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**Influence of Technology-Organization-External Environment on Adoption of Enterprise Mobility
Management Solutions: A case of Organizations in Kenya.**

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Computer Science Information Technology Management (MSc-ITM) Degree, School of Computing
and Informatics, University of Nairobi.**

Date: 23rd July 2015

DECLARATION

This is to certify that this research project is a product of my original research investigation and has not been presented for a degree award in any other university or institution of higher learning. Information from other sources has been acknowledged.

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This management project has been submitted for examination with my approval as the university supervisor.

Dr. ROBERT OBOKO

Date.....

Sign.....

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First is to thank the almighty God who has seen me through this course and even when things seemed hard I always got a turnaround. To my employer for allowing me the time and resources to attend classes and achieve personal development.

I wish to thank my supervisor immensely Dr Oboko for your patience and exceptional understanding and steering me like a vessel in the high seas. To my peers whom we met many Saturday afternoons, your unprecedented help and input is really appreciated.

To the entire SCI community, we have come a long way and great a moments of triumph; even some MOT [Moment of Truth] with a Supplementary paper or two, it was a great journey.

To you all who in one way or another eased my journey, thank you very much may God bless you.

DEDICATION

To my siblings Camila, Charity, Steve and Charlie you are my anchor in my everyday hectic life. Love you always and God Bless you immensely.

ABSTRACT

The words on everybody's lips in the enterprise world is 'mobility' but again the questions follow on how secure are we as we have data being accessed anywhere anytime. Gone are the days when information was on total lock down, and with Blackberry Enterprise Server (BES), enterprises were assured of secure data access mainly in emails. Next came Citrix who offered server virtualization and CIOs were all excited about enterprise mobility.

The revolution came with the Apple iPhone and iPad and hot on their heels was Android and the age of Smartphones and mobility was overwhelming. This has brought about changes in the ICT arena and users are now demanding to be let off the least and no more 'total lockdown' as the BYOD phenomena has liberated them and telecommuting the order of the day. This has given rise to the Consumerization of Information Technology and this calls for better IT governance in order to ensure that employees are compliant to IS policies for the organization to function without falling into loopholes undermining the IS security.

This research is aimed at discussing the options available for enterprises to realize mobility but at the same time being at the helm in controlling the same by use of Enterprise Mobility Management solutions. In conclusion, a recommendation of the best EMM solutions available in the industry and what options to look out for in the future.

LIST OF ABBREVIATIONS

MDM – Mobile Device Management
IBM – International Business Machines
BYOD- Bring Your Own Device
iOS – (previously iPhone OS) is a mobile operating system by Apple Inc
MDS – Mobile Data Services
VPN – Virtual private Networks
IT – Information Technology
IS – Information Systems
CIO – Chief Information Officer
CTO – Chief Technology Officer
CFO – Chief Financial Officer
SaaS – Software–as-a-Service
IaaS – Infrastructure–as-a-Service
PaaS – Platform–as-a-Service
MRM - Mobile Risk Management
MIM - Mobile Information Management
MI/CM - Mobile Information/Content Management
MAM - Mobile Application Management
OTA – Over-The -Air
EMM - Enterprise Mobility Management
TCO – Total Cost of Ownership
ROI – Return on Investment
CoIT – Commercialization of Information Technology
IoT – Internet of Things
IFMIS - Integrated Financial Management Information System

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CHAPTER ONE: INTRODUCTION

1.1 Background

The world today is moving at pace where it's so hard to keep up with technology and the trends that come with it. With the advent of cloud computing and smart devices, people find themselves juggling with multiple devices that they use and want their information synced between their devices.

Organizations are fighting to reduce the carbon footprint and hence required that they store and disseminate their information in a manner that its available anywhere and if a format other than printed.

This has led to individuals using multiple devices to access information stored centrally in the servers or on corporate networks on their personal devices. This is what is referred to Bring Your Own Device (BYOD) phenomena. However, with information being easily accessible there is the threat of security and information stored on personal devices landing in the wrong hands. In a study conducted by ESG Group (2009), it came up with a report that revealed that 86% of the large organizations in North America believed mobile devices are critical or important for business processes and productivity.

According to Bill Bodin, CTO Officer for Mobility IBM, "Enterprises must ensure the security and control of their data regardless of where it is. This includes employee owned mobile devices." With the rise of all this mobility hulla baloo, comes the need for Mobile Risk Management (MRM) as more users adopt the mobile devices. This calls for Mobile Information/Content Management (MI/CM) and measures taken in regard to Mobile Information Management (MIM) and Mobile Application Management(MAM).

Jack Madden, in his book: Enterprise Mobility Management: Everything you need to know about MDM, MAM, and BYOD, 2014 Edition, he had this foreword. "This book is for anyone who's noticed the hype around enterprise mobility management: It's for people who've heard of Mobile Device Management (MDM) and want to know how it works. It's for people who have observed the debate between MDM and Mobile Application Management (MAM) vendors and want to know how they fit together. It's for people who've heard ominous warnings about the dangers of BYOD and want to see what the big deal is. He continues that, "This book is for users who want to understand what their company is doing; users who think it's ridiculous that they have separate work and personal phones. It's for users who don't want to give up control of their

phone to their company. And it's for users who just want to be able to bring in a phone or tablet in the first place.

1.2 Problem Statement

There are a number of vendors who have solutions that support a number of platforms, from iOS devices, Android devices, Windows platform, Symbian and Blackberry. Consumerization of IT (CoIT) trends and the momentum of BYOD are unstoppable. Although many organizations support mobile devices, there are multiple mobile platforms. Managing these multiple platforms is an arduous task (Jan Wiewiora, 2011). Organizations are grappling with the wide variety of mobile devices being taken up in organizations either with the approval of the management as is the case with Bring Your Own Device (BYOD) or without outright approval of the management as is the case with Consumerization of Information Technology (CoIT).

According to Zumerle and Hill in their Gartner Report 2015, "50% of employees will be accessing enterprise data from devices for which there is currently no solution for enterprise management/visibility by the year 2018". In their call for strategic planning in the future they predict that, "By 2020, 70% of enterprises will treat the entirety of their endpoints as untrusted platforms, regardless of whether they are enterprise or privately owned, up from 20% today." All devices have a lifecycle that they go through in a corporate network. Figure 1-1 shows an example of the lifecycle of a mobile device.

With BYOD the users will come with a device but before it can access the corporate network, it goes through a cycle in order to access the corporate resources. IT department can make use of User profiles by use of apps that help in auto-registration and ease deployment of security and other settings on a device once its authenticated and hence auto-provisioning. The ubiquity of mobile devices, cellular networks and Wi-Fi hotspots means there are more chances than ever for sensitive data to find itself in the wrong place at the wrong time (Jake O'Donnell 2015).

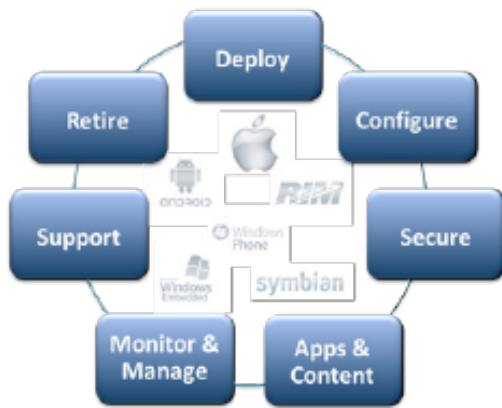


Figure 1-1: Life cycle of a device on a corporate network [source: IBM Whitepaper]

The challenges of managing ICTs in the new ecosystem include multiple devices of different standards and these do pose a problem to support staff in managing all of these devices since they have to learn how to support many different devices. Security standards of all these devices are another problem especially when this not well documented and understood as they may pose a security threat. Another challenge is that Information Systems (IS') Users access the network from remote locations using their personal devices such as mobile devices, laptops and tablets and this opens the corporate network to security threats and vulnerabilities. Yet, organizations worldwide are seeking greater employee mobility for a variety of business and quality of life reasons. Key to becoming a 'mobile enterprise' is the ability to manage and secure the identities and data within an IT ecosystem whose boundaries are becoming increasing blurry (Mor Ahuvia (2015).

There is need for the organizations in Kenya to clearly understand the importance of these factors influencing adoption so as to address them in order to get to a position where they can take advantage of the benefits of Enterprise Mobility Management (EMM) Solutions in the form of BYOD and CoIT.

1.3 Research Objectives

The main Objective is to find out the factors related to technology, organization and external environment influencing the adoption of Enterprise Mobility Management in Organizations.

The specific objectives then are as follows:

- (i) To estimate the **extent** of CoIT and BYOD in Organizations in Kenya
- (ii) To investigate technology factors that **influence** the adoption of EMM solutions in Organizations in Kenya.
- (iii) To investigate organization factors that **influence** the adoption of EMM solutions in Organizations in Kenya.
- (iv) To investigate external environment factors that **influence** the adoption of EMM solutions in Organizations in Kenya.

1.4 Significance of the Research

Recently there was a tendering process for the national assembly to acquire 545 iPads for the legislators to use them in their daily house business. On the other hand the parliament in our neighbouring country Uganda has already rolled out the iPads and 450 members of parliament are using the iPad but with the usual tools such as email and Dropbox to share information and files amongst themselves.

This research is meant to help understand what is entailed in Enterprise Mobility Management [EMM] Solutions and the pros and cons of the same. It will also look at the best practices in implementing EMMs and the best solutions and vendors to choose from. The mobile device management market has evolved into the enterprise mobility management suites market. EMM is growing quickly, and the vendor landscape has changed significantly, which will impact IT leaders' choices, Gartner Magic quadrant (2014). It is also going to help organizations understand better the need for Consumerization of Information Technology (CoIT) and the need for telecommuting to increase employee productivity.

There is little research done regarding this subject and with such little knowledge in the public domain especially in the third world, it's a field that requires intimate knowledge and rigor in achieving the objectives set forth. SafeNetInc in their 2015 report had this to say, "Organizations worldwide are seeking greater employee mobility for a variety of business and quality of life reasons. Key to becoming a 'mobile enterprise' is the ability to manage and secure the identities

and data within an IT ecosystem whose boundaries are becoming increasingly blurry.” Enterprise Mobility can be better depicted as Figure 1-2.



Figure 1-2: Enterprise Mobility [Source SafeNet Inc 2015]

1.5 Assumptions of the Research

The assumptions made in this research are:

- i) This research was based on a survey of organizations based in Nairobi Kenya
- ii) The data collected was uniformly distributed.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The term CoIT has various definitions so far, the one chosen for the purpose of this study is by Harris et al. (2011, p. 2) that defines CoIT as “the adoption of consumer applications, tools and devices in the workplace.” Niehaves et al (2012) in their Working Paper 13, Towards an IT Consumerization Theory, observed that, IT Consumerization is considered to be a major driver that redefines the relationship between employees (in terms of consumers of enterprise IT) and the IT organization [...] and this trend is perceived as contributing significantly to work performance. This resonates with the moderating variable chosen for this study, Performance Expectancy [PE].

With all the current trends in ICT and mobile and cloud computing, users are faced with the dilemma of what to adopt with the changing tides of time. We have mobile Apps now available in the form of Software-as-a-Service (SaaS) and no more complex Server virtualizations. In the PWC (2011) report, they argue that today’s CoIT trend is the culmination of a fundamental shift in the relationship between employers and employees. Saxena and Lanier (2010) in their white paper on ‘Mobility Meets Complex’ observed that “Organizations recognize the value in optimizing mobile business processes through technology solutions that can track, measure, and monitor field events, improving work efficiency and visibility. However, the application of technology to the highly-mobile field force has proven to be a challenge, especially in complex environments.”

The thematic area of Enterprise Mobility management is quite new and there are not enough papers for discussion. However, the Industry and research firms have a good number of white papers discussing the pros and cons as well as the trends and the future. “Enterprise mobility doesn’t just transform business processes. It’s changing IT’s approach to security—forever” comment by Jake O’Donnell in a TechTarget (2015) report titled Modern Mobility - Enabling a mobile workforce. Alisdair Faulkner of ThreatMatrix California in the same report had this to say, “Mobile application management (MAM) and mobile content management (MCM) are two newer approaches that allow workers the freedom to use the tools they want while keeping corporate data within IT’s grasp.”

There are different theories that have tried to understand the effects of changes in IS and the following will play a vital role in understanding CoIT and the effects of the same in governance and of course criteria to use in adopting EMM solutions. The CIOs are playing catch 22 with the

Security requirements and the ever-changing technology trends. Big data analytics, Cloud computing and now the IoT is proving to be a race they might not win if they slack in implementing changes and especially if the organization culture is too rigid. Even the Government of Kenya has now finally stumped down its foot and enforced IFMIS for all its procurement needs.

2.2 Technology-Organization-Environment [TOE] Framework

Technology –Organization-Environment [TOE] Framework was devised by Tornatzky and Fleisher (1990) and it's a framework that has been adopted by many IS researchers to analyze the adoption of e-Business and Open Systems among others. It concedes that the process by which a firm adopts and implements technological innovations is influenced by the technological context, the organizational context, and the environmental context.

These three contexts are interrelated in such a way that the environmental context dictates the business forces such as competition and regulations and stakeholders who may support or hinder the innovation and adoption of new technology. The Organizational context deals with the Organizational culture, structure and change process in that how easy for the organization to implement and adopt to change. A good example is IBM whose culture is innovation-oriented and supports its employees in research and innovation. The technology context relates to readiness to embrace new technology. A good case is the change from enterprise hosted mail servers to taking mail to the cloud using Google Apps. This trend in Organizations in Kenya started with BRITAM, hot on their heels all other players especially vertical markets followed such that Old Mutual Insurance was next and now it's the order of the day.

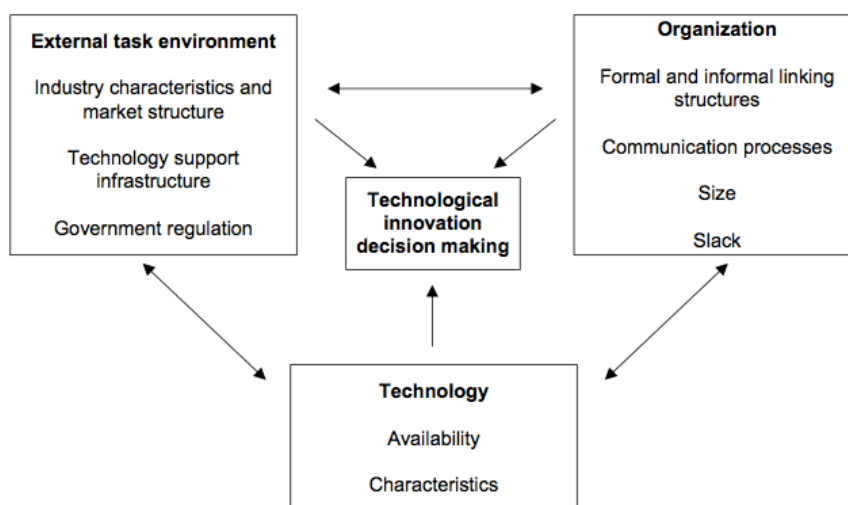


Figure 2-1: Technology Organization Environment Framework

2.3 Unified Theory of Acceptance and Use of Technology [UTAUT]

This theory by Venkatesh et al (2003) was deduced from eight [8] other theories namely, Theory of Reasoned Action (TRA), Model Combining the Technology Acceptance Model and Theory of Planned Behavior (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), Social Cognitive Theory (SCT) Technology Acceptance Model (TAM), Motivational Model (MM) and Theory of Planned Behavior (TPB). They argue that the use and behavioral Intention of a system is dependent on four constructs, which are independent variables; Performance Expectancy [PE], Effort Expectancy [EE], Social Influence [SI] and Facilitating Conditions [FC]. However, there are four moderating variables; Age, Gender, Experience and Voluntariness.

1. **Performance Expectancy [PE]:** the degree to which an individual believes that using a particular system would improve his or her job performance.
2. **Effort Expectancy [EE]:** the degree of simplicity associated with the use of a particular system.
3. **Social Influence [SI]:** the degree to which an individual perceives that others believe he or she should use a particular system.
4. **Facilitating Conditions [FC]:** the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of a particular system

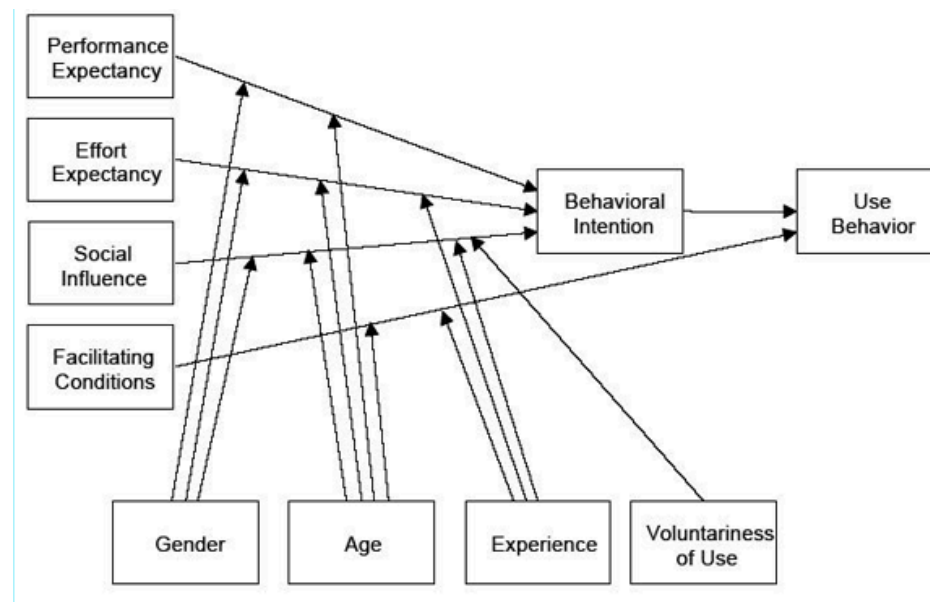
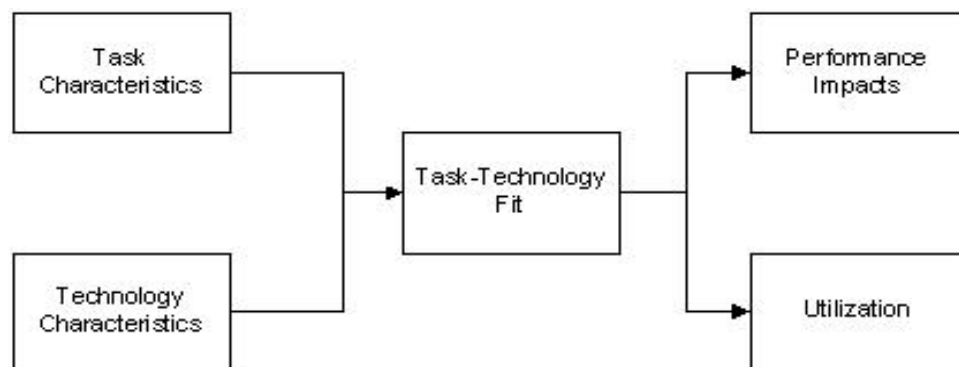


Figure 2-2: Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al (2003)

2.4 Task-Technology Fit Model

Task-technology fit (TTF) is an established theoretical framework in information systems research that enables the investigation of issues of fit of technology to tasks as well as performance (D'Ambra et al 2013). Task-technology fit (TTF) theory holds that IT is more likely to have a positive impact on individual performance and be used if the capabilities of the IT match the tasks that the user must perform (Goodhue and Thompson, 1995).



Source: Goodhue and Thompson, (1995)

Figure 2-3: Task-technology Fit Model

A later version of this model was developed by Gribbins et al (2006) and this one was focused on Mobile IS hence, Task-Technology Fit for Mobile IS [...] we provide more than a checklist of requirements and of stumbling blocks as the model can help identify the limits of IS management and help find alternatives.

This model will be applied in this research being that, there are issues to consider while choosing the right EMM solution for the company and the mobility aspect of the research. The management will have to consider all security issues and risk exposure and determine the Utilization benefit and Performance impact compared to their Risk appetite. On the other hand the end users are Technology and Task characteristics in achieving their maximum Productivity and the drawbacks or advantages achieved from the EMM implemented and how well it suits or Fits into their Tasks.

2.5 Conceptual Framework

Upon examination of the above models and relating to the problem statement, the authors deduced a conceptual framework shown in Figure 2-4.

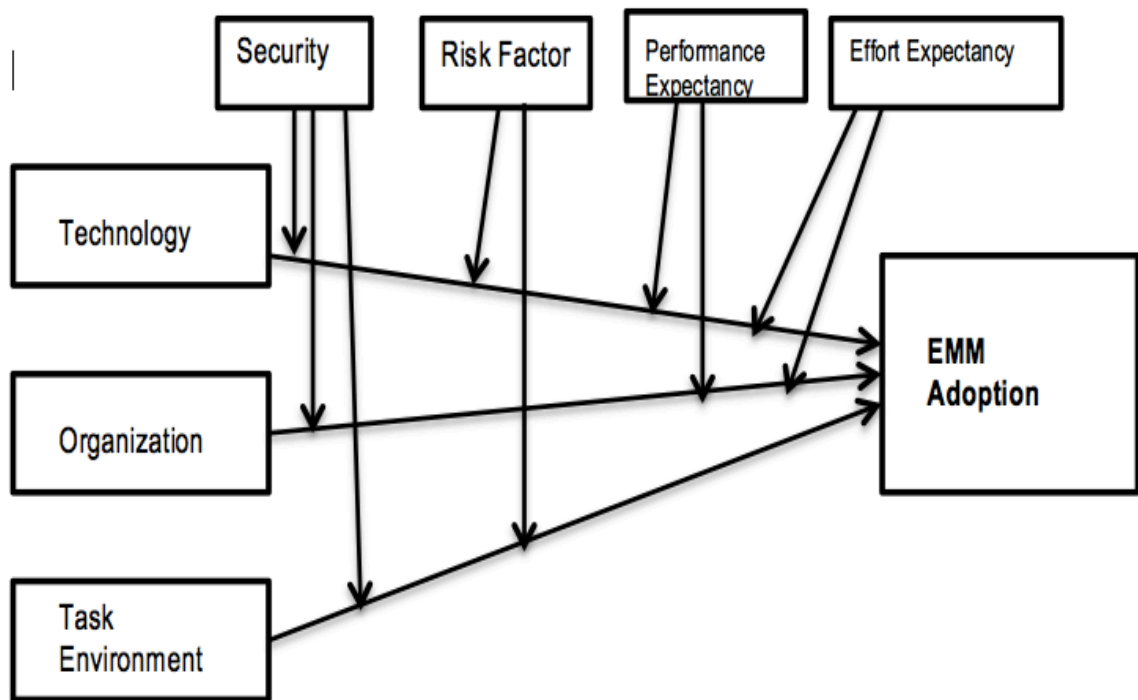


Figure 2-4: Conceptual Framework

2.5.1 Dependent Variable

1. EMM Adoption

CoIT and BYOD are determinants of how the Enterprise or organizations in Kenya are adopting the EMMs. Consumerization is seen as enabler for the next wave of productivity as observed by Andriole 2012b, Moore 2011 and it's also associated with the necessity of enterprise IT and process change. This means that its plays a vital role in the adoption of EMMs.

McNicol (2014) in a report for ABI Research noted that, "For employees to embrace enterprise mobility initiatives and more importantly policies, more flexible yet secure solutions are mandatory, hence the growing demand in MAM solutions." The technology innovation decision-making is directly influenced by these determinants of adoption i.e CoIT and BYOD.

The framework is adopted mainly from constructs of the TOE framework but some other theories have been considered in the understanding of the constructs.

2.5.2 Independent Variables

1. Technology

The regard to technological context; characteristics and availability are the main considerations. Olivera and Martins (2010) in the study of E-business, considered technological context in terms of technology integration into other systems and security applications. This resonates with the study as the researcher seeks to understand the extent of BYOD and CoIT in the adoption of EMMs in organizations in Kenya. The availability of personal devices and the new emerging technologies has reshaped the way people work. There are tools and applications at the disposal of IS users that enables them to access corporate networks and access data at the comfort of their homes or even from remote locations.

2. Organization

The organization context refers to the communication processes and how this affects the adoption of EMMs. It is commonplace to find that organizational notice boards are now electronic and especially with the security of employees, the easiest way to broadcast information is through their personal devices by way of email and text messages. On the other hand tools and Apps have been developed to assist file sharing and collaboration amongst employees. A good example is **Slack** an App that allows people within the organization to collaborate share meetings and even archive all notes generated by all team members. Slack as a tool is far-reaching, potentially including the edit history for workers' messages as well as messages workers have marked for deletion, if the supervisor so desires according to Zach Miners (ComputerWorld 2014). This will affect adoption of EMMs in the way that the organization treats formal and informal links.

3. External Task Environment

The external environment refers to the market structures and industry characteristics. In the Kenyan arena, it's the norm seeing that a certain organization sets the standards for the industry. A good example is the banking industry in Kenya, which has adopted mobile banking due to the proliferation of M-Pesa in country and reaching the unbanked and marginalized population. M-PESA demonstrates the value of leveraging mobile technology to extend financial services to large segments of unbanked poor people (Mas & Radcliff, 2010).

2.5.3 Moderating Variables

1. Security

The security threats and vulnerabilities dictate how the CIOs are bracing themselves to ensure minimal data leakage and separate the personal from corporate data being accessed on personal devices within and outside the organization. Mobile devices represent the proverbial

“weak link” in the security chain; therefore, poor mobile device security creates vulnerability for all critical systems on the corporate network (Jon Oltisik 2010).

2. Enterprise Risk Factor

The Risk appetite an organization has affects the amount of risk exposure they are willing to take when adopting a new technology. With Cloud computing and IoT, only the High Risk organization will be the early adopters and the risk averse will be late majority and some be laggards. Oltisik (2010) in a report on Mobile Device Management and Security Trends noted that there are so many new and disparate mobile devices literally “walking in the door,” it is not surprising that many enterprises are having difficulty with device management and security. In a white paper Oltisik (2012) analysed that the growing gap between mobile enterprise requirements and corporate IT capabilities as a whole is caused by the fact that existing IT infrastructure was not designed for mobility but the discontinuity is most acute with regard to IT security.

3. Performance Expectancy

Performance Expectancy this the degree to which an individual believes that using a particular system would improve his or her job performance. It has a subtle effect and this can be negative or positive depending on how it’s applied. On the positive side it can be seen as enablers for IS users to achieve or increase productivity and hence mobility achieved in their day-to-day work. On the negative side its about inhibitors to the ICT support staff being bombarded by numerous devices that access the corporate network and hence coping with security threats and vulnerabilities these devices pose causes them pain than gain in achieving their work performance.

4. Effort Expectancy

Effort Expectancy refers to the degree of ease associated with ease of use of the system. This variable moderates the technology in that it increases the rate of adoption if the mobile devices and technologies are easy to use and with little effort. BYOD and CoIT have allowed IS’ users to enjoy mobility and use their devices to work from any location anywhere and hence improve their productivity. In regard to the organization this variable has effects of changing the way organizations communicate and how they share and collaborate especially with geographically dispersed locations.

2.6 Operationalization of Variables

Table 2-1 shows the various variables used in the conceptual framework and their operationalization.

Table 2-1: Operationalization of Variables

Variable	Indicators	Sub-indicators
Adoption of EMM	BYOD	<ul style="list-style-type: none"> Number of people in the organization that use BYOD in terms of organization levels such as junior staff, mid-level management, senior management. Percentage of departments that allow BYOD example sales force or ICT support staff.
	CoIT	<ul style="list-style-type: none"> Number of devices and Apps approved by management Number of devices accessing the corporate network and data without management approval
Technology	Availability	<ul style="list-style-type: none"> What technological architectures are available to EMM users? What information is available to EMM users remotely?
	Characteristics	<ul style="list-style-type: none"> What is the nature of Applications used in the organization How can user data and corporate data be containerized?
Organization	Size and Structure	<ul style="list-style-type: none"> Number of employees that work remotely Number of locations the company allows for secure connections.
	Communication links	<ul style="list-style-type: none"> What channels of communication are approved by management within the EMM

		<p>users</p> <ul style="list-style-type: none"> • How do employees communicate in various levels of organization
External environment	Regulations	<ul style="list-style-type: none"> • What are the regulations and policies governing BYOD • Numbers of cases reported on average on violations of the regulations e.g Jailbroken iPhones.
	Technological Support	<ul style="list-style-type: none"> • What are the levels of support available to EMM users? • What applications are available remotely to EMM users?
	Industry characteristics and Market structures	<ul style="list-style-type: none"> • Level of improvement realized by new system in achieving innovation and competitive edge. • Percentage of increase in service delivery on adoption of the new technology.
Moderating	Performance expectancy	<ul style="list-style-type: none"> • Degree the EMM users will achieve their task performance by use of BYOD and CoIT.
	Effort expectancy	<ul style="list-style-type: none"> • Degree of use in achieving productivity and securing corporate by adopting the EMMs.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Approach

The research had a pre-study stage for establishing the organizations in Kenya, which are currently using EMMs, organized according to their sectors.

This is to be followed by the actual study in which mixed methods are to be used. The study seeks to understand the adoption of EMM solutions by organizations in Kenya.

3.2 Pre-study

A study with key EMM vendors was used to come up with a list of to enable the researcher to identify organizations and the sectors they represent who are using EMMs. The vendors studied include Microsoft (they sell the Azure solution) and IBM (they sell the MobileFirst solution, formerly Maas360).

The two vendors were selected because they are the only EMM vendors with local presence. The respondents were the representatives in charge of the vending companies. Face to face interviews were used to obtain a list of respondents, their sectors, contact persons and details. The pre-study lasted two [2] weeks. The list of organizations obtained from the vendors is presented in Table 3-1.

Table 3-1: List of sectors and organizations sampled

Sector	Name of Organization
Financial & Banking	1. Standard Chartered 2. Barclays 3. CFC Stanbic 4. Chase Bank 5. Diamond Trust Bank 6. GT Bank Ltd 7. Commercial Bank of Africa 8. Faulu Kenya 9. Equity Bank Group KWFT Bank
Service	1. Kenya Airways

	<ol style="list-style-type: none"> 2. KPMG 3. Deloitte 4. Old Mutual 5. Jubilee 6. KAPS 7. PwC
Healthcare	<ol style="list-style-type: none"> 1. Phillips Healthcare 2. GlaxoSmithKline 3. Bayer Healthcare 4. Aga Khan Hospital 5. Avenue Hospital 6. Beta Healthcare 7. Getrude's Hospital
Oil & Gas	<ol style="list-style-type: none"> 1. Tullow Oil 2. National Oil corporation 3. Oil & Energy Services Limited 4. Kenol Kobil Limited 5. Total Kenya Limited
Academic	<ol style="list-style-type: none"> 1. Strathmore University 2. Riara University 3. Africa Digital Media Institute 4. Brookhouse Schools 5. University of Nairobi 6. Kenton College & Preparatory School
Research	<ol style="list-style-type: none"> 1. Ipsos Synovate 2. Milward Brown East Africa Ltd 3. ICRAF 4. ILRI 5. Consumer Insight 6. ICIPE
Manufacturing	<ol style="list-style-type: none"> 1. Bidco Limited 2. Unga Limited

	<ul style="list-style-type: none"> 3. Nestle East Africa 4. La Farge 5. Unilever Kenya 6. PZ Cussions 7. Sadolin Paints 8. SKF Kenya Limited <p>Ramco Group</p>
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3.3 The Main Study

The research is based on mixed methods mainly quantitative research, which is to be conducted using the descriptive survey method. The qualitative part of the study will be conducted using content analysis. For the quantitative study, open-ended questions will be included in the survey questionnaire.

3.4 Research Design

This study uses a quantitative research method in the form of a descriptive survey. This is due to the fact that IT consumerization is a contemporary topic that has not much been described in scientific literature, other sources of information will therefore be consulted to form a foundation for this research.

3.5 Population and Sampling Method

The sampling method selected is the purposive sampling and the sample selected to be a fair representative of each sector of the industries represented. The sample selected in each sector is to represent minimum 50% of the number of organizations used per sector.

Table 3-2: Population and sample size

Sector	Population Size	Sample size
Manufacturing	9	5
Services	7	4
Academic	6	3

Oil & Gas	5	3
Healthcare	7	4
Research	6	3
Financial & Banking	10	5
TOTAL	55	27

Within each organization, convenient sampling will be used to identify the ICT manager and users who will respond. The users will be those who have participated in the EMMS. The study will target 1 ICT senior manager and 4 users.

3.6 Sources of Data/Information

The fact that this area of research is quite uncharted, source of primary data is from the sample drawn purposively selected for the study. As for EMM solutions in the market, I will get secondary data from published reports such as Gartner and IBM amongst other sources such as company websites.

3.6.1 Instruments of Data Collection

Semi- Structured questionnaire

Semi-structured questionnaires comprise a mixture of closed and open questions. This method was selected due to the need to accommodate a large range of different responses from companies. The study was descriptive in nature to enable gather all data and information required to get the correlation between the factors that determine the adoption of Enterprise Mobility Management. This method was used for both ICT manager and End users to explore their views on the questions asked to get the qualitative research. The use of semi-structured questionnaires enables a mix of qualitative and quantitative information to be gathered. questionnaire they are given the opportunity to express his or her opinions from a set of options.

Unstructured Interview

The Unstructured Interview is less formal type with sets of questions used but the interviewer freely modifies the sequence of questions, changes wording and sometimes explains them or adds to them during the interaction. However, researcher has to be careful in order not to

deviate from his/her focus. The atmosphere is often casual and conducted in an opened situation where there is more flexibility and freedom in the interaction.

3.6.2 Validity and reliability

Reliability is the extent to which assessments are consistent. The values for reliability coefficients range from 0 to 1.0. A coefficient of 0 means no reliability and 1.0 means perfect reliability. A reliability of above .80 is very good reliability and one below .50 would not be considered a very reliable test.

3.7 Data Analysis

Descriptive Statistics for the Quantitative data

Descriptive statistics in data analysis helps describe show or summarize data in a meaningful way and assist see patterns that might emerge from the data.

The data analysis consisted of the frequency of the respondents on the difference objectives that helps analyse the specific objectives stated.

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter presents a summary of the results and findings of the study in relation to the research objectives.

4.2 Response Rate

Table 4-1 presents a summary of the findings with respect to the response rate sent to End user and IT manager respondents in different industries in the Kenyan market place.

Table 4-1: Response Rate

Type of the Respondent	Questionnaires Issued	Questionnaires Returned	Response Rate (%)
End User	90	72	80.0
IT Manager	27	24	88.9

The total number of questionnaire obtained from end users of EMMs was 72 representing a response rate of 80%, while that of IT managers was 24, representing a response rate of 88.9%. This rates represent are good are will give a better representation of the earlier intended sample size.

4.3 Demographic information

An analysis of the demographic data was carried out to have a clear understanding of the socio-demographic characteristic of the sample data used in this study.

4.3.1 Industry of the respondents

The results of the findings in

Table 4-2 depict the respondents with regards to the industry of the respondents are showing.

Table 4-2: Industry of the Respondents

Industry of Operation	Number of End User & ICT Managers	Percentage(%)
Financial and Banking	16	16.7
Service Industry	22	22.9
Healthcare	10	10.4
Oil and gas	10	10.4
Academic	12	12.5
Research	8	8.3
Manufacturing	14	14.6
Print and Media	4	4.2
	96	100

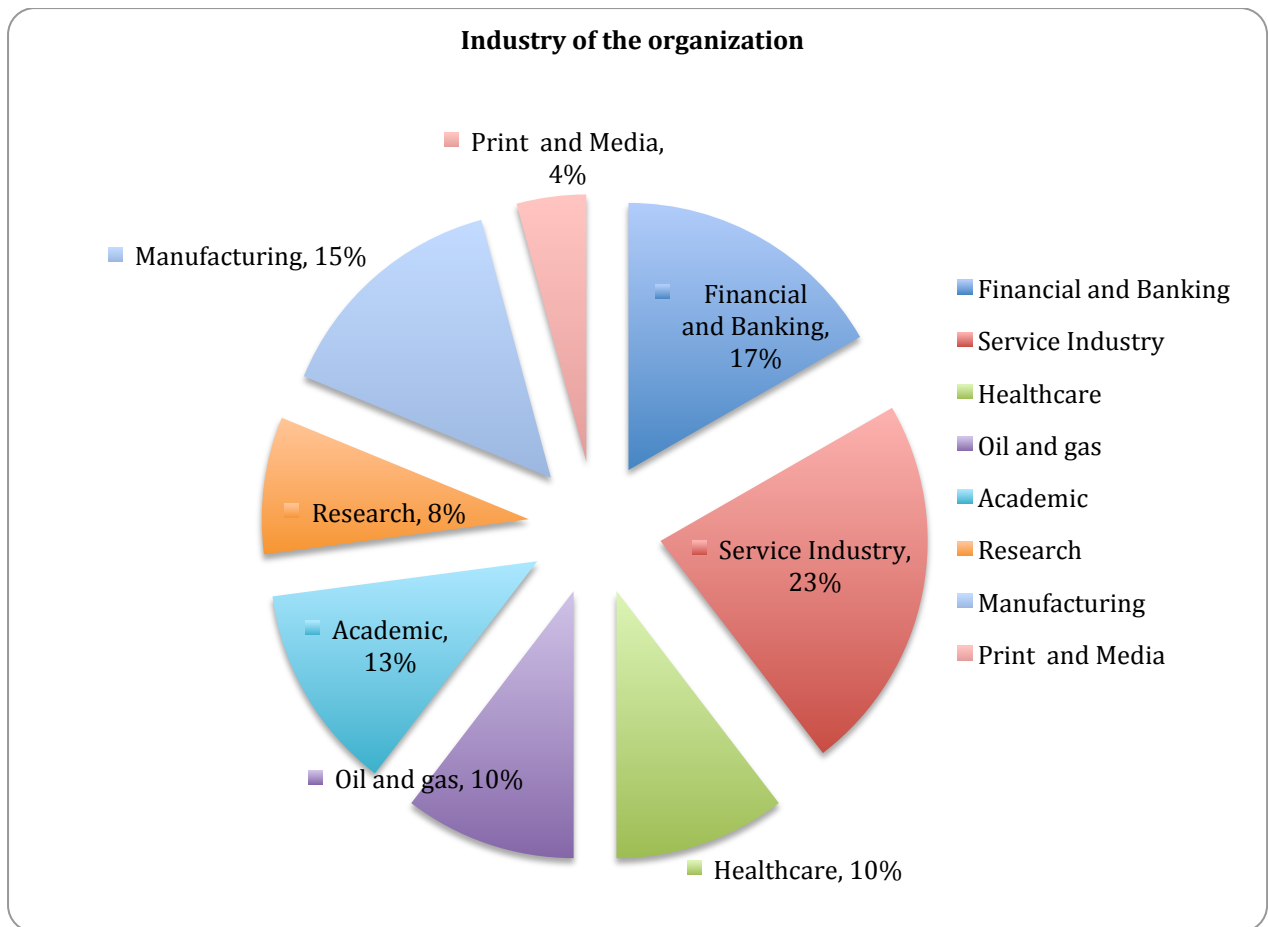


Figure 4-1: Industry of the organization

The above table and pie chart shows that majority of the respondents were from service industry at 33.6%, followed by financial and banking at 21%, academic and oil & gas at 12.5%, health care at 8.3%, research, manufacturing and print media at 4.2%.

4.3.2 Number of Employee

The Figure 4-2 presents the range of the number of employees of the organizations the respondents belonged to.

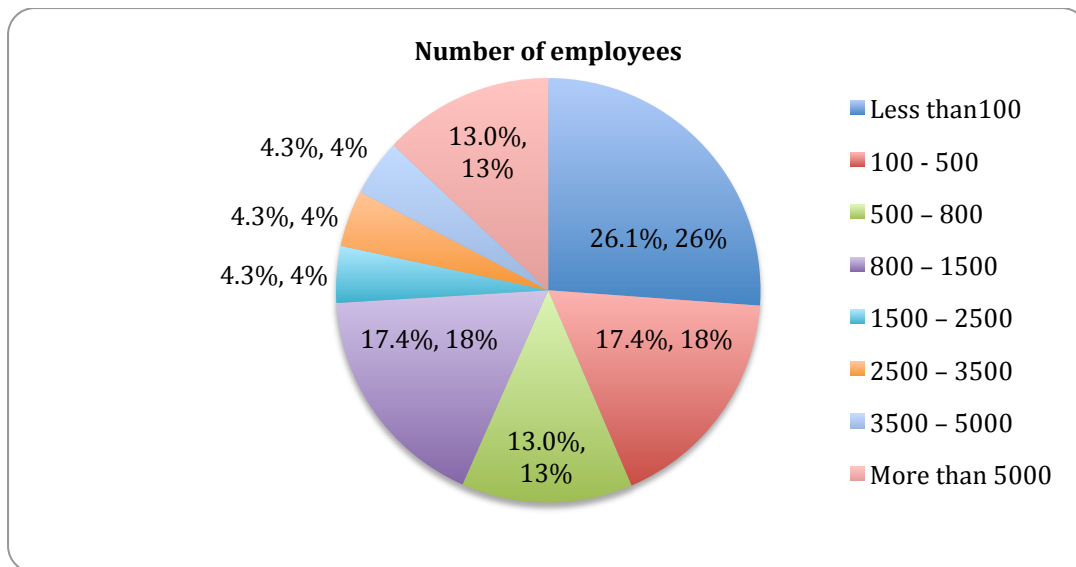


Figure 4-2: The number of employees

The findings indicate most of the respondents belonged to organizations with less than 100 employees at 26%, followed by 100-500 and 800-1500 at 18%, then 500-800 and over 5000 employees at 13%, and finally 1500-2500, 2500-3500 and 3500-5000 employees at 4%. This implies most of the respondents were from small medium enterprises. Most of the SMEs do not have very established IT infrastructure and would find adoption of EMMs effective and cost cutting in boosting the productivity of its employees.

4.3.3 Channel of Communications used in the organization

Table 4-3 presents the results of the findings with regards to the channel of communication the respondents' organizations are currently using.

Table 4-3: Channel of communication

Channel of Communication	Number of Responses	Percentage(%)
Social Media	37	16.6
Emails	55	23.9
Company Notice Board	22	9.9
Memos	33	14.8

Intranet	30	13.4
Departmental Meetings & Briefings	44	19.7
Missing values	2	1.7
Total	223	100

This question involved the application of multivariable response, and we expect the number N to be more than the total number of our sample space (sum of end users and the IT managers).

From findings, the respondents indicated that email is the leading mode of at 23.9%, followed by departmental briefings at 19.7%, social media at 16.6, memos at 14.8%, intranet at 13.4%, and finally company notice boards at 9.9%. 1.7% of the respondents did not respond to this question.

The Figure 4-3 below shows the pie chart representation of the channel of communications discussed above.

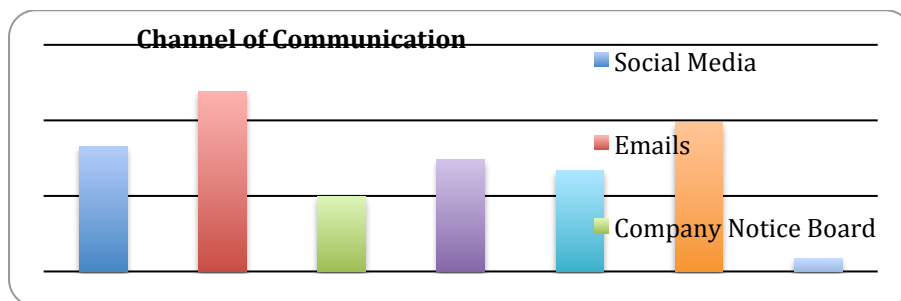


Figure 4-3: Channels of communication

4.3.4 Departments of the respondents

The Table 4-4 below shows the summary of the department the respondents belong to. The findings indicate that most of the end users interviewed were in the IT department at 36.1%.

Table 4-4: Departments

Department	Number of Responses	Percentage(%)
IT	26	36.1

Marketing	12	16.7
Finance	16	22.2
Planning & supply	4	2.8
Workshop	4	2.8
Operations	4	2.8
HR	4	2.8
Missing Value	2	13.8
Total	72	100

4.4 Findings on the Research Objectives

This section give that data presentation and analysis of the five research objectives stated in chapter one, they are analysed to see if they meet the objectives of the study and are further used in the chapter five in drawing conclusion and recommendation for this study.

4.4.1 The extent of the CoIT and BYOD in Organizations in Kenya

To study this objective, we analyse the finding on the extent to which IT managers in the organizations allow CoIT and BYOD, and the whether the end users are aware of BYOD and CoIT in their organizations. The section also examines the personal devices used by the employees of the organizations that are using CoIT and BYOD.

(i) Extent of allowance to use CoIT and BYOD by IT Managers

This section presents research results on the extent to which IT Managers allow the use of CoIT and BYOD in organizations.

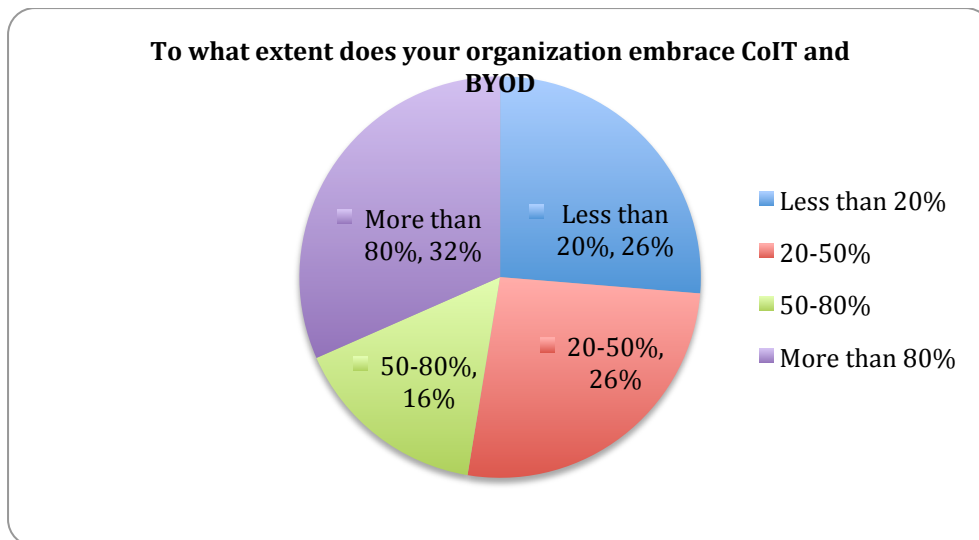


Figure 4-4: The level of CoIT and BYOD

From the Figure 4-4, the respondents indicate that there is a higher extent to which their organization allows CoIT and BYOD. 32% of the respondents indicated that the extent is more than 80%, 26% of the respondents indicated that is less than 20% and 20-50%, and only 16% of the respondents indicated that it is 50-80%.

(ii) End user Awareness of CoIT and BYOD in their Organizations

This section presents results on end users' awareness of BYOD and CoIT in their organizations. The findings indicate high level of BYOD awareness with 78% of the respondents indicating that they are aware, 19% indicating that they are not aware and only 3% not indicating their response.

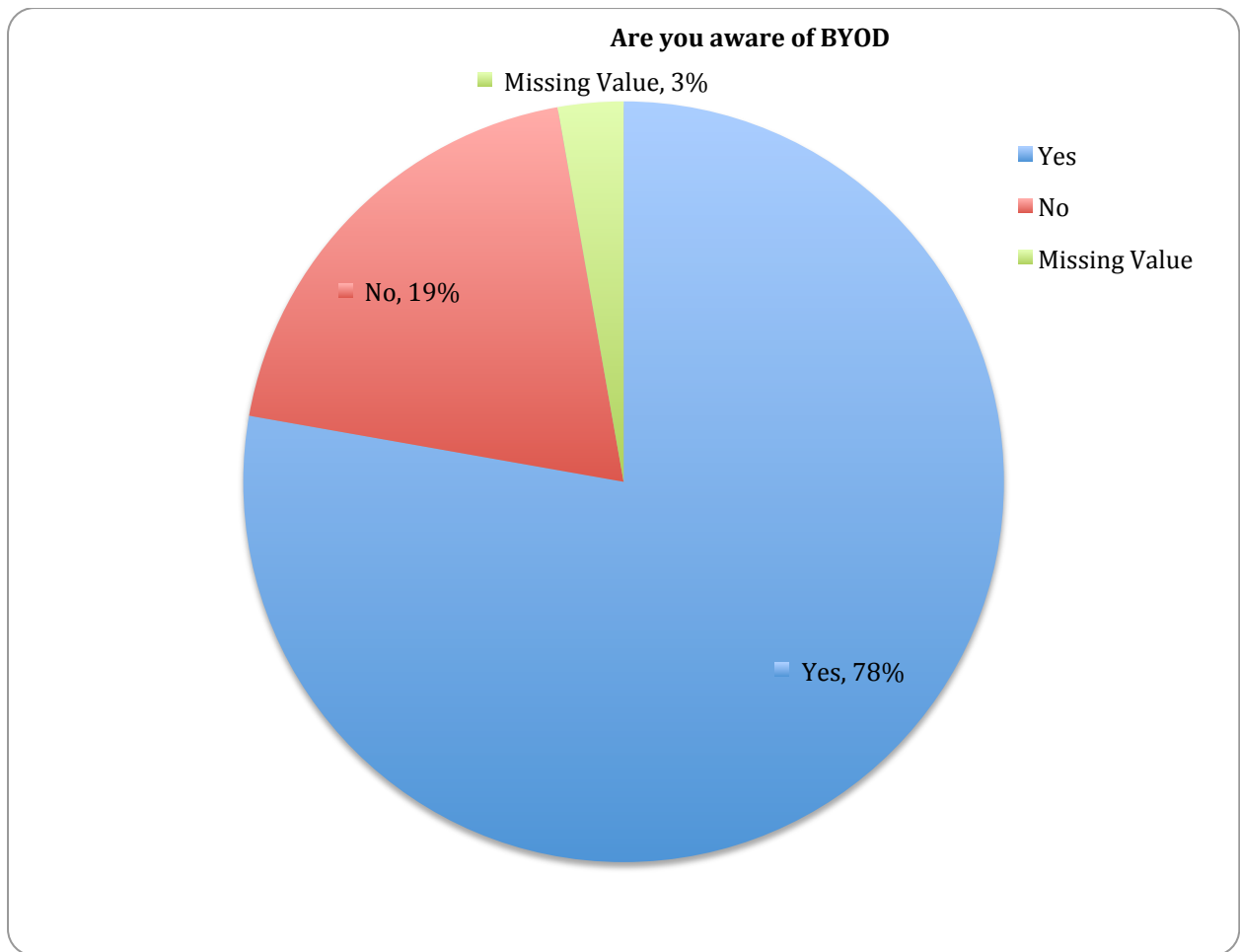


Figure 4-5: End Users awareness of BYOD

From the findings in Figure 4-4 and Figure 4-5, we can conclude that extending of awareness of CoIT and BYOD in the organizations in Kenya is in at least 50% of the organizations. This can be explained in terms of the good development of the Internet network in Kenya and the advent of smart devices in Kenyan market. This has encouraged companies to incorporate flexible working models. Also the advent of IT solutions for remote collaborations like Skype, TeamsViewer, Citrix and SSL extender have made it easier for employees to access the corporate network from remote locations.

(iii) Personal Devices Used

Figure 4-6 represents the results on the type of personal devices the end users use to enable them to working within and outside corporate network in organizations that are implementing CoIT and BYOD.

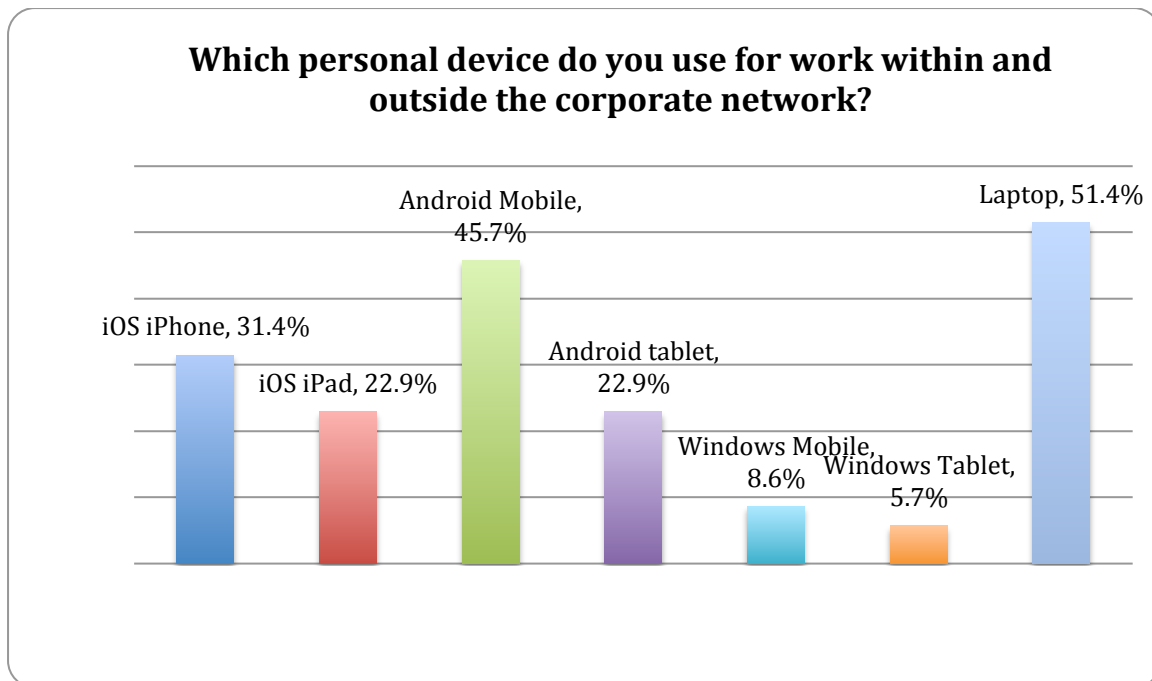


Figure 4-6: Nature of smart devices

The findings indicate that the most used device is laptop at 51.4%, followed by Android mobile phone at 45.7%, then Android tablet and iOS iPad at 22.9% each, while 8.6% use windows mobile and finally 5.7% use windows tablet.

4.4.2 The technology factors that influences the adoption of EMM solutions in Organizations in Kenya.

A number of technology factors were studied. Under the dimension of technology availability, technology architectures for implementing CoIT and BYOD were studied. Under the dimension of technology characteristics, data containerization techniques and the nature of applications used with CoIT and BYOD were studied.

(i) Technology Architectures for Implementing CoIT and BYOD

To test whether this objective was met, we analyse the architectures used by the organizations to allow the mobility of its end users, how the organizations containerize personal data and corporate data on personal mobile devices, the nature of applications used in the organization, the personal devices end users are using outside work and whether they get support from their remote locations.

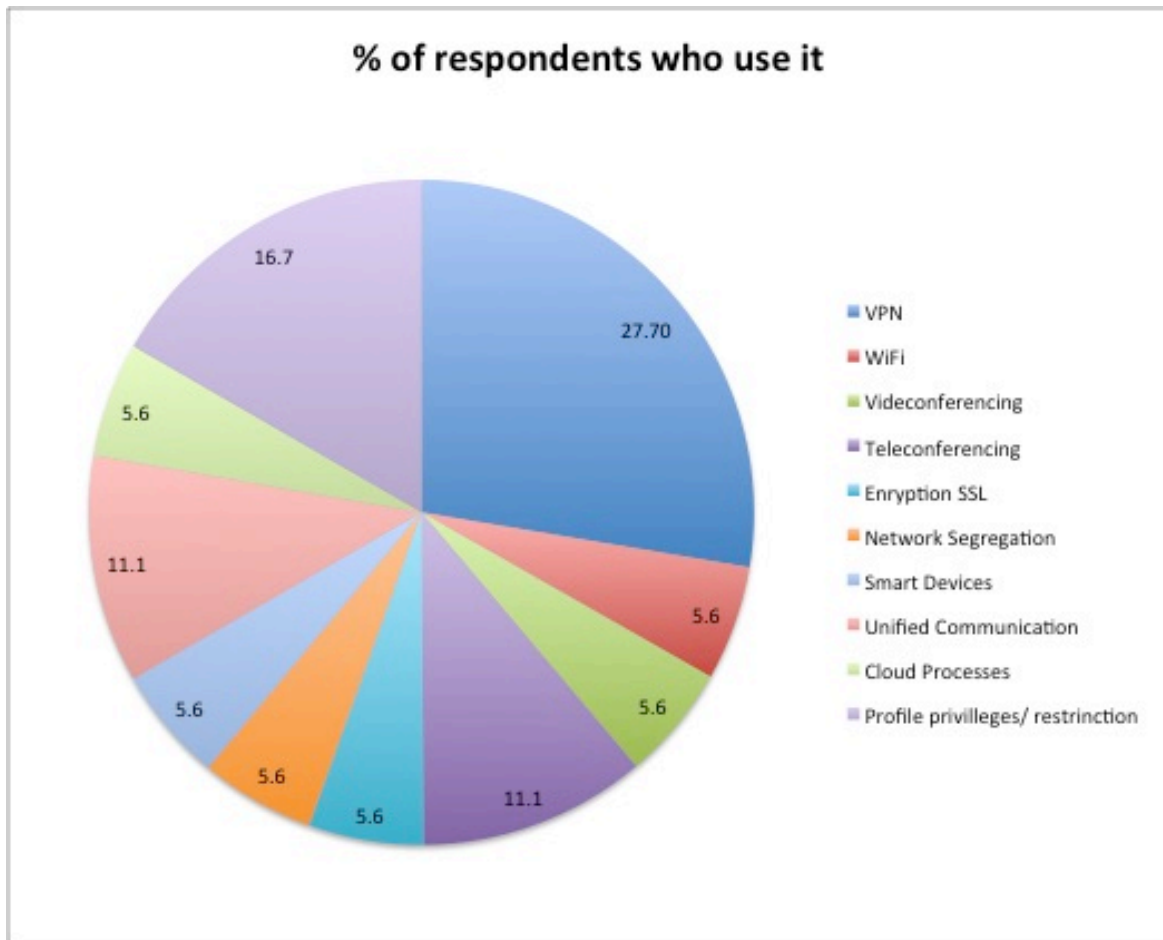


Figure 4-7: Percentage of respondents using various Architectures for CoIT and BYOD

As shown in Figure 4-7, the results indicate that VPN is the most used architecture in the organizations surveyed for the implementation of CoIT and BYOD policies with 27.8 % of the organizations using it for this purpose. The next most used architecture is profile privileges/restriction with 16.7% of the organizations using it to implement CoIT and BYOD. 11.1% of the organizations use unified communication and teleconferencing while 5.5% of the organizations indicated that they use Wifi, Video conferencing, Encryption SSL, network segregation, smart devices and cloud processes apiece.

(ii) Data containerization Techniques

This section looks at the data containerization techniques used

Table 4-5 shows the results of the findings on the different personal and corporate data containerization techniques used by various types of organizations in Kenya.

Table 4-5: Data containerizing Technique

Containerizing Technique	Number of organizations using the Techniques	Percentage (%) of Organizations using the Technique
Two factor authentication	9	11.8
VPN	9	11.8
CGXChange	5	5.9
Security awareness	5	5.9
Bit locker	5	5.9
None	47	58.7
TOTAL	80	100

The results indicate that most of the organizations have not employed containerization of data. This implies the personal and the corporate data contained in these devices is vulnerable to attacks from the hackers, virus, malware, and root kits. 58.7% of the respondents indicated that there is no containerization technique currently in use by their organizations, 11.8% indicated that they are using Virtual Private Networks (VPN) and two factor authentication apiece, while 5.9% of the respondents indicated they use CGXChange, security awareness and bit locker respectively as their technique for data containerization.

(iii) Nature of Applications

This section shows results on investigation into the nature of applications used with CoIT and BYOD in the organizations.

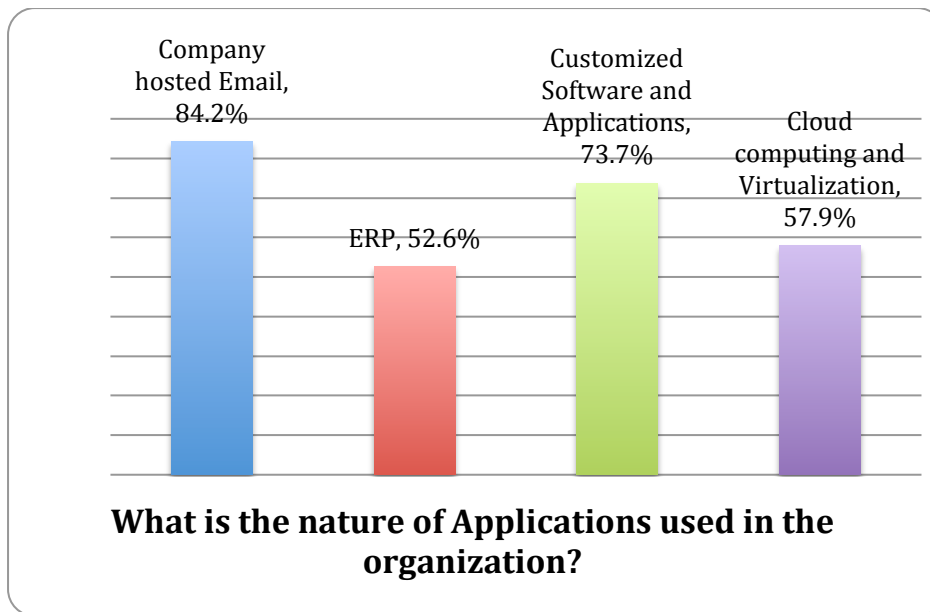


Figure 4-8: The types of applications used by organizations which support implementation of CoIT and BYOD

Figure 4-8 represents the findings on the nature of application used by organizations that support the implementation of CoIT and BYOD. The findings indicate the company-hosted email is the most used application in the CoIT and BYOD framework. 84.2% of the respondents indicated that email is the most used application, 56.2% indicated Enterprise Resource Planning (ERP), 73.7% of the respondents indicated customized software and application, and 57.9% indicated cloud computing and virtualization.

4.4.3 Organizational factors that influence the adoption of EMM solutions in Organizations in Kenya.

To study this objective, we analyse the results on whether there is Enterprise Mobility Management (EMM) solutions implemented in the organization and the extent to which the organizational cultures affect the adoption of EMMs. These factors are related to organizational size and culture. The other dimension studied is the regulatory environment within the organization for supporting adoption of EMMs.

- (i) Size and Culture and Adoption of EMMs
- (a) The Enterprise Mobility Management Solutions in the organization

Table 4-6 shows the findings on whether the organization has implemented EMMs solutions or not. 70.8% of the respondents indicated that no EMMs solutions are implemented in their organizations, 20.8% indicated that EMMs have been implemented, and 8.4% of the respondents did not respond.

Table 4-6: Adoption of EMMs Solutions in Organizations

Do you have EMMs implemented	Number of Organizations	Percentage (%)
Yes	17	20.8
No	57	70.8
Missing Value	6	8.4
TOTAL	80	100

(b) The organizational culture and EMMs adoption

From the findings in Table 4-7, the respondents indicated that organizational culture has to some extent affected the adoption of EMMs solutions. 45.8% of the respondents indicated that their organization's culture has affected the implementation of EMMs to some extent, 25% of the respondents indicated the culture has affected it to a large extent, 20.8% indicated the culture has not affected adoption of EMMs at all and 8.4% did not respond to this question.

Table 4-7: Organization Culture and EMM Adoption

To what extent has organization culture affects adoption of EMMs	Number of Organizations	Percentage (%)
To a large extent	20	25
To some extent	36	45.8
Not at all	17	20.8
Missing values	7	8.4

TOTAL	80	100
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The organizational culture, based on the sensitivity of the data held by the organization, may influence the organization's adoption of EMM solutions. Organizations may be reluctant to venture into EMM adoption because of the vulnerability they will expose their data to.

(ii) Regulatory Environment

Under the regulations sub-domain of the external environment, this study focused on the BYOD Policy in the organizations studied.

The BYOD Policy in the Organization

The Table 4-8 below gives the summary of the findings whether there is BYOD policy in the respondent's organization. The results indicate that most of the organizations have not implemented the BYOD policy. 54% of the respondents indicated no existence of the policy, 38% indicated that they have BYOD policy in place, while 8% did not respond to the question.

Table 4-8: Adoption of BYOD Policy in the Organization

Do you have BYOD policy	Number of Respondents	Percentage (%) of Respondents
Yes	30	38
No	44	54
Missing Value	6	8
TOTAL	80	100

4.4.4 External environment factors that influence the adoption of EMM solutions in Organizations in Kenya

To study this objective, we present findings on whether the respondents' organization interact with other firms and partners through the use of mobility solutions such as Mobile Apps and social

media, and how the current trends in technology such as cloud computing and social media have changed the way business is conducted.

(i) Industry Characteristics and Market Structures

Under this sub-domain of industry characteristics and market structures, we studied Interaction with other firms through mobility solutions and Development of technologies like cloud and social media in Kenya.

(a) Interaction with other firms through mobility solutions

From the findings, interaction with other firms has not greatly influenced the organization's adoption of EMMs. From the Table 4-9, 54.1% of the respondents indicated that the interaction of their organizations with others through mobility solutions has influenced their adoption to EMMs, 33.3% indicated that their organizations do not interact with others through EMMs and 12.6% of the respondents did not respond. Those that are using EMMs to interact with other organizations cited interactions in the form of online Purchasing systems, mobile payment systems, use of Skype for communication, Facebook, WhatsApp and twitter for interaction with their customers.

Table 4-9: Interaction with others through mobility solutions

Does your organization interacts with others through mobility solutions	Number of Organizations	Percentage (%)
Yes	43	54.1
No	27	33.3
Missing values	10	12.6
TOTAL	80	100

The findings hence indicate that though it's the sole initiative of the customer organizations to implement EMMs solutions, they are also influenced to adopt EMM solutions by the other organizations they work with.

(b) Development of technologies like cloud and social media in Kenya

The respondents indicated that the development of current technologies have propelled the implementation of EMMs solutions. In the Table 4-10 below, 75% of the respondents indicated that the advent of latest technologies in Kenya has encouraged their organizations to adopt cloud and social media technologies as EMMs. However, 8.3 % of the respondents indicated that the advent of new technologies has not influenced their organizations to take up cloud and social media technologies for official use. 16.7 % of the respondents did not provide a response.

Table 4-10: Effects of current technologies on EMMs solutions

Effects of current technology like cloud and social media	Number of Organizations	Percentage (%)
Yes	60	75
No	7	8.3
Missing values	13	16.7
TOTAL	80	100

The results indicate that development in Internet access has encouraged organization to invest in cloud computing. Cloud services like Software as a service (SaaS), Platform as a service (PaaS) and Infrastructure as a service (IaaS) have seen organizations host their applications in the Internet to allow for remote access. Uses of social media such as WhatsApp, Facebook and twitter has been adopted by all the major organizations studied for customer support.

(ii) Technical Support

This sub-domain focuses on provision of Support for Personal Devices.

Support for Personal Devices

As shown in Table 4-11, support for CoIT and BYOD to users has not been fully implemented in some organizations.

Table 4-11: Support to personal devices

Support on personal devices?	N	Percentage(%)
Yes	36	49.96
No	32	44.48
Missing Value	4	5.56
Total	72	100

49.96% of the organizations indicated that there is support offered to those using personal devices remotely, while 44.48% indicated that there is not support offered to them. Clearly, this situation needs to be improved. Policies to enforce support to these remote devices should be the number one strategy for the IT Manager.

4.5 Qualitative Analysis of the management comments

From the analysis the respondents indicated that the most used channel of communication in their organization is email, departmental briefings and social media.

On the part of the information that is available for remote access, they indicated that email is the most available, followed by databases then the general information. These are supported by Virtual Private Network (VPN) architecture as indicated by the respondents, through Wi-Fi in most of the respondents' premises. They also indicated that the development in cloud computing and internet-teleconferencing architectures have greatly enhanced the adoption of EMM solutions.

The data pushed for access by EMMs need protection through containerization. The respondents indicated that little has been done to containerize data. Most of the respondents said that their company has implemented nil techniques. Although some indicated that in cases of VPN architectures, they have been provided with secure login to the VPN. Other modes of containerization techniques cited by the respondents were: Two factor authentication, CGXCHANGE sync, Bit Locker, SOTI and creation of security awareness among the mobility solution users.

The respondents indicated that the company-hosted email is the major organization application that supports the EMMs. Others like Customized Software and Applications, Cloud computing and Virtualization and ERP were also listed as the company applications supporting EMMS.

The managers indicated that their organizations interact with other organizations through social media. They indicated that they mostly interact through twitter, followed by Skype and Facebook and then through WhatsApp. The advances in social media and cloud computing have contributed in increasing organization business productivity, public relationship and improved customer service.

4.6 Summary of Results

From the results obtained we have deduced the following;

- (i) **Objective 1 – To understand the extent of CoIT and BYOD in organizations in Kenya**
The authors concluded that the first objective on the extent of CoIT and BYOD in organizations in Kenya is prevalent as depicted by figure 4.4.1 with a 32% of the respondents attributing the CoIT phenomena within their organization. This is also confirmed and echoed by the more than 78 per cent (78%) of the respondents who answered the question on awareness of BYOD in their organization.
- (ii) **Objective 2 – Understand the extent of CoIT and BYOD in organizations in Kenya**
It was apparent that though a good percentage of the respondents are aware of BYOD and acknowledge the use of CoIT, the implementation of Enterprise Mobility Management solutions (EMMs) is still lacking in organizations in Kenya. This can be confirmed by the data obtained and shown in table 4.3.4 with respondents answer to Adoption of EMMs being no weighted at 70.8%. This is further confirmed by the respondents indicating little or lack thereof of the EMMs adoption. Table 4.3.5 indicates that the extent of EMMs adoption, 45.8% recorded not at all and 20.8% recorded little extent hence a combined weight of 66.6%.
- (iii) **Objective 3 – Factors affecting adoption of EMMs in Organizations in Kenya**
There are a number of organizational factors that affect the adoption of EMMs in Organizations in Kenya. This can be attributed to factors such as the organization side and culture. The largest number of organizations in Kenya are Small and Medium size Enterprises (SMEs) hence the adoption not that prevalent. On the other hand, the larger

the organization and cultures such as telecommuting and remote working locations has greatly enhanced the adoption of EMMs. Other factors such as regulations and BYOD policies have impacted the way people interact with different architectures and especially in terms of data containerization and access to organizational data from remote locations.

(iv) Objective 4 – External factors influencing EMMs Adoption in Organizations in Kenya

This objective was to investigate the external environment outside of the organization that influenced the adoption of EMMs in organizations in Kenya.

This objective sought to differentiate the factors outside of the organization that influenced the adoption of EMMs and according to extensive research, the improved access to internet connection with the under sea fiber cable has enabled organizations to have fast and easy end to end connections and hence enabled them to interact at little cost and with greater efficiency. Table 4.3.8 shows that current technologies such as Cloud computing and social media has a positive effect on organizations ad adoption of EMMs. Industrial characteristics and market structures have influenced the adoption of EMMs in organizations in Kenya due to the fact that there is need for personalized and swift reaction to ever changing customer needs. All organizations that have adopted EMMs cited the use of social media to handle their customer relations especially with Twitter and Facebook and address disgruntled customers and remedy any negative feedback.

The following moderating factors were eliminated and deemed to have no effect on the research.

- (1) Performance expectancy
- (2) Enterprise Risk Factor
- (3) Effort expectancy
- (4) Security

The resultant conceptual framework or model is as shown in Figure 4-9.

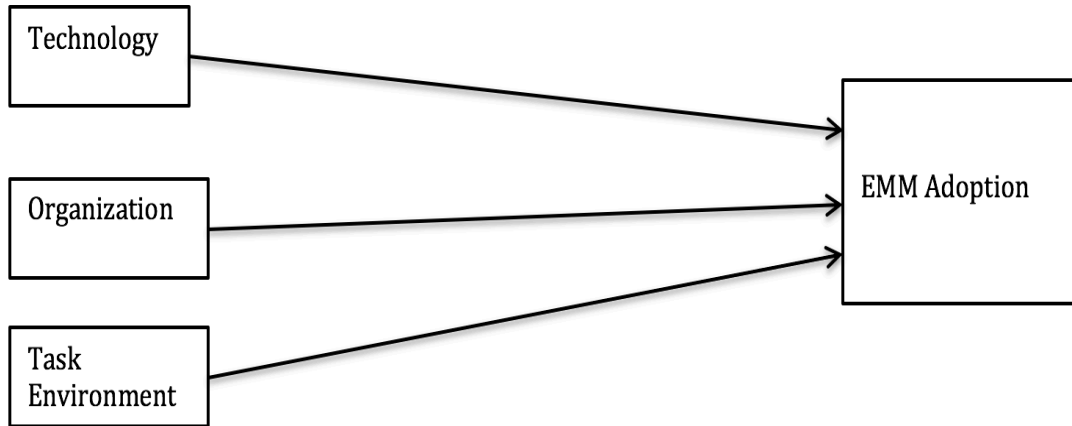


Figure 4-9: The New conceptual Framework

CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The content of this chapter has been divided into discussion, conclusions, recommendations, limitations and future research.

5.2 Discussion

The study is intended to find out the factors related to technology, organization and external environment influencing the adoption of Enterprise Mobility Management in Organizations in Kenya. The survey findings seem to be very aligned to the objectives of the study. The survey indicated that most of the channels of communication used by EMM users in the companies support the use of the Consumerization of Information Technology (CoIT) and Bring Your Own Device (BYOD) framework. The respondents indicated that they mostly use email as it can be easily be configured in their smart devices. IT departments in the organizations have embraced CoIT and BYOD to a great extent and have created good awareness of BYOD to their end users.

On the part of technology influence in adoption of Enterprise Mobility Management solutions (EMMs), the findings indicate that the best architecture for implementing CoIT and BYOD is Virtual Private Networks (VPN) and Unified Communications. These architectures offer versatile security features to avert threats to attacks on the data by hackers.

The technology used in the nature of the applications by the organization also supports EMMs. The respondents indicated that they mostly use hosted emails, Enterprise Resource Planning (ERP), customized software, cloud services and virtualizations. The technology used in implementing these applications is compatible to the implementation of EMMs. The advent of more smart devices in the Kenyan market has also encouraged the implementation of EMMs. Today, we have laptops, android, windows, and iOS tablets and mobile phones. These devices can use hotspot WiFi or Long-Term Evolution (LTE)/4G high speed wireless communication for mobile network to access the internet hence allowing the end users access their applications that are either hosted or through the local intranet using products like Secure Socket Layer (SSL) Extender or Citrix clients. The end users also indicated that they get 24-hour support from the IT department staff on how to configure emails, Google Apps, configuring the SSL extender and Citrix client. Generally, the technology in

network architecture, applications, smart devices and the support level from the IT staff has influenced the adoption of Enterprise Mobility Management in Organizations in Kenya.

The survey findings indicated that the organizational factors have influenced the adoption of Enterprise Mobility Management in a number of ways. Firstly, they have embraced the idea of CoIT and BYOD by allowing the end users to bring their personal devices. Secondly, allowing flexible working hours and locations of work, thus encouraging remote working away from the desk. Thirdly, they have incorporated in-house teams of web designers and application developers to always ensure that the applications accessed remotely are always available. Fourthly, the organizational culture, BYOD policies and regulations nurtured by the organizations have encouraged EMMs implementation. Nonetheless, the findings indicate that more needs to be done on the part of EMM solutions implementation by the organization.

On the part external environment's influence on the adoption of Enterprise Mobile Mobility, the findings indicate that interaction with other firms that have already implemented mobile mobility has considerable influence in the implementation of EMMs. Developments in technologies such as the cloud infrastructure and social media networks have contributed immensely to the growth and adoption of EMMs. The implementation becomes simpler and easy because there is already a laid infrastructure, which tends to lower the initial cost and makes the overall capital expenditure less. Further, development of mobile computing facilitated by the meshed fibre and Wi-Fi from many of the mobile providers offering 3G and LTE/4G mobile networks have made possible easier access of Internet connectivity, thereby enhancing mobile computing.

There is no doubt that EMMs have provided platforms for organizations to better interact with their internal end users and external partners. The flexible work schedule has enabled change of monotony from the traditional office set up thereby setting pace for high employee creativity and break from the norm. This is likely to improve employee productivity, which cascades to the organizational output.

5.3 Conclusions

The research clearly depicts that most organizations in Kenya have already implemented EMMs, and are adjusting to have optimal returns from their investment in EMMs. The extent of adoption and awareness is to great extent developed. Firms are able to enjoy the benefits that come with EMMs. End users in particular have seen improvement in communication speed, feedback from

customers, and the possibility of improved productivity. It is agreed that the use of EMMs has contributed to improving their way of working in the organization and to some extent improved their performance and task execution.

Companies that adopt the CoIT and BYOD framework realize some level of improvement in achieving competitive edge and innovation. This also raises the demand for the highly skilled employees who have the expertise to implement robust EMM projects. The stakeholders in the organization need to find a better trade-off between the opportunities gained from EMM implementation versus the potential threats that come with it if they do not put proactive security measures in place. They should do thorough analysis and close this gap between their current IT capabilities, their security strategy, and the necessary resources to help realize the maximum benefits from the EMMs implementation. They must be agile enough to realize the pool of data that will be made available by implementing EMMs has the potential to create utmost business value and gain higher competitive advantage but it must be protected.

The technical and organizational challenges addressed in this study should be addressed first by the organization before full potential of EMMs implementation can be realized. The issues on containerization of data, BYOD regulation policy and the EMMs security must be addressed by organizations.

5.4 Recommendations

The benefits that accrue from investing in and implementing EMMs should make organizations increase their investments in these new technologies.

The test-and-learn mentality has enabled many organizations to achieve successful implementation of EMM initiatives, as opposed to wait-and-see mentality that other people would wish to adopt to see whether it works for other organizations before they can take the step of implementing the same technologies in their organization. Organizations need to understand that the world has become a global village and with the good internet connectivity, IT infrastructure and cloud architecture already affordable in Kenya, soon we will not need to have seriously set office infrastructure but rather conference room for just sign off with the client. Aspiring business leaders should take this initiative and embrace the working culture that allows staff flexibility in terms of locations from where they can work at any time of the day as long as they can be connected to the internet.

Organizations wishing to take this move should focus on the best approach in implementing their EMMs. They should adopt the best technology in laying their network architecture, apply the best methods in data containerization, and come up with good and acceptable BYOD policies and regulatory environment.

5.5 Limitations

Due to the high restrictions in the security policies in most of the organizations, especially in the financial and banking sector, some respondents were reluctant to give information on security policies and data containerization techniques they have used. This meant that getting timely and comprehensive information from the respondents was cumbersome.

The number of organizations sampled was all from Nairobi County. This was mainly because adoption of EMMs in organizations outside Nairobi is low. Therefore, the generalizability of the results to the whole of Kenya was not as anticipated at the beginning of the study.

5.6 Future Research

There will be need to sample respondents for a similar study from the whole of Kenya. This is with the hope that access to Internet in the other towns and counties will keep improving so that there is a better chance of having organizations in these places that adopt EMMs. This will lead to better representation and generalizability of results.

There will also be need to benchmark the Kenyan case against other countries in the developing and well as the developed world. This will offer further understanding and insights on how well Kenya is doing in terms of EMM adoption.

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APPENDICES

Appendix 1: ICT Manager Questionnaire

My name is Hellen Mutungi, undertaking a Master degree in Computer science at University of Nairobi, Chiromo Campus kindly request your assistance in filling this questionnaire for my research project. Your input is considered confidential and will be treated so and its for purposes of educational use only and not for commercial purposes.

The thematic area of my research is 'The Extent of Enterprise Mobile Management Solutions'and how its influenced by the Technology and Organization – Environment changes.

SECTION A: General Information

For the questions in this sections please tick the appropriate answer

1. Nature of your organization

Financial and Banking

Service Industry

Healthcare

Oil and Gas

Academic

Research

Manufacturing

2. Number of employees

Less than 100

100 - 500

500 - 800

- 800 - 1500
- 1500 - 2500
- 2500 - 3500
- 3500 - 5000
- More than 5000

3. What channels of communications do you allow in the office?

- Social Media [Whatsapp, text messages, Skype]
- Email
- Company Notice Board
- Memos
- Intranet
- Departmental Meetings and Briefings

4. Do you allow your employees to use their personal devices in the organization to access company network and resources?

Yes [] No []

SECTION B: CoIT [Consumerization of Information Technology], BYOD [Bring Your Own Device] and Technological Environment

1. To what extent does your organization embrace CoIT [Consumerization of Information Technology] and BYOD [Bring Your Own Device]?

- less than 20%
- 20-50%
- 50-80%
- more than 80%

2. What architectures do you employ in your organization to enable mobility for your users?

3. What information is available to your end users accessing company resources remotely

4. How do you containerize personal data and corporate data on personal mobile devices?

5. What is the nature of Applications used in the organization?

- Company hosted Email
- ERP
- Customized Software and Applications
- Cloud computing and Virtualization

6. Do you have BYOD policies and regulations in the organization?

If Yes list them _____

7. What is the average number of cases reported on violations of the Policies and regulations in the organization?

8. Do you allow employees to work remotely in the organization?

Yes [] No []

If Yes what number _____

9. Do you have specific locations that allow employees to connect securely into the company network and resources?

Yes [] No []

If Yes how many? _____

10. Do you have an in-house Apps development team?

Yes [] No []

If Yes explain briefly _____

SECTION C: Mobility Management and Productivity

1. What is the number of Apps approved by management?

2. Do you have an Enterprise Mobility Management Solutions [EMMs] implemented in your organization?

Yes [] No []

If Yes explain briefly _____

3. What are the technological factors that have influenced the adoption of EMMs in your organization? List and briefly explain

4. What is the number of devices accessing the corporate network without approval by management?

5. What are the levels of improvement realized my use of Enterprise Mobility Management Solutions [EMMs] in achieving competitive edge and innovation?

- Greatly improved
- Improved
- Somewhat improved
- Not improved at all

6. What percentage increase in service level delivery with the adoption of new technologies and mobility?

- less than 20%
- 20-50%
- 50-80%
- more than 80%

7. To what extent or degree of productivity achieved by IT Dept in securing the corporate with Mobility enabled users?

- To a large extent
- To some extent
- A little extent
- No extent at all

SECTION D: Enterprise Mobility Management and Organization Factors Correlation

1. To what extent does the organizational culture affect adoption of EMMs?

- To a large extent
- To some extent
- A little extent
- No extent at all

2. Does your organization interact with other firms and partners through the use of mobility solutions such as Mobile Apps and social media?

Yes [] No []

If Yes explain briefly _____

3. Do you think the current trends in technology such as cloud computing and social media has changed the way you conduct business?

Yes [] No []

If Yes explain briefly _____

4. In your opinion, has the adoption of EMMs improved the way your organization interacts with both internal users and external partners?

Yes [] No []

If yes to what extent?

[] To a large extent

[] To some extent

[] A little extent

[] No extent at all

Appendix 2: End User Questionnaire

I Hellen Mutungi, undertaking a Master degree in Computer science at University of Nairobi, Chiromo Campus kindly request your assistance in filling this questionnaire for my research project. Your input is considered confidential and will be treated so and its for purposes of educational use only and not for commercial purposes.

The thematic area of my research is 'The Extent of Enterprise Mobile Management Solutions' and how it's influenced by the Technology and Organization – Environment changes.

SECTION A: General Information

For the questions in this sections please tick the appropriate answer

5. Nature of your organization

Financial and Banking

Service Industry

Healthcare

Oil and Gas

Academic

Research

Manufacturing

6. Number of employees

Less than100

100 - 500

500 – 800

800 – 1500

- 1500 – 2500
- 2500 – 3500
- 3500 – 5000
- More than 5000

7. What channels of communications do you allow in the office?

- Social Media [Whatsapp, text messages, Skype]
- Email
- Company Notice Board
- Memos
- Intranet
- Departmental Meetings and Briefings

8. Are you allowed to use your personal devices in the organization to access company network and resources?

Yes [] No []

SECTION B: Enterprise Mobility Solutions and Consumerization of IT

1. Which department do you work?

2. Which personal device do you use for work within and outside the corporate network?

- iOS iPhone
- iOS iPad
- Android Mobile
- Android tablet
- Windows Mobile
- Windows Tablet

_____ Laptop

3. Are you aware of BYOD [Bring Your Own Device] Policies and regulations?

Yes [] No []

If Yes explain _____

4. Do you get support on your personal devices to access corporate resources while in remote locations?

Yes [] No []

If Yes explain _____

5. To what extent do you feel the use of personal mobile devices has contributed to achieve performance and improved how you do your tasks?

_____ Improved to a high extent

_____ Improved to some extent

_____ Improved to slightly

_____ No Improvement at all

_____ Has been disruptive to some extent

6. Are there Apps approved by management for work and team collaboration?

If Yes list them _____

7. Do you think use of mobile computing has improved the way the company works?

Yes [] No []

If Yes explain _____

8. Do you feel you get enough support on mobile devices while using them for work related tasks?

Yes [] No []

If No explain _____

9. Does the management encourage use of latest technologies and applications?

Yes [] No []

If NO explain _____

10. Do you think adoption of EMMs has improved the way you work in the organization?

Yes [] No []

If Yes to what extent?

[] less than 20%

[] 20-50%

[] 50-80%

[] more than 80%