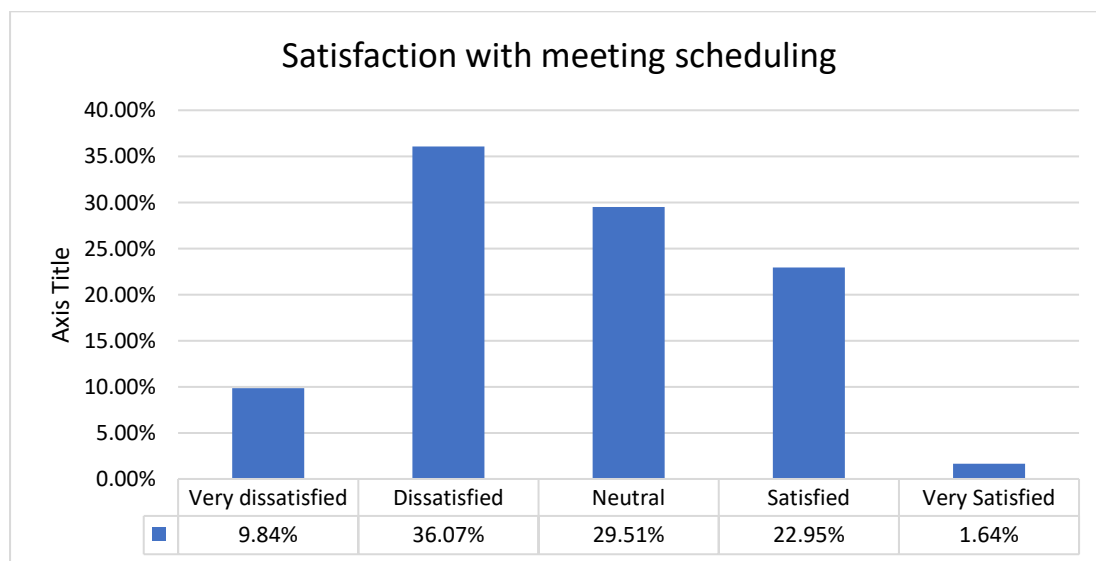


Figure 4-8: NPDMS' adequacy in retrieving past communication



Data from NCC indicated that in the year 2022, a total of 24 technical meetings were carried out to consider 3,604 items in Agenda/Review stage. These consisted of 1,996 building plans (55.38%), 978 (27.14%) change of use (27.14%), 195 subdivisions (5.41%), 153 extension of use (4.25%), 112 large format advertisement (3.11%), 97 amalgamations (2.69%), and 73 renewal/extension of lease (2.02%) applications. There was at least one meeting per month with only the month of March, June and July having three technical meetings. The respondents rated the NPDMS poorly on aspects regarding technical meetings. From the results, only three (4.9%) respondents reported having access to technical meeting verdicts and agendas. Besides, nearly half of the respondents (45.9%) were either dissatisfied or very dissatisfied with the frequency of technical meetings to consider applications submitted on the platform. Only about a quarter of users (24.6%) were satisfied or very satisfied with the frequency of holding the meetings (See Figure 4-9).

Figure 4-9: User satisfaction with technical meeting scheduling.



### 4.5.3 NPDMS Effectiveness

The process was subdivided into different activities to identify areas presenting difficulties to the users. On average, about half (49.9%) of users rated the effectiveness of the NPDMS in completing permit applications as either 4 or 5 on a scale of 1-5, while 21.7% gave it a score of 1 or 2. Document submission was rated as the most effective aspect in the permit application process while the review, technical meeting and ratification aspects were the least effective. Table 4-3 presents how the participants rated the effectiveness of different processes in the application process on a Likert scale of 1-5.

*Table 4-3: Effectiveness of the NPDS in Completing Different Application Processes*

<b>Process Aspect</b>	<b>1 (very poor)</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5 (excellent)</b>	<b>Weighted Average (Score/5)</b>
<b>KRA PIN/ID Verification</b>	6.6%	9.8%	21.3%	39.3%	23%	3.623
<b>Plot number validation</b>	11.5%	14.8%	29.5%	26.2%	18%	3.244
<b>Application type selection</b>	3.3%	8.2%	18%	34.4%	36.1%	3.918
<b>Filing of submission form</b>	3.3%	3.3%	24.6%	37.7%	31.1%	3.9
<b>Document submission</b>	4.9%	3.3%	19.7%	36.1%	36.1%	3.955
<b>Invoicing and fees payment</b>	6.6%	4.9%	29.5%	34.4%	24.6%	3.655
<b>Circulations</b>	8.2%	19.7%	41%	23%	8.2%	3.036
<b>Review, technical meeting and ratification</b>	11%	26.2%	36.1%	14.8%	4.9%	2.554
<b>Land rates confirmation and approval issuance</b>	14.8%	27.9%	36.1%	16.4%	4.9%	2.69
<b>Average</b>	8.6%	13.1%	28.4%	29.1%	20.8%	3.404

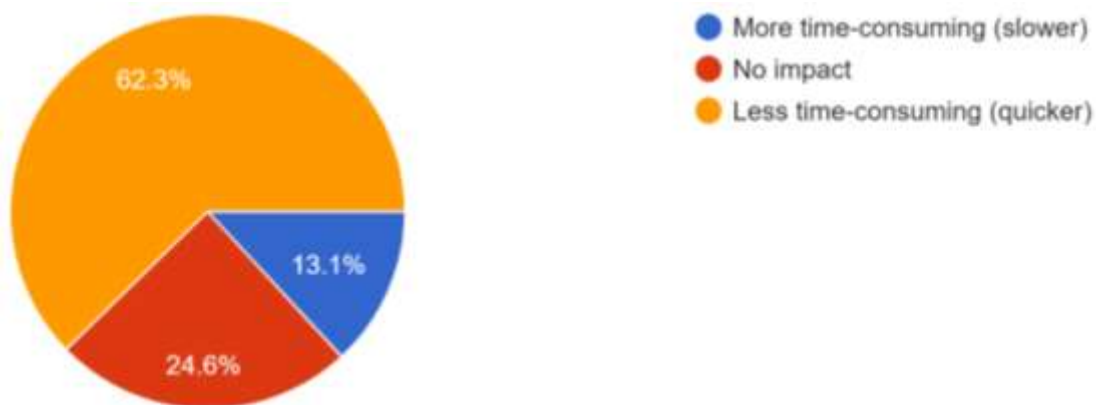
*Source: Author, 2023*

Data from NCC indicated that it takes an average of 14 days for an ideal/normal application to be recommended for approval (Review/Technical Meeting Stage). This refers to application without major impacts on environmental, traffic management, development scale, and neighbourhood. The study revealed that majority of the applications are not within this category or are compounded by slow response to comments by applicants, delayed notifications and delayed site visits.

Analysis on NCC data for the year 2022, indicated that it took an average of 52 days for building plans to move to review/technical meeting level. It also took an average of 66 days for extension of use, 47 days for extension/renewal of lease, 46 days for subdivision, 25 days for change of use, and 19 days for amalgamation application. On the other hand, the least timelines taken to that stage was indicated as 5 days. This was noted for renovations, fitouts, additional of floors and perimeter wall applications subsections of building approvals. The data revealed that, on average, it takes 14 days and a minimum of 2 days for an approval to be released to the applicant after approval. This is one of the key issues which was highlighted when the ratification stage was lowly rated.

Users felt that the NPDMS reduced the permit application time. Nearly two-thirds (62.3%) of users reported that the system was quicker than the manual system while 24.6% noted to significant impact on time. Only 13.1% of users argued that the NPDMS increased the time taken to complete the permit application process (See Figure 4-10). Increased convenience when making applications was the most reported advantage of the e-Permit System over the manual system.

Figure 4-10: Impact of NPDMS on the time taken to complete a permit application process



The NPDMS was also rated for cost effectiveness, time effectiveness, and convenience as follows. Over half (52.5%) of users reported that using NPDMS had reduced the cost of making permit applications in Nairobi City County, while 32.8% reported no marked difference. Only 14.8% of users reported increased costs (See Figure 4-11). Cost reduction was also reported as one of the primary advantages of the e-Permit System over the manual system. However, the e-permit system’s impact on reducing corruption was debatable. Only 26.3% of users found the NPDMS as effective or highly effective in this area (See Figure 4-12).



Figure 4-11: Impact of NPDMS on cost of making permit applications

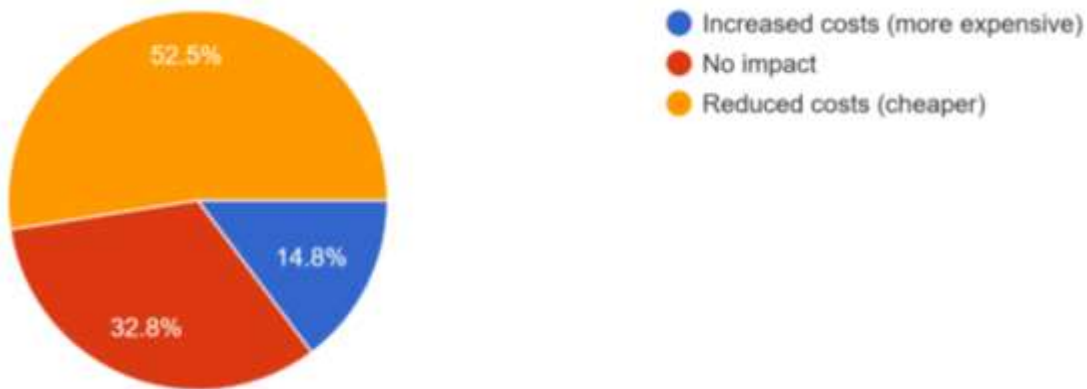
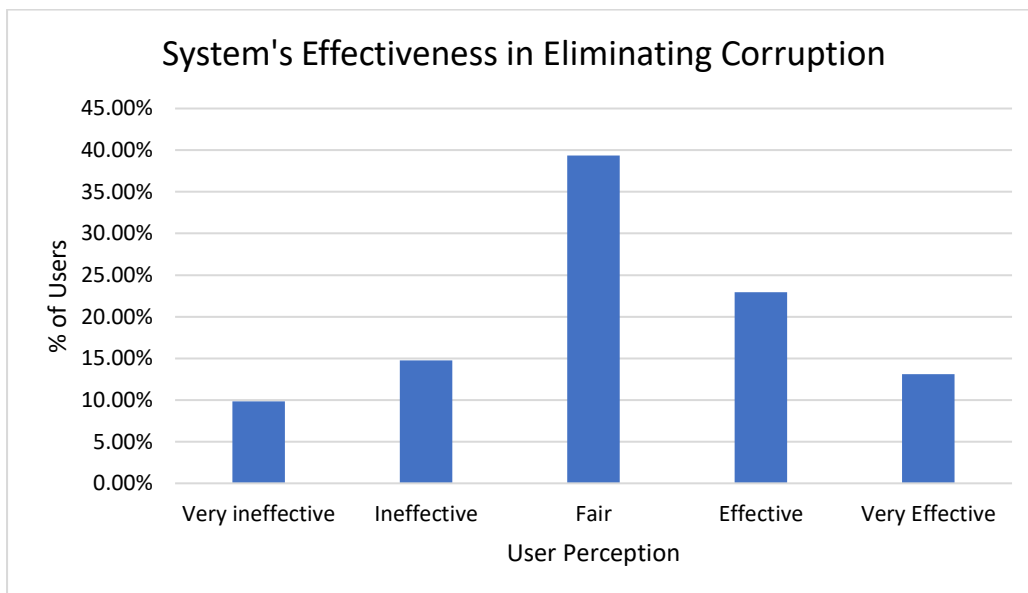


Figure 4-12: NPDMS effectiveness in eliminating corruption



#### 4.5.4 NPDMS Reliability

When assessing the NPDMS reliability in making permit applications, the study considered the frequency of experiencing technical challenges, problem resolution capabilities, communication about critical stages. Although most users (98.4%) reported experiencing challenges when using the platform, the frequency of such challenges was low. Notably, 42.6% of users reported experiencing challenges rarely, while 27.9% reported experiencing them sometimes. Only 27.9% of users reported experiencing challenges often or always (See Figure 4-13). Besides, most technical challenges were resolved promptly. About a third (31.1%) of all challenges were resolved within 24 hours, while 63.9% were resolved within three days. Only 18% of challenges took more than seven days to resolve (See Figure 4-14).

Figure 4-13: Frequency of encountering challenges on the NPDMS.

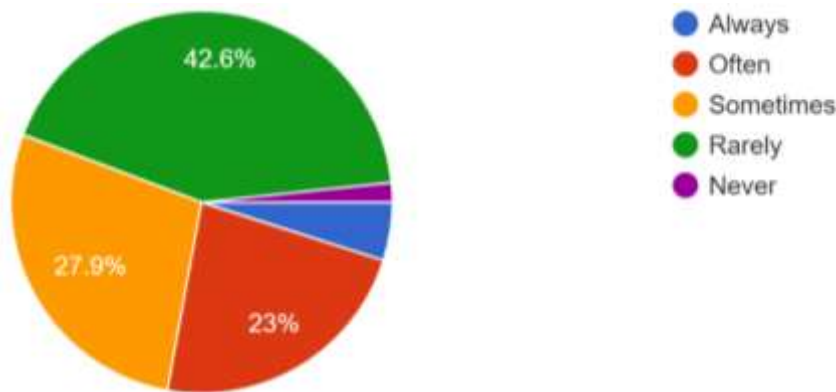
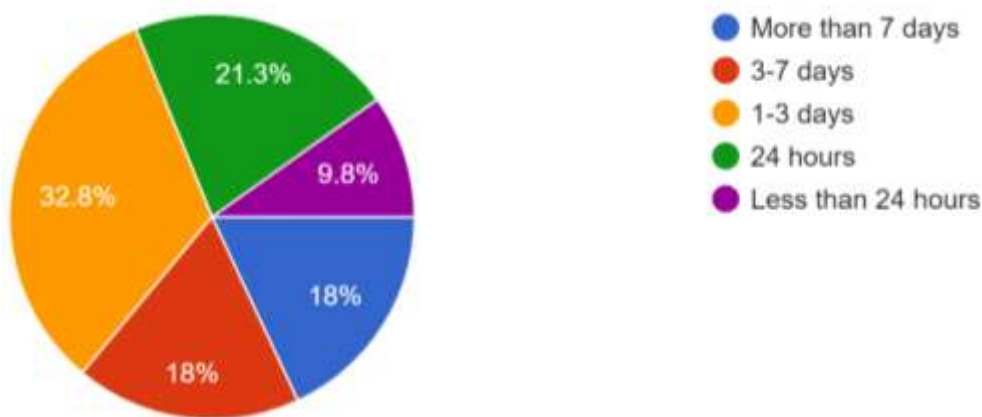
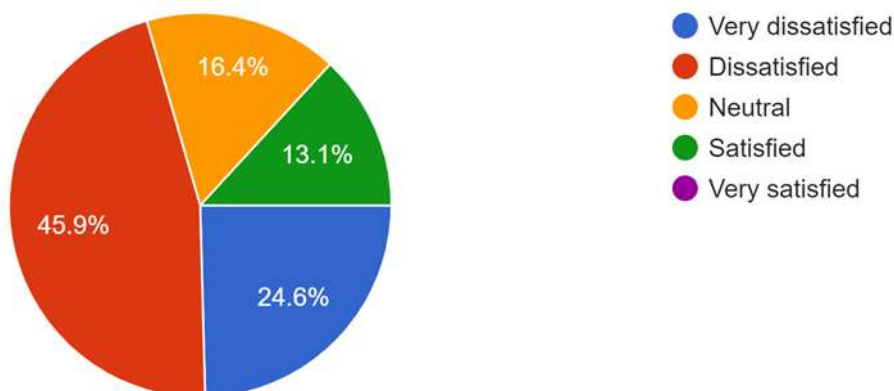


Figure 4-14: Time taken to resolve problems on the NPDMS



However, most users did not consider the NPDMS a reliable platform to communicate about technical meetings. Only 13.1% of users expressed satisfaction in this area, while 70.5% were either dissatisfied or very dissatisfied with the platform’s role in this area (See Figure 4-15).

Figure 4-15: Satisfaction with NPDMS communication about technical meetings

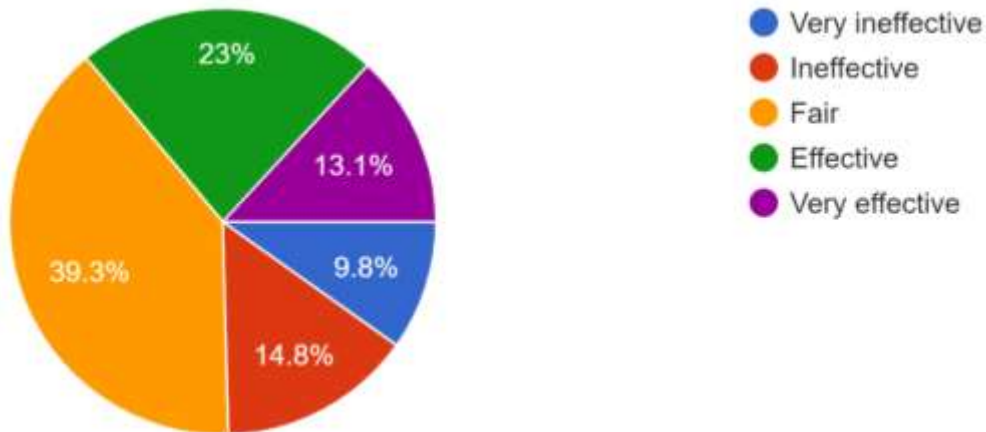


#### 4.5.5 Legality, Data Security and Ethics

According to NPDMS users, the system is highly compliant with existing physical and land use laws and regulations. However, they admit that the it commits certain violations. Notably,

only 21.3% of users think that the e-permit system is fully compliant with laws and regulations guiding development applications and approvals. About two-fifths (39.3%) of users contend that the system has between one and three violations. Only 3.3% of users think the NPDMS is lowly compliant (ten or more violations). Figure 4-16 summarizes these findings. Therefore, there is clear gap in the system in adherence to laws and regulations.

Figure 4-16: NPDMS compliance with existing laws and regulations



Another issue of concern regarded data security and privacy. 44.3% of users reported they had lost data when using the platform, with 8.2% reporting losing data often (26-49% of the time) or frequently ((50%+ of the time) (See Figure 4-17). Apart from losing data, the system does not always ensure confidentiality. Approximately one in five users (21.3%) reported that their data or approvals were released or accessed by third parties without their approval. Figure 4-18 summarizes the frequency with which data confidentiality was compromised.

Figure 4-17: Frequency of losing data using the NPDMS.

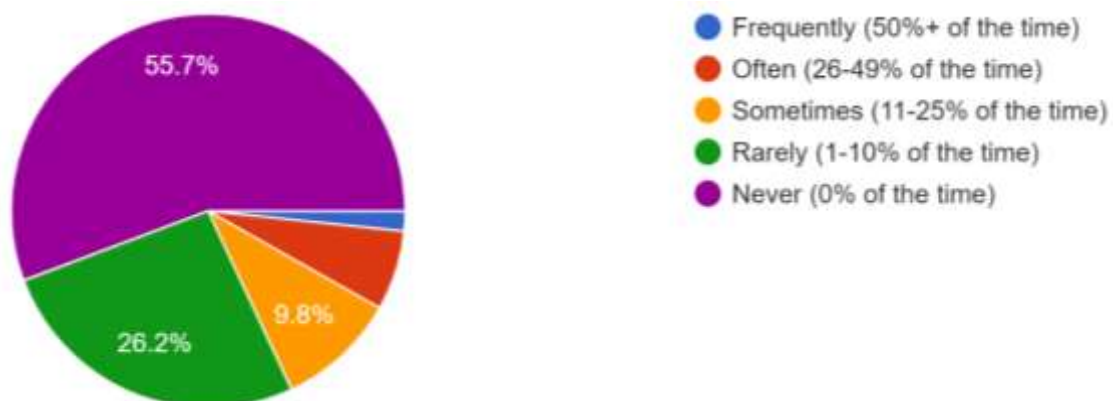
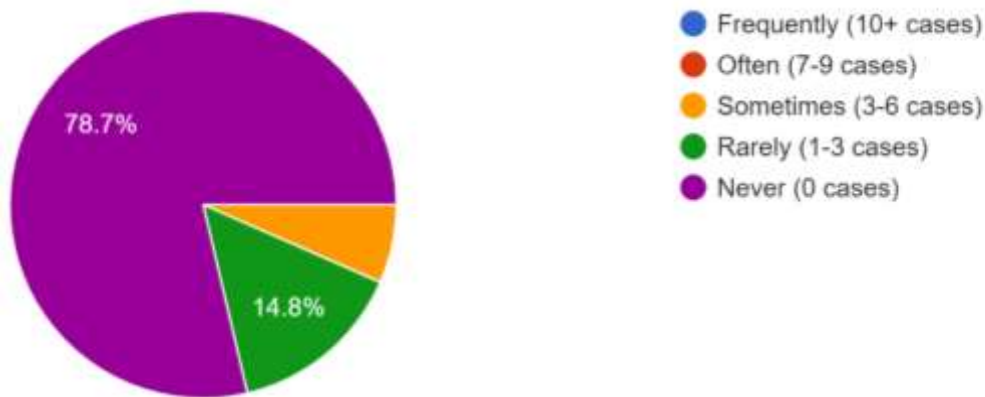


Figure 4-18: Frequency of data confidentiality breaches using the NPDMS



#### 4.6 Challenges faced by the Electronic Permit System users.

The study identified the following challenges:

##### a) Limited Interactive interface/communication

- Communication channels integrated within the system are limited.
- The system has intercommunication deficient interface. The communication is one way and inconsistent.
- There are no alerts during system upgrades, application changes and issues. There are limited alerts on progress.
- Feedbacks on the system are on piecemeal and in irretrievable formats. For instance, the respondents indicated that for disapproved applications they only get one word or sentence, “Rejected” from the system without clear reasons as envisioned under PLUPA 2019 on communications and Statutory forms.
- Error communications on the system are not legible
- The respondents identified lack of timely and objective communication on the system as a key inhibitor of efficiency. It was indicated that an application would sometime stay for over two weeks in the same stage in the system but on the eve of the technical meeting it gets rectification or other related comments. This phenomenon was referred to as unfair and unreasonable by various respondents because it leads to items missing on the approval meeting.
- There is no tab to access agenda items and the minutes of the discussion for approval meetings.

**b) Inadequate qualified County staff in the system**

- There is lack of adequate staff operating the e-permit system. During data collection, it was established that there were 20 internal users of the Nairobi e-Development Permit Systems (8 planners, 3 engineers, 1 architect, 2 public health officers, 3 development control officers, 1 fire officer, and 2 assistant planning officers). The department has over 120 staff, implying that almost 80% of the workforce is operating outside the only approval system. The current scenario indicates an ineffective and illogical way of deploying the resources. It is concerning that there was only one architect registered on the system by the NCC, whereas there are 444 registered architects submitting designs for review in the system. Building plans applications constitute more than 50% (based on the year 2022 data) of all applications in the system.
- It was established that some of the review components are carried out by unqualified and inexperienced county personnel.

**c) Slow and ineffective issue-resolution management.**

- Respondents highlighted that, when challenges arise in the system, there was lack of timely error resolutions and feedback especially in regards to payments and validation
- It was indicated that, in addition of County staff in the system being few, they are also not in control of key systems components. Third part (System developers) in the system are needed to rectify various errors and challenges in the system. This was also supported by the survey where 18% of respondent indicated that it took over 7 days to resolve challenges in the system.

**d) Inadequacy of the interface and functions**

- Locality function is inadequate. Only predetermined locations are provided for selection yet various estates and neighborhood are excluded. For example, Nyari, Ridgeways. This facilitates generalization of areas whereas the development might be based on characteristic of a subzone.
- Search functions on the interface is irresponsive. Currently, the users are only able to categorize application by dates or nature of application. For users who have large number of applications, navigation around the applications was identified to be very challenging.
- There was lack of consistency on documents requirement. For instance, there is no provision for space for site notice and previous approvals.

- During the initiation of applications, the system generates only one owner's name despite the existence of various types of ownership in Nairobi such as Joint ownership, Share ownership, Estate Administrators and multi owners. The invoices, receipts and approvals are issued under the only name captured name in the system. This causes inconveniences in subsequent approvals and processes such as reimbursement, compensation and registration.
- There was lack of user guide to assist users on ease on navigation and self-help.
- There was no obligation charter for users on the E-Permit System.
- There was lack of submission options for sectional properties, amalgamation and subdivision, amalgamation and change of use, final approval for amalgamation and subdivision and subdivision certificate application for subdivision and subdivision certificate. This leads to loss of time and increased cost of undertaking the approval.
- Finalization of previous application such as Final approval for amalgamation and subdivision and subdivision certificate application for subdivision and subdivision certificate in the current System was not possible whereas vital.
- There was restriction to validate more than one plot in the System apart from the Amalgamation application. This implies that applications involving more than one plot number cannot be admissible on the system. This is against the general practice where other counties and previous system allowed such applications.
- Some plots are not able to validate on the system as supported by the Ardhisasa component such as those with share certificates and allotment letters.

**e) Undefined Timelines**

- The study established that there were no clear timelines for various processes and aspects of the system. The respondent indicated that in most cases, they had to follow up on each of the approval stage (invoicing, payment confirmation, agenda and release of approvals etc.).
- There was lack of clarity on agenda timelines, approval release timelines and most importantly ratification of approval minutes as indicated by the respondents. It was indicated that a lot of time is lost after approvals are discussed in the technical meeting and the actual dispatch.

**f) Opaque circulation, Reviews and lack of periodical reports**

- The respondents identified lack transparency in circulations and entire approval cycle as a key challenge. The internal circulation was opaque and there was no documentation about it. It just appears as a stage where the records of the proceeding are only available to backend users. The study established that it was important for submitting professionals to obtain search circulation sheets in recommended formats by PLUPA, 2019.
- Technical meeting schedules, agenda, list, members present and minutes of proceedings are inaccessible to the consultants.
- System periodical reports are not generated or shared with front-end users.

**g) Cost and Invoicing**

- The respondents indicated that the statutory cost for architectural drawings was very high. Charging of was done at initial stages before full review of the proposal. Whereas charging of statutory fees is done based on plinth area which is an aspect of plot coverage and number of floors, the latter aspects sometimes get reduced at review stage which leads to losses of the proponent resources which was unnecessarily paid.

**h) Lack of data back up and previous system abandonment**

- The respondents identified the previous system closure and abandonment as a key challenge. The previous system had massive data on approvals but was entirely abandoned. The Planning and Architectural approval characteristics is not a onetime event as may be on other systems. The aspect is characterized by frequent litigation and need for certification. Aspects such as sale of certified copies of plans and approvals which are provided for in the Nairobi City County Finance Act cannot be implemented without such database. This does not only deny the City County government revenue but it is also an impediment of effective data and urban management. The users can no longer access previous data which is still relevant to subsequent applications or use.
- Hosting; It was noted that the system was developed by private enterprise and hosted on private hosting site. There is a lot of government data in private hands which is susceptible to misuse and security risks.

**i) Training and capacity building**

- Navigation for new users was identified as a key challenge. It takes several applications to learn the system.

- The System users inclusive of reviewers are trained by the System developers on the system steps and aspects. It was indicated that this training is inconsistent, short and partial. Critical editorial rights still remain under control of System developers hence making issues resolve very challenging. The users are also trained via occasional Continuous Professional Developments on planning laws, and regulations by Professional Associations such as KIP, AAK, IEK and APSEA. The respondents indicated that the training undertaken were superficial, inadequate and only on initial stages.
- Progress report on implementation of changes and stakeholders' inputs have never been provided.

**j) Creation of Linkages and effectiveness in subsystem**

- There was lack of linkage between the county, E-Permit system and external stakeholder involved in development approvals such as Roads Authorities NEMA, KCAA, NAWASCO, Kenya Power and WRA. Comments, recommendations and sub approvals emanating or purported to emanate from these stakeholders cannot be easily authenticated in the E-Permit system.

**k) Legal compliance**

- Various laws and legal instruments which relate to development control were reviewed. However, a gap was established that there was lack of specific and clear regulations on the governance, maintenance and operations of the E-permit system. This makes the System vulnerable to unstandardized procedure and designs.
- The E-Permit System does not issue submission certificate as envisioned on PLUPA regulations.
- 24.6% of the respondents indicated that the system is ineffective (Very ineffective and Effective). Only 36.1% indicated that the System is effective.
- There are issuances of Letters of refusal of approval and deferment as provided in PLUPA, 2019.
- Communications in the system was not fully compliant to Forms, timelines or done by offices envisioned in PLUPA. For instance, decisions are intended to be communicated by The Director of Physical and Land use Planning or CECM in Charge of Planning but some approvals are issued/communicated under Chief Officer.



- The study established that numerous decisions are based on precedence and not on an approved zoning plan. The approved zoning plan in use was ineffective and obsolete. This component makes the system very ineffective in development control management.

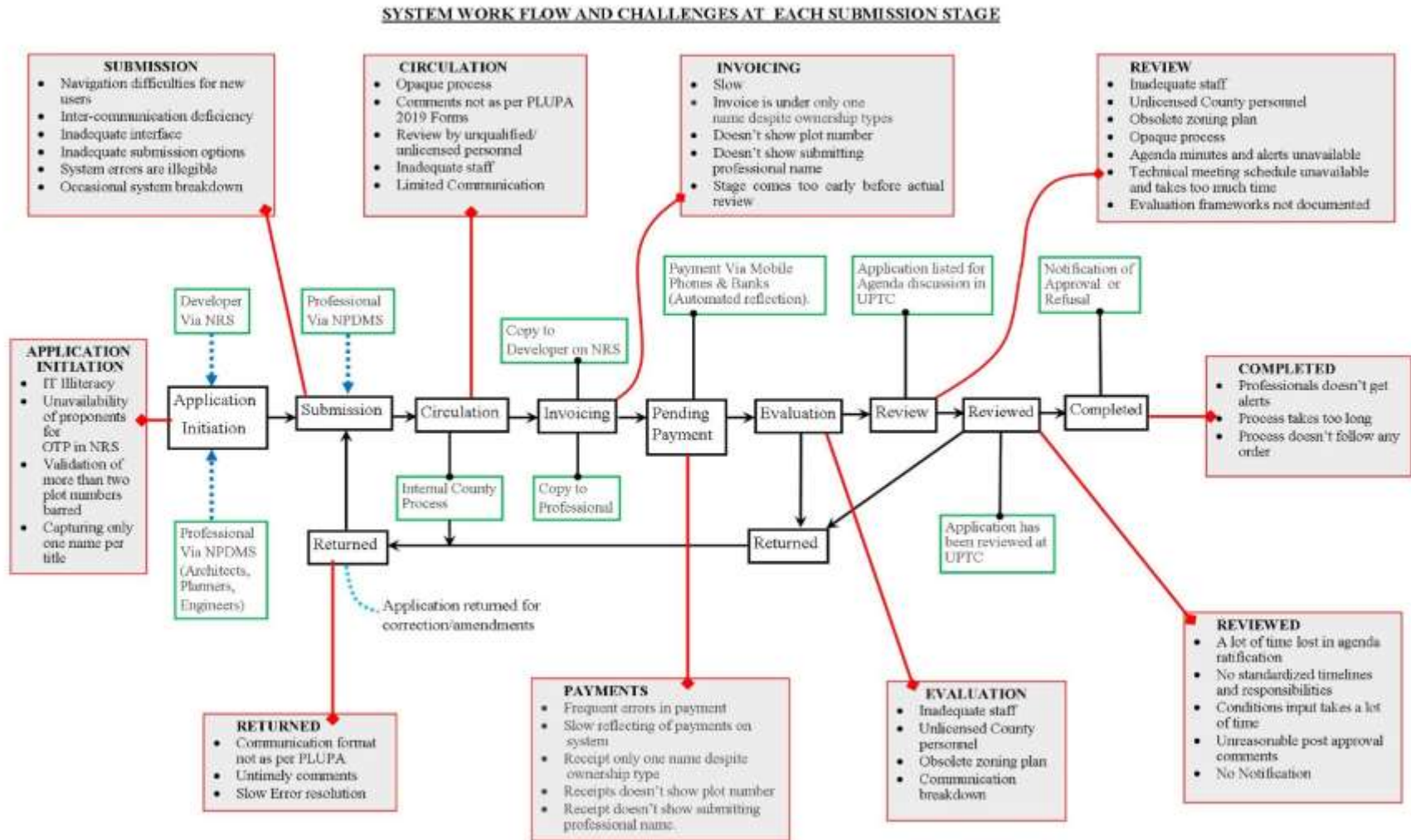
**l) Lack of Standardization and Review**

- There was lack of documented guidelines and transparency of requirements, review parameters and standards. There are frequent unexplained or undocumented changes to the process. Controller of the system has the ability to manipulate any data within the system at will. This may jeopardize integrity of the processes and approvals.
- Every political and managerial regime keeps on making changes and adjustments on system control, system rights, roles, procedures, staff, timelines among other parameters which results in periodical delays, confusion, duplication, and inefficacy.

**m) Periodical Downtime**

- There were frequent downtime and lack of adequate dedicated technical officers to respond to call-in issues. Especially on Payments and payment confirmation, automatically picking of plot Coordinates and Zones, KRA validation and document uploading.

Figure 4-19: Challenges at each stage of System work flow



Source: Author, 2023

## **4.7 Intervention measures for the improvement of the Nairobi Electronic Permit System.**

The study recommends the following;

### **4.7.1 Interactive interface**

A more interactive interface connecting users and reviewers was recommended. The interface should have interactive Chat Sessions/AI integration. This will enable automated and immediate communication within the system. The respondents recommended that the system should incorporate mechanism for alerts on email or text communication on system upgrades, application changes, issues and progress.

Elaborate feedback on disapproved applications with justifying reasons, in the system was recommended. This should adhere to provisions of PLUPA on communications and Statutory forms. A tab to access agenda items and the minutes of the discussion should be considered. Support staff and direct contact to the IT specialist was deemed necessary whenever there is a system hitch / clarification.

### **4.7.2 Adequacy of the interface and functions**

Locality function need to be more comprehensive. A function for “others” where one can type unavailable location should be considered.

Search functions on the interface should be improved to be more responsive. There is need to enable search by independent parameters such as owners name, Plot number, locality, approval date and reference number.

On requirement documents there is need for consistence. Extra slots for attachment of additional documents should be considered. This shall assist in adequacy of the system to provide various reports, evidences and data. User guide on the system to define various system terminologies, tabs, processes was recommended. This would aid self-help and auto diagnosis and navigation by new users.

Respondents recommended alerts for system updates, down times, new features, additional instructions, waivers and other development application and approval data. This brings in clarity and consistent. Some functions such as validation of Company PINS was faulty but customers continued to struggle with errors and trips to city whereas the system developers are silently aware of the situation. Alternative mechanism can be stated in alerts.

It was recommended that sectional property application ought to be on the system. Recommendations were also made that the system should allow amalgamation and change of

use application, and amalgamation and subdivision applications to enhance functionality and provide compatibility with previous approvals which allowed such applications and reduce timeline for processing such application. A combined application saves up to six months in approval. A system which should ease doing business should not be result to increase of timelines and complexity. Validation of two or more plots should be enabled for amalgamation and subdivision, amalgamation and change of use, final approval for amalgamation and subdivision and subdivision certificate application for subdivision and subdivision certificate. Removal of restriction against making applications on plot numbers that have not been integrated within Ardhisasa platform such as those with share certificates and allotment letters should be considered. It was reported that Ardhisasa was generally not fully functional and thus a hindrance to part of development process. Secondly, when plots with share certificates and letters of allotment are left out, the owners carry out developments without approvals, a situation that hinders development control efforts and denies the county government revenue. That section of the system can be discontinued until ArdhiSasa and titling in Nairobi is finalized

#### **4.7.3 Timelines Charter**

The Study proposes that timelines charter for each stage should be developed, published and implemented. The review of applications should be within specific timelines and if the timelines surpass it automatically move to the next stage. Comments, feedback and communication on planning Permissions should be communicated within the stipulated timeframe within formats provided in PLUPA 2019 and its Regulations. The respondents highlighted the need for daily checks by reviewers and allowing more reviewers in the system and hiring more technical officers. An increase in number and frequency of technical meetings was also recommended. The study recommends the following timelines:

*Table 4-4: Proposed Timelines*

<b>Process</b>	<b>Proposed Timeline</b>
Issuance of invoices	Within 24 hours
Payment confirmation	Instant
Site visits	Within 3 days
Technical meetings	Thrice per month
Minutes ratification	2 days
Issuance of approvals	Within 2 days after technical meeting

#### **4.7.4 Transparent on circulation, reviews and periodical reports**

The respondents highlighted the need for circulation and agenda listing to be accompanied by a notification message. Technical meeting schedules, agenda. list, members present and minutes of proceedings should be provided to the consultants. Publishing of approved applications after every technical meeting to all registered in the system was also recommended.

Minutes ratification stage timelines should be short and defined. Quarterly reports should be released on current issues being dealt with to improve communication between the back and front-end users.

#### **4.7.5 Cost and Invoicing**

The study proposes that County Finance Act should be more elaborate, updated and adequately provide for all services and products of the system and as those required in the Physical And land use planning Act.2019 and other development laws and policies. The costs proposed under the County Finance Act should be justifiable and reasonable to ease doing business.

To avert losses on unnecessary payments made on invoices, the study presents four options for implementation;

- To ensure that all development that pass pre-vetting stage to invoicing are compliant;
- To ensure updated Zoning plans and regulations which will enable self-regulation and ensure submitted plans does not exceed permissible Plinth area, PR and PC;
- Increase efficiency on excess payment refund system and /or conversion of the extra monies for other client use such as Land rates and other permits;
- Invoice to be honoured on application approval to avert losses in case of non-approval and:
- To provide two instalment payments, one on commencement and balance on approval.

The payments can be graduated to fit to different progress stages. Cost and zoning plans to be incorporated in the system for self-regulations

#### **4.7.6 Effective data management**

**Data archiving and storage:** It was recommended that data backups and accessible storage to be included in the system components. When upgrading the system, all previous data on the old system should be migrated to the new system. Storage and archiving for is vital for future reference and compliance monitoring. For instance, the previous system had a number of plans

that had been approved but getting the copies has been a problem. Verification of such approval would be a challenge in case of litigation and certification.

**Safety, security and encryption;** Constant review of data security measures should be in place to ensure the system is not breached. Encryption of data provided in the system should be done so that in case of a breach, the data is useless to the perpetrators.

**Improve data confidentiality:** Keeping the private information therein confidential, the data can be mined and used to establish trends and areas that need government to improve services in order to meet growth for development. The current system should improve data security to avoid loss or access by unauthorized personnel.

**Data control protocols:** There is need for creation of clearance levels for various persons and level of access and system responsibilities to enhance accountability.

**Hosting;** The study recommend that the system should be hosted at government data centre.

#### **4.7.7 Training and capacity building**

The study indicated that there is need for continuous engagement with the professionals using the system as well as training them on the use of any upgraded features. Training for newly registered Planners, Architects, Engineers and reviewers should be carried out every three months. The County and system developers should partner with Professional Associations such as KIP, AAK, IEK, ISK and APSEA for tailor made annual CPD training on the system aspects. Tutorial and user manual should be prepared for new users and aspects to enable self-training.

The study recommends employment of more technical staff (planners, architects, engineers, and IT personnel among others) to march the needs of the e-permit system, development control and the city planning. The study recommends engagement of licensed and qualified professionals in the approval process. The system access and submitters are restricted to licensed, registered and professional in good standing. Equally the reviewers should be of similar standards, licensed and professionally in good standing. The study also recommends incorporation of all the Urban Planning department staff into the e-Permit System. The rights and roles can be limited as per the technical capabilities, needs and organization roles and/or structure. It is vital to enable basic staff members to view applications, confirm basic inquiries and ask queries. There is also a need for inclusion of GIS to geolocate plots making reference to Land Use Policy and Development Control Policy.

#### **4.7.8 Creation of Linkages and effectiveness in subsystem**

The study identifies need to prepare and link the system with Neighbourhood Land Use and Zoning Plans. The System should be linked to Professional Associations and Professionals regulatory bodies to who should ascertain and regulate Professionals allowed into the system. Link the system to the National Land information System bringing on board Ministry, CoG and NLC Link with other stakeholders in Planning and Development. Create system linkages with NEMA, KCAA, NAWASCO, Kenya Power and WRA among other agencies involved in development approvals. Connect system to other county governments' permit application processes systems.

#### **4.7.9 Legal compliance**

The study recommends development of a specific and clear regulations on the governance, maintenance and operations of the E-permit system to make it more efficient. Some of components established to important in such regulation framework are discussed in section

It was recommended that all system aspects should be compliant to PLUPA and applicable development laws and policies. PLUPA regulatory timelines or shorter should be observed where applicable.

Letters of refusal of approval and deferment should be incorporated in the system as provided in the PLUPA regulation. Provision for appeal function as provided by PLUPA should also be incorporated in the system. Comments should be in a format which can be used by a third party. Currently you can only obtain a screen shot. There are third parties interested in the documents such as developers, financiers, courts among others thus they need to be easily retrievable. All types of applications should be provided for and applicable to Nairobi including sectional property.

The system should issue submission certificate as envisioned on PLUPA regulations. The system should only admit /accept document (where provided by law) in formats provided, such as Form PLUPA Form DC-3 for Newspaper adverts and PLUPA form DC-4 for site notices. Approvals from the system should also adhere to the PLUPA regulations.

There is dire need to revise and approve zoning guidelines used in the system. The study established that numerous decisions are based on precedence and not on an approved zoning plan. This component makes the system very ineffective in development control management.

The system should provide frameworks to ensure that the roles provided by the Physical and Land Use Planning are carried out by qualified and registered professionals. For instance, section 20 provides for the responsibilities of the Director which includes; “communicating decisions of the county government development application and issuance of development permission and other development control instruments under the Act with the approval of the county executive committee member”.

#### **4.7.10 Regulation framework for electronic Permit System**

The study established that there is lack of specific and clear regulations on the governance, maintenance and operations of the E-permit system. This may include formal framework on how various stakeholders shall behave in the system, the rules of engagements, responsibilities and obligations, how to deal with outliers or exceptional, transitions provisions, terms and conditions, Contractual agreements, data protection, copy right, updates, definitions of system terms and among others. The nature of the E-permitting system operations is like a statutory instrument to enable implementation of the Physical and Land use Planning Act,2019 and other development laws. The e-permit system makes rights, liberties, obligations and processes dependent the digital system.

It should be noted that, the development of the system regulations is a legislative role under the National or county government. It is the study recommendation that such regulations should be developed urgently to apply to existing and upcoming e-Permit Systems. When developing such an instrument the following should be considered;

##### **a. Definitions of system terms and levels**

All terms used in the system should be defined. Processes and stages should also be defined.

##### **b. Development and legal provisions**

The system architecture and interface should adequately provide for submission, review and approvals of all nature of applications envisioned in the urban planning, engineering and survey. System developers should be knowledgeable and include the target professional in the design team (Registered Planners, Architects, Engineers and experienced reviewers)

The system should adhere to the provisions of Constitution of Kenya, The Statutory Instruments Act No.23 of 2013, the Physical and Land Use Planning Act, 2019, Kenya Information and Communications Act (KICA), National Lands Commission Act, Physical Planners Registration Act of 1996, Architects and Quantity Surveyors Act, Engineers Registration Act of 2011.



Section 21 of the Physical Planners Registration Act of 1996, Section 3(1) of the Architects and Quantity Surveyors Act, Section 50 (1) and (2) of the Engineers Registration Act of 2011 bars unqualified and unregistered professional to practice planning, architecture and engineering. The system should therefore ensure that only qualified professionals make submissions.

There should be adequate Stakeholders participation and consultation. The timelines as provided in various laws such as section 11 of the Statutory Instruments Act should be applied. The national values and principles of governance such as good governance, integrity, transparency and accountability should be applied in the system design and operations. Mechanism to promote and enforce the leadership and integrity issues as provided in the Constitution of Kenya, (2010) chapter six should also be formulated.

Rights for Access to information, Consumer rights, fair administrative action, fair hearing and liaison with oversight institutions such as provided under article 259 (11) and 67. (1) of the Constitution of Kenya should also be factored

Regulations for e-permitting system require a regulatory impact statement within the meaning of sections 6, 7, and 8 of the statutory Instruments Act since they are intended to prescribe guidelines for electronic permitting on land which is a critical sector. It has impacts on rights on information, association, consumer rights and fair administrative actions. Therefore, on developments this should be adhered to.

**c. Authorized professions and Creation of Accounts**

All authorized registered professionals shall be viable for creation of user account in the system. Circumstances for any denial or refusal shall be clearly in writing to reduce potential for abuse and infringements on rights.

**d. Front end user accounts**

The data of authorized persons shall be solely obtained from the PPRB for Physical Planners, BORAQS for Architects and ERB for Structural Engineers. There should be periodical data and reports to PPRB and BORAQS on persons operating in the system.

**e. Backend user accounts**

The county should create user accounts for its officers. The level of clearance, responsibilities and obligations should be stated. The county should ensure that the authorized officers are qualified and have necessary experiences to undertake the responsibilities assigned in the system. The officers deployed to the system should be adequate to effectively undertake the workload.

The county government should put in place adequate operational and technical measures to ensure integrity and confidentiality of the applicant's data via controls around: access control, information classification, cryptography, physical and environmental security and monitoring and compliance.

**f. Rules of engagements**

When signing up in the system, a contract detailing the terms and conditions of the system use and relationship between the user and the system operators shall be availed to the user to read and accept or decline. A user is deemed to have accepted the system terms and conditions upon registration to the system and will equally be bound by the same.

**g. Suspension of a user's access to the system**

Some of reasons which may lead to suspension of Users access to the system should include the following:

- i. User has contravened the obligations or the terms and conditions of access
- ii. As recommended by respective registration board disciplinary committees
- iii. User is not in good standing with the professional body
- iv. User has committed fraud, identity theft or system misuse
- v. User allows an unauthorized/unqualified person to access the system
- vi. User is dead
- vii. User is declared insolvent or of unsound

Fair administrative action and fair hearing should however be conducted.

**h. User obligations**

The user should;

- i. Provide and submit only authentic and complete information when applying to join or when using the system
- ii. Carry out authorized transactions
- iii. Complete such formalities as are required to become a registered user before accessing the system
- iv. Meet the eligibility criteria at all times
- v. Be responsible for the security of his or her login credentials and for any access made using the login credentials
- vi. Not impersonate another person or entity,
- vii. The user shall not use the system or its products and services in any manner that violates/infringes the provisions of the Kenya Information and Communication Act, 1998, the Computer Misuse and Cybercrimes Act, 2018 or any other written law

#### **i. NCC obligations to Users**

The NCC should;

- i. Ensure continuity of the system and its database
- ii. Maintain this system in good operational condition
- iii. Ensure adequate and accessible data storage
- iv. Inform the users in cases of scheduled and/or unscheduled system maintenance, updates
- v. Assist users to understand the operational requirements and any protocols adopted from time to time for use in the system
- vi. Comply with all statutory and regulatory requirements imposed by law and policies
- vii. Shall not aid contravening of contractual agreements between users and their client
- viii. Ensure parameters used for evaluation are valid, approved and available in the system
- ix. Ensure the system is run by licensed and qualified professionals in good standing.

#### **j. Outliers or exceptional**

The county should provide mechanism to handle exceptional applications and situations. System to allow preapplication presentations and presentation of physical or digital models where appropriate.

#### **k. Data protection and database management**

The County should provide continuity and access of the system database

#### **l. Contractual agreements**

The system should not aid contravening of contractual agreements between users and their clients. The county shall not unreasonably delay issuance of approvals to users.

The user shall not unreasonably delay delivery of approvals to clients.

#### **m. Availability of services and support**

The County government should provide services at all times. Notices regarding planned system outages will be made available on users and county website.

### **4.8 Challenges encountered during the field investigation**

One of the main challenges faced during field studies include; In accessibility of respondents especially architects (due to the large target sample size in the strata) and County Officers. This was resolved by scheduling online interviews and digital questionnaire. The research assistant also played a great role in reminders and follow ups.

## **CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMENDATIONS**

### **5.1 Introduction**

This chapter presents the summary of findings based on the study objectives. It also present various recommendations emanating from the study. The study aimed in assessing the effectiveness of the E-permit system in management of development applications and approval in Nairobi City County. The current Nairobi NPDMS was used as the case study.

### **5.2 Revisiting the research objectives**

The main objective of the study was to evaluate the effectiveness of the utilization of online portals in the management of developments applications and approvals within Nairobi City County. The study objectives were:

1. To document the characteristics of an Effective Electronic Permit System and use them to highlight deficiencies of the existing E-Permit System at Nairobi City County.
2. To evaluate the effectiveness of the Electronic Permit System in relation to efficacy, adequacy, reliability, cost, legality and operation framework in Nairobi City County.
3. To identify challenges faced by the Electronic Permit System users.
4. To recommend possible interventions that can mitigate the challenges facing the Nairobi Electronic Permit System and improve its effectiveness in facilitating processing of development applications and approval.

### **5.3 Summary of findings**

The theoretical underpinning of the study, namely: Systems theory; Unified Theory of Acceptance and Use of Technology; and Technology Acceptance Model, were found to be sufficient and accurate in anchoring the study and its findings.

#### **5.3.1 Characteristics of an Effective Electronic Permit System.**

The study literature review established that Safety, Convenience, Interactiveness, Adaptability, Trackability, Progressiveness, Adequacy and Scalability key characteristics of an effective e-permit system. These characteristics were assessed from respondent views, observation and system assessment. Convenience was the highest rated quality, with over three-quarters

(75.4%) of users rating it a 4 or 5. Scalability and adaptability were the poorest rated qualities. Table 4-2 shows how the users rate different aspects as relates to the system.

The system is good but has room for improvement. Mechanism to improve interactives, adaptability and scalability need to be prioritized. Substantial good qualities have been already been achieved. The system needs to be improved and updated and not to be abandoned as has occurred to the previous system in Nairobi.

### **5.3.2 E- Permit System Efficacy, adequacy, reliability, cost, legality and operation framework.**

Based on the System theory various components (subsystem) of the e-Permit System were evaluated. key aspects evaluated include Efficiency, reliability, adequacy, legality. Below is summary of the findings:

#### **1. User Experience**

Most users reported positive experiences in their interactions. Similar results were reported when assessing the effectiveness of the system's front-end interface in undertaking roles. Majority of users considered the interface as effective or highly effective. The study indicated comparative advantages of the e-platform over the manual system as the following:

- a. The e-permit system is more convenience and effective as it allows faster submission and follow up from any geographical area and anytime
- b. Easier tracking, increased transparency on the processes, reduced human interaction and
- c. E-permit is cheaper than manual submissions. It cut travel and printing cost
- d. Increased efficiency in permit application processes and accountability. The e-permit system is more convenient and allows for transparency

#### **2. Adequacy**

NPDMS users rated the system's adequacy highly on certain issues but reported concerns in others. Only 18.1% of the respondents reported being dissatisfied or very dissatisfied. On the contrary, users rated the system's communication capabilities poorly. aspects regarding technical meetings., meeting verdicts and agendas and frequency of technical meetings to consider applications submitted on the platform.

### **3. NPDMS Effectiveness**

On average, about half (49.9%) of users rated the effectiveness of the NPDMS in completing permit applications. Document submission was rated as the most effective aspect in the permit application process while the review, technical meeting and ratification aspects were the least effective. The NPDMS was also reported to reduce the permit application time. Nearly two-thirds (62.3%) of users reported that the system was quicker than the manual system while 24.6% noted to significant impact on time. Only 13.1% of users argued that the NPDMS increased the time taken to complete the permit application process. Increased convenience when making applications was the most reported advantage of the e-permit system over the manual system.

The NPDMS was also rated for cost effectiveness, time effectiveness, and convenience as follows. Over half (52.5%) of users reported that using NPDMS had reduced the cost of making permit applications in Nairobi City County, while 32.8% reported no marked difference. Only 14.8% of users reported increased costs. Cost reduction was also reported as one of the primary advantages of the e-permit system over the manual system. However, the e-permit system's impact on reducing corruption was debatable. Only 26.3% of users found the NPDMS as effective or highly effective in this area

### **4. NPDMS Reliability**

The study considered the frequency of experiencing technical challenges, problem resolution capabilities, communication about critical stages. Although most users (98.4%) reported experiencing challenges when using the platform, the frequency of such challenges was low. Notably, 42.6% of users reported experiencing challenges rarely, while 27.9% reported experiencing them sometimes. Only 27.9% of users reported experiencing challenges often or always. Besides, most technical challenges were resolved promptly. About a third (31.1%) of all challenges were resolved within 24 hours, while 63.9% were resolved within three days. Only 18% of challenges took more than seven days to resolve

However, most users did not consider the NPDMS a reliable platform to communicate about technical meetings. Only 13.1% of users expressed satisfaction in this area, while 70.5% were either dissatisfied or very dissatisfied with the platform's role in this area.

## **5. Legality, Data Security and Ethics**

According to NPDMS users, the system is highly compliant with existing physical and land use laws and regulations. However, they admit that the it commits certain violations. Notably, only 21.3% of users think that the e-permit system is fully compliant with laws and regulations guiding development applications and approvals. About two-fifths (39.3%) of users contend that the system has between one and three violations. Only 3.3% of users think the NPDMS is lowly compliant (ten or more violations).

### **5.3.3 Challenges faced by the Electronic Permit System users.**

The following issues were identified by respondents:

- a. Poor communication frameworks between various actors in the system.
- b. Lack of updates on processes, changes and progress in the application process.
- c. Slow and ineffective issue resolution management.
- d. Lack of full control of the system by County officials.
- e. Inadequate licensed and qualified county officers who have the rights to change, edit or add documents on submitted and dedicated technical officers to respond call-in issues.
- f. Restriction on certain plots and types of developments (composite applications such as Amalgamation and subdivision, Amalgamation) plots not on Ardhi sasa, certificates and allotments. and change of use
- g. Lack of system navigation guide for new users.
- h. Challenging to use for computer illiterate clients on NRS system or launch applications
- i. Lack of documented guidelines and transparency
- j. Lack of elaborate system continuity plans., policy and regulations
- k. Slow dispatching of approvals after technical meeting
- l. Challenges in interlinked sub system such as payment confirmation, rates clearance, plot validation, client registration on NRS and validation of plot numbers on Ardhisasa platform
- m. System lack of accessible back up and private hosting of the system
- n. Lack of elaborate and contingency plans/ alternative for continuity when the system fails
- o. Noncompliance to provisions of Physical and Land use Planning Act.2019 Forms, Formats and Offices.
- p. Obsolete zoning plans used in the system

### **5.3.4 Intervention measures for the improvement of the Nairobi Electronic Permit System**

The following was recommended;

#### **a. To improve communication interface**

- Incorporate mechanism for interactive alerts on email or text communication on system upgrades, application changes, issues and progress.
- Elaborate feedback on disapproved applications in adherence to provisions of PLUPA on communications and Statutory forms.
- Provide tab to access agenda items and the technical meeting minutes
- Provide User guide on the system to define various system terminologies, tabs, processes
- Alerts for system updates, down times, new features, additional instructions, waivers and other development application and approval data.
- Carry out and publish periodical system reviews and periodical reports
- Assign dedicated support staff and provide active contact
- Errors on the system should be clearly labelled to enable resolve
- Avail functional, onsite response team and office dedicated to resolve system and related issue issues
- Technical meeting schedules, agenda. list, members present and minutes of proceedings should be provided to the consultants and developers. Publishing of approved applications after every technical meeting to all registered in the system

#### **b. Improve adequacy of the interface and functions**

- Enable validation of two or more plots to facilitate, amalgamation and subdivision, amalgamation and change of use, final approval for amalgamation and subdivision and subdivision certificate application for amalgamation and subdivision
- Improve locality function to be more comprehensive
- Improve search functions on the interface to factor wider range of variables such as owners name, Plot number and area
- Sieve appropriate documents requirement per nature of application.
- Removal of restriction against making composite applications on the system.
- Allow composite applications and sectional property application



**c. Timelines charter**

- It was proposed that review timelines charter for each stage should be developed, published and implemented. The review of applications should be within specific timelines and if the timelines surpass it automatically move to the next stage.
- Comments, feedback and communication of Planning Permissions ought to be communicated within the reasonable timeframe within formats provided in PLUPA and its Regulations.
- The respondents highlighted the need for daily checks by reviewers, allowing more reviewers in the system and hiring more technical officers.

**d. Cost**

- The study proposes that County Finance Act should be more elaborate, updated and adequately provide for all services and products of the system and as those required in the Physical And land use planning Act.2019 and other development laws and policies. The costs proposed under the County Finance Act should be justifiable and reasonable to ease doing business.
- To avert losses on unnecessary payments made on invoices, the study presents four options for implementation;
  - To ensure that all development that pass pre-vetting stage to invoicing are compliant;
  - To ensure updated Zoning plans and regulations which will enable self-regulation and ensure submitted plans does not exceed permissible Plinth area, PR and PC;
  - Increase efficiency on excess payment refund system and /or conversion of the extra monies for other client use such as Land rates and other permits;
  - Invoice to be honoured on application approval to avert losses in case of non-approval and;
  - To provide two instalment payments, one on commencement and balance on approval.

**e. Effective data management**

- Provide adequate storage capacity.
- Periodic data archiving and storage
- Enforce data encryption
- Improve data confidentiality and deter access by unauthorized personnel

- Establish data control and access clearance protocols
- Detach the system from sections of currently ineffective Ardhisasa system till it is fully functional

**f. Legal compliance**

- System forms, timelines and component to be Compliant to PLUPA
- System to issue submission certificate as envisioned under PLUPA
- Letters of refusal of approval and deferment to be incorporated in the system as provided in the PLUPA regulation.
- Provide for appeal function as provided by PLUPA
- Provide for all types of applications provided for and applicable to Nairobi including sectional property.
- Comments and circulation data format to be in retrievable format
- Establish back up plans and procedures in case of collapse of the system.
- Prepare e-Permit System regulations
- The system should provide frameworks to ensure that the roles provided by the physical and Land use planning are carried out by such person. For instance, provisions of section 20 provide for the responsibilities of the director which includes; “communicating decisions of the county government development application and issuance of development permission and other development control instruments under the Act with the approval of the county executive committee member.”
- Zoning plans, assessment parameters and cost in the system should be valid and approved

**g. Training and capacity building**

- Continuous engagement with the professionals using the system as well as training them on the use of upgraded features. make more user friendly.
- Engagement of professionals in the approval and reviewing process
- Hire more qualified staff and increase staff on the System.
- Partnership with Professional Associations such as KIP, AAK, IEK, KPDA, KEPSA and APSEA for tailor made annual CPD training on the system aspects.

**h. Creation of Linkages and effectiveness in subsystem**

- Link with other line departments especially rates clearance and finance
- Prepare and link with Neighbourhood Land Use and Zoning Plans
- The e-Permit system should incorporate components of compliance and enforcement.

- System linked to be Professional Associations and regulatory body to ascertain and regulate professional allowed into the system
- Link to the National Land Information System bringing on board Ministry, CoG and NLC
- Link with other stakeholders in planning and development (NEMA, KCAA, NAWASCO, Kenya Power, WRA)
- Connect system to other county governments' permit application processes.
- Cost and zoning plans to be incorporated in the system for self-regulations
- Inclusion of GIS to geolocate plots making reference to land use policy and development control policy.

#### **5.4 Implications of the findings**

The finding implies that the Nairobi e-Permit System is a suitable tool for development application and management. Optimization of the system is still due. Progress can only be to improve the system and not to abandon as the case of previous system. Various sub systems and steps which are important but ineffective were identified and issues discussed. There is need for strategic and adequate consideration when integrating various components to the system. The E-permit System is a strategic specialized and professional system hence there need its sustainable design and maintenance is critical. The study findings imply the need for development of regulations to govern establishment, operations and maintenance of e-Permit Systems.

#### **5.5 Revisiting the Study proposition.**

The study proposition was that utilization of Electronic Permit System has improved the effectiveness of development application and approval management in Nairobi City County. The study results do not support this proposition.

Though the study results indicated that the System provides convenience of virtual operations, it was also established that key development applications and approval aspects remains ineffective, costly, complicated, inadequate and contravene various legal and policy provisions. Key characteristic of an effective e-Permit System such as safety, convenience, interactiveness, adaptability, trackability, progressiveness, adequacy and scalability have not been optimized.

The development application and approval process is still faced with basic challenges including approval delays, system failures and abandonment, system data breach, lengthy processes,

dependency on third party expertise/rights, lack of adequate and qualified staff, outdated zoning policies, opaque processes, unstandardized and clear evaluation parameters, poor interface, unresponsive search functions, exclusion of composite application with were earlier possible and still viable in other counties, increase of approval timelines and cost for composite applications, increased vulnerability of public data in private host, inaccessible hosting, incomplete system rights, Integration of the system with other incomplete system and databases, lack of clarity on timelines and lack of adherence to provisions of Physical and Land Use Planning Act 2019 and allied regulations.

The study has however highlighted key positive attributes of the system to the effectiveness of management of development applications and approvals and provided variety of mitigation measures for various challenges making the system ineffective.

## **5.6 Recommendations**

- Nairobi City County should deliberately increase financial investment in the system especially on issues of storage, staffing, system updates and capacity building.
- The development of the e-Permit system should be inclusive to consider input of all the users and stakeholders not just the county team or developers. This way it will capture most of the aspects envisioned by the users.
- Procurement and design team for Development permit system should include experienced users (Architects, Planners, Engineers) or any other professional envisioned to practise through the system.

## **5.7 Areas of Further Study**

Areas of further studies identified in this research includes:

- a. There is need for more study on appropriate regulations for procurement, development, operations and maintenance of public-private initiated Electronic Permit Systems.
- b. The implications of the of Electronic Permit Systems on urban employment and revenues in should be investigated.

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**APPENDICES**

**Questionnaire- Planner/Architect/Structural Engineer**

**UNIVERSITY OF NAIROBI**

**DEPARTMENT OF ARCHITECTURE AND BUILDING SCIENCE**

**Research Project - Master's Degree in Urban Management**

**QUESTIONNAIRE (Users)**

**RESEARCH TITLE:** EFFECTIVENESS OF E-DEVELOPMENT PERMIT SYSTEM IN MANAGEMENT OF DEVELOPMENTS APPLICATIONS AND APPROVALS IN NAIROBI CITY COUNTY

**RESEARCH PURPOSE:** The main objective of the study is to evaluate the effectiveness of the utilization of online portals in the management of developments applications and approvals within Nairobi City County.

**Respondent Name:** ..... **Reg. No:** .....

**Time:** ..... **Date:** ..... **KII No:** .....

**Disclaimer:** The information given in this research will be used only to inform the study.

**Summary:**

I am undertaking research on effectiveness of Nairobi Electronic Permit System (Currently NPDMS) in management of developments applications and approvals in Nairobi city county. To accomplish this task, I hereby seek your assistance by answering the questions below. All information will be treated with maximum confidentiality and will only be used to understand the effectiveness of the Electronic Permit System in management of developments applications and approvals. Your cooperation is highly appreciated.

**Instructions:**

- I. Answer all questions
- II. Type/tick your responses

**Demographic Characteristics**

1. Age: 18-25       26-35       36-45       46-65       Above 65

2. Gender: Male  Female
3. Profession: Architect
- Planner
- Structural engineer

### **General Questions**

4. How would you rate the ease of navigation on the system interface?
- Very difficult
- Difficult
- Fair
- Easy
- Very Easy
5. How effective is the system's front-end interface when undertaking your roles?
- Very ineffective
- Ineffective
- Fair
- Effective
- Very effective
6. What is your opinion on the system design and development?
- Poor
- Bad
- Fair
- Good
- Excellent
7. How satisfied are you with the adequacy of the options provided in the system in facilitating the submission and processing of different applications within your profession?
- Very dissatisfied
- Slightly dissatisfied

- Neutral
- Slightly satisfied
- Very satisfied

8. How often do you experience challenges when using the NPDMS?

- Always
- Often
- Occasionally
- Rarely
- Never

9. How effective is NPDMS as a platform for communicating and getting feedback from Nairobi County?

- Very ineffective
- Ineffective
- Fair
- Effective
- Very effective

10. How easy is it to retrieve communication/feedback/comments that were exchanged during the application and approval process at a future date?

- Impossible
- Difficult
- Fair
- Easy
- Very Easy

11. How satisfied are you with communication about when technical meetings are held?

- Very dissatisfied
- Slightly dissatisfied
- Neutral
- Slightly satisfied

Very satisfied

12. Do you have access to technical meeting verdicts/agenda?

Yes

No

13. How satisfied are you with the frequency of technical meetings to consider applications?

Very dissatisfied

Slightly dissatisfied

Neutral

Slightly satisfied

Very satisfied

14. On average, how long did it take to resolve the challenges (if applicable)?

More than 1 week

3-7 days

1-3 days

24 hours

Less than 24 hours

15. How often do you receive updates in case of changes or improvements made to the system interface?

Never

Rarely

Occasionally

Often

Always

16. What are the cost implications of using the NPDMS for permit application and approval compared to the old (manual) system?

Increased costs (more expensive)

No impact

Reduced costs (cheaper)

17. What are the time implications of using the NPDMS for permit application and approval compared to the old (manual) system?
- More time-consuming (quicker)
  - No impact
  - Less time-consuming (slower)
18. How effective is NPDMS in eliminating corruption in the permit application and approval process in Nairobi County?
- Very ineffective
  - Ineffective
  - Fair
  - Effective
  - Very effective
19. To what extent do you think the system has complied with the Physical and Land Use Planning Act and its regulations regarding development applications and approvals?
- Lowly compliant (10+ violations)
  - Slightly uncompliant (7-9 violations)
  - Fairly compliant (4-6 violations)
  - Substantially compliant (1-3 violations)
  - Fully compliant (0 violations)
20. How often do you lose data or applications on the platform?
- Frequently (50%+ of the time)
  - Often (26-49% of the time)
  - Sometimes (11-25% of the time)
  - Rarely (1-10% of the time)
  - Never (0% of the time)
21. How often has your data or approvals been released/accessed to third party without your consent?
- Frequently (10+ cases)
  - Often (7-9 cases)
  - Sometimes (3-6 cases)

Rarely (1-3 cases)

Never (0 cases)

22. On a scale of (1=very poor; 5=excellent) how would you rate the effectiveness of the NPDMS when completing the KRA PIN /ID validation section?

1       2       3       4       5

23. On a scale of (1=very poor; 5=excellent) how would you rate the effectiveness of the NPDMS when completing the Plot Number validation section?

1       2       3       4       5

24. On a scale of (1=very poor; 5=excellent) how would you rate the effectiveness of the NPDMS when completing the Application type selection section?

1       2       3       4       5

25. On a scale of (1=very poor; 5=excellent) how would you rate the effectiveness of the NPDMS when completing the Filling of submission form section?

1       2       3       4       5

26. On a scale of (1=very poor; 5=excellent) how would you rate the effectiveness of the NPDMS when completing the Documents requirements and attaching documents sections?

1       2       3       4       5

27. On a scale of (1=very poor; 5=excellent) how would you rate the effectiveness of the NPDMS when completing the Invoicing and fees payment processes?

1       2       3       4       5

28. On a scale of (1=very poor; 5=excellent) how would you rate the effectiveness of the NPDMS when completing the Circulations process?

1       2       3       4       5

29. On a scale of (1=very poor; 5=excellent) how would you rate the effectiveness of the NPDMS when completing the Review/Technical meeting/Ratification processes?

1       2       3       4       5

30. On a scale of (1=very poor; 5=excellent) how would you rate the effectiveness of the NPDMS when completing the Land Rates confirmation/Approval issuance processes?

1       2       3       4       5

31. On a scale of 1-5 (1=very poor; 5=excellent) how would you rate the NPDMS on security/safety aspects?

1           2           3           4           5

32. On a scale of 1-5 (1=very poor; 5=excellent) how would you rate the NPDMS on Convenience?

1           2           3           4           5

33. On a scale of 1-5 (1=very poor; 5=excellent) how would you rate the NPDMS on Interactiveness?

1           2           3           4           5

34. On a scale of 1-5 (1=very poor; 5=excellent) how would you rate the NPDMS on Adaptability?

1           2           3           4           5

35. On a scale of 1-5 (1=very poor; 5=excellent) how would you rate the NPDMS on Adequacy?

1           2           3           4           5

36. On a scale of 1-5 (1=very poor; 5=excellent) how would you rate the NPDMS on Progressiveness?

1           2           3           4           5

37. On a scale of 1-5 (1=very poor; 5=excellent) how would you rate the NPDMS on Scalability?

1           2           3           4           5

38. Please list the components you would add to the NPDMS (if applicable). Why?

39. Please list the components you would remove from the NPDMS (if applicable). Why?

40. List the advantages of the e-platform over the manual system.

41. List the disadvantages of the e-platform over the manual system.

42. What are your recommendations to enable effective communication/ feedback/ comments in the NPDMS?

43. What are your recommendations on data management within the System?

44. What are your recommendations on data management within the System?

45. List Challenges encountered when using the NPDMS

**THANK YOU FO YOUR TIME**



## Key Informant questionnaire -Reviewers/County Officials

Date: .....

Officer Name: .....

Station: .....

Years at the station: .....

1. Has the system increased efficiency?
2. Has the system reduced processing times of applications?
3. Is the current system adequate in undertaking the mandates and functions prescribed in Physical and Land Use Planning Act, Urban Areas and Cities Act and the County Government Act in regards to development applications and approvals? (Types of applications, Costing and operations of Statutory offices)
4. Is data access and storage safe and adequate? Are there protocols on handling data in the system?
5. Has the use of the system impacted approvals and operations cost? If yes how?
6. Has the utilization of the system led to emergence of new needs? If yes elaborate
7. Are you able to meet the time threshold permitted by law and on the service charter?
8. Has the electronic system, reduced cases of corruption? (Somehow, No, Yes)
9. Can the system generate a record of all the applications since it was implemented?
10. Does the system provide ample and required information to the users?
11. Do clients get their communication on time, regarding comments and the verdict?
12. Has the system been upgraded? What are some of the issues resolved or components added?
13. How many officers are deployed on the system?
14. How often are site visits carried out?
15. Do you have adequate equipment, technologies, tools and qualified personnel to support the system?
16. What challenges do you face with the system?
17. What challenges did you face with the manual system?
18. What recommendations would you make on the improvement of the system?
19. In events of system failure, are there set mechanisms and frameworks to ensure developments applications and approvals are not discontinued.

**THANK YOU FOR YOUR TIME**

## Data Collection Introduction Form



### UNIVERSITY OF NAIROBI

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DEPARTMENT OF ARCHITECTURE  
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**Our Ref:** UON/FBED/Arch/34805/2019

**Date:** 17<sup>th</sup> January, 2023

### TO WHOM IT MAY CONCERN

Dear Sir/Madam,

**RE: SILAS MBAABU GICHURU – REG. NO. W50/34805/2019**

This is to confirm that the above named is a registered Masters student in Urban Management in the Department of Architecture, University of Nairobi.

He is carrying out a project titled "EFFECTIVENESS OF ELECTRONIC PERMIT SYSTEM IN MANAGEMENT OF DEVELOPMENTS APPLICATIONS AND APPROVALS IN NAIROBI CITY COUNTY".

We are thus requesting you to give him some of your valuable time and respond positively to his enquiries, provision of drawings, maps, etc as may be required. This is for academic purposes only.

Any assistance accorded to him will be highly appreciated.

Yours sincerely,

CHAIRMAN  
DEPARTMENT OF ARCHITECTURE  
UNIVERSITY OF NAIROBI

**Arch. Musau Kimeu**  
**CHAIRMAN,**  
**DEPT. OF ARCHITECTURE**