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## Effect of E-Governance Pillars on Service Delivery in Decentralized Governments: Case Study of Machakos County in Kenya

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### **Abstract:**

*E-governance has gained a lot of interest in the recent years as one of the ways of improving service provision as economies have transformed from agricultural, industrial to information and knowledge based. Effective application of E-governance requires consideration of four factors; ICT (knowledge management systems), processes, resources and people. This research assesses these factors in the context Machakos County in Kenya. The research adopted both quantitative and qualitative approaches using structured questionnaires and key informant interviews with residents, business persons and employees in Machakos county. The results indicated that a lot of county government services were computerized and could be accessed or provided electronically though the county government had not put enough resources in place for its full implementation and sustenance. The time taken to provide and access county government services had significantly reduced compared to when the services were being offered manually. Most respondents owned phones and had access to the internet yet there were those who said they did not know that county services were electronically offered. This calls for sensitization and training for all county stakeholders on the benefits associated with the use of E-government.*

**Keywords:** *Electronic, government, governance, service delivery, knowledge management systems, county*

### **1. Introduction**

Governments around the world are trying to be more effective and efficient to meet evolving needs of their citizens, government agencies and businesses. This has been brought about by the need of higher service quality, transparency, and availability of services all the time with quick response and with one-stop processing (Luen et al, 2001). The common knowledge-management related problems governments and organizations are facing is the loss of knowledge with both retired and employees who leave work (Cong & Pandya, 2003, McNabb, 2007), failure to retrieve knowledge held by employees in form of tacit and explicit knowledge (Kandadi&Acheampong, 2008, Knudsen, 2005) and bureaucracy within the government (Kandadi & Acheampong, 2008). For efficiency and effectiveness in governments' service delivery, accountability, involvement of all stakeholders, transparency, informed decisions, connecting silos in various governmental divisions and capturing the knowledge of all workers (Riege& Lindsay, 2006; Robertson, 2004) is essential. To solve these problems governments are increasingly introducing several reforms with e-governance being one of the most recent.

E-governance can be defined as application of innovative forms of government through the use of ICT to improve governance at all levels (Alsaghier, et al, 2009; Castelnovo et al, 2007a; Michiel, 2001; Backus, 2001). E-governance involves provision of direct services to users instead of or in addition to traditional flow of paper work between the government and its citizens (Ho, 2002; Netchaeva, 2002; Whitson & Davis, 2001).E-government refers to the government that delivers services via the internet, telephone, community centers, wireless devices or other communications systems (Fagan & Fagan, 2001). Studies conducted by Ho (2002) and Fagan and Fagan (2001) indicated that E-government services should provide users with 'one-stop shopping' to access and transact the information they need via a government website that is tailored to provide information irrespective of the various functional units of that government agency. This saves time for both parties involved, (i.e. the government and the users) and improves service provision processes. E-government services are affect how the public sector provides services to the public by shifting from system-oriented to user-oriented focus (Kaaya, 2004). It also affects the way the government agencies measure their performance by focusing on users as key to the transaction process (Whitson & Davis 2001).

For effective E-governance, governments need to put in place the right knowledge management systems, have the right processes, motivated people with the right expertise and adequate finances (Irani, 2014). It entails putting in place proper systems and the development of information systems (IS) using modern ICT to collect and process relevant knowledge. Researchers such as Frasher (2000) have insisted that, to effectively use ICT for governance, governments need to build institutional information systems, databases and applications; and not to remain in what is commonly seen in manual governance i.e. individual applications, use of

computers for simple tasks as typing, and exchange of messages via email systems. Institutional information systems (IS) may be only the first step towards effective E-governance for service delivery (Fraseri, 2000).

Recognizing the importance of ICT in service delivery, investing in ICT infrastructure, having the right processes and resources in place as well as employing the right skills are some of the factors that have not been adequately understood especially in the context of Kenyan County Governments (Kariuki, 2015). Several studies have analysed the status of implementation of E-government and the factors affecting adoption of E-government (Sarisar, 2015; Obonyo, 2011; Ogutu & Irungu, 2013), the effect of E-government strategy on service delivery (Onono, 2012; Mugambi, 2013; Caesar, 2013). However, no studies have systematically analysed the four pillars of E-government implementation and how they influence service delivery especially in the context of decentralized governments. This study therefore sought to fill this knowledge gap by finding out the effect of these pillars of E-governance identified as knowledge management systems, processes, human capacity, and resources on service delivery in Machakos County in Kenya.

The research findings would expose weaknesses and strengths in each of the four pillars of E-governance thus enabling policy makers to make informed decisions and put in place remedial measures. The findings would thus enable Kenyan county governments to identify areas of improvement as well as justifying further investments in E-governance implementation. The findings would contribute to the body of knowledge on E-governance by highlighting the research gaps in E-governance, service delivery and knowledge management. It will help citizens and business persons to reflect on and understand their right to information and know those services already in place and that they can benefit from as a result of E-governance implementation.

## 2. Literature Review

### 2.1. The Concept of Governance and E-Governance in Public Service Delivery

The concept of governance encompasses a wide range of institutions and relationships beyond government. Governance has been defined as "the exercise of economic, political and administrative authority to manage a country's affairs at all levels" (Birner 2007, pg 1). The World Bank measures good governance using indicators such as political stability and absence of violence, the rule of law, voice and accountability, regulatory quality, government effectiveness and control of corruption (Kaufmann et al. 2009). Batista and Brasilia (2003) defined governance, as an interaction process between government and society. Governance is said to be safeguarded if government processes are transparent, individuals can organize themselves, express their priorities and make demands to government for better services (Batista & Brasilia 2003). Good governance is seen in successful interaction with the constituted powers (legislative and executive), decentralization of decisions and of institutions and budgets. Information and knowledge management (IKM) systems within the governments provide a mechanism for improving interaction processes such as Government to Citizens (Owira & Ogollah, 2014; Martin, 2003). For good governance, governments have no option but to implement E-government (Gupta, 2003). People and policies play the primary role in making E-government a success. Technology plays a supportive, but important, role (Irani, 2014). However, it cannot work in isolation as several elements are important to the effective administration of information including empowered information technology staff, the implementation of state wide architecture, and the rollout of intergovernmental projects that include an efficient portal for citizens. A proper policy framework is also of paramount importance in this context (Gupta, 2003). Many governmental units across the world have embraced the digital revolution and placed a wide range of materials on the web, from publications to databases to actual government services online for the use of citizens.

E-governance has been implemented in both developed and developing countries. Studies on adoption of E-government in three Latin America Countries (Argentina, Brazil, Mexico) show that the level/ status of adoption varies across countries depending on political structures (Lau, et al, 2008). Lau et al, (2008). Research by Batista & Brasilia (2003) indicated that E-governance has increased citizen participation and increased transparency. Governance needs to be transparent, enable individuals to organize themselves, express their priorities and demands to government for better services. In connection to good governance, in Latin America the notion of citizenship has grown, power-sharing increased, decisions making made better and the conditions for good governance improved with use of knowledge management systems such as Decision Support Systems, Collaborative Systems and Communication Systems in the last few years (Batista & Brasilia, 2003). Similarly, in countries such as Canada, federal government make online decisions which help to create the environment whereby it is practical to offer online government services including establishment of Electronic Commerce branch and Information Highway group within Industry Canada and development of legislation in the 1990s that ensures that electronic transactions have the same standing in the law as regular paper based transactions (Reddick & Turner, 2012). In matters relating to knowledge management in government services, Egypt is making its procedures transparent, empowering its people and eliminating the traditional ad hoc way in which officials deals with citizens. For example, procedures for registering births and getting copies of birth and death certificates are now more transparent and accessible through a telephone hotline and the Internet. (Leaders & Ask, 2002). The E-government vision focuses on redefining the relationship between government and citizens. In china knowledge management in electronic governance have become part of the daily work and lives of the people (Holmstrom et al., 2003) and the society has transformed from an industrial society to information society which is seen as the foundation for E-government plans. Its citizens, businesses, schools, public administration and service industries are knowledge based and the use of knowledge management systems has enabled removal of discretionary power from street-level bureaucrats (Bovens&Zouridis, 2002), resulting in higher transparency of administrative processes (Elbahnasawy, 2014). These deliberations have been widely accepted in India, where the National E-government Plan provides directives to improve services through E-governance (Bhatnagar, 2004).

A United Nation publication (2008) reported that developing countries especially African countries are facing huge problem in E-governance implementations while many developed countries worldwide have set up appropriate institutions and formulated well

planned national ICT strategies for E-government implementation. United Nations see the introduction of E-government / E-governance as a very important tool for the improvement of the quality and diversity of information and services offered to the citizens and government agents and non-government organizations. The Government of Kenya recognized the importance of E-governance by launching an ambitious three years 2003-2007 E-government Strategy (Johnson L. et al, 2012). The E-government strategy was designed to achieve a set of goals and objectives, namely, to efficiently deliver government information and services to the citizens; to promote productivity among public servants; to encourage participation of citizens in government; and to empower all Kenyans in line with development priorities outlined in the 2003 – 2007 Economic Recovery Strategy for Wealth and Employment Creation (GoK, 2007). The directorate of e-government was launched in March 2004, primarily to promote electronic services delivery within government. In 2013, the directorate of e-government was merged with the Kenya ICT Board, and the Government Information Technology Services (GITS) to form the Kenya ICT Authority. The ICT Authority has the mandate of enforcing ICT standards in Government and enhancing the supervision of its electronic communication. The Authority also promotes ICT literacy, capacity, innovation and enterprise in line with the Kenya National ICT Masterplan. The Kenyan government has implemented various electronic systems including national tax systems (iTax), e-Citizen, the integrated financial management system (IFMIS), education systems, an open data system, Huduma Centres, among others. In line with Vision 2030, the Kenya National ICT Master Plan (ICTMP, 2014) was developed focusing on three goals; i) E-Government services, which aims at ensuring provision of e-Government information and services as key to improving productivity, efficiency, effectiveness and governance in all key sectors; ii) ICT as a Driver of Industry, which aims at transforming key Vision 2030 economic sectors to significantly enhance productivity, global competitiveness and growth; and iii) Developing ICT Businesses that can produce and or provide exportable quality products and services that are comparable to the best in the world.

### 2.2. Public Service Delivery

Service is defined as a system that satisfies a need. Due to varying public E-services development stages, different public services are offered differently across contexts (Homburg A, 2008, p.93). Examples of such services are; local and political information, unit lists, official reports and speeches, tenders and draft bills (Mutula, 2001), democratic activities ('e-democracy') such as online voting, campaigning and fund raising, voter registration, opinion polling, representative voter communication and public feedback (Silcock, 2001). Services offered by governments may differ depending on different national governments or different county/local government within the same country depending on their level of E-governance implementation.

In the United Kingdom (UK), government offers public services electronically including the National Health Service hospitals (non-emergencies), social services, doctor's surgeries, local councils and the Passport Agency public services among others (Silcock 2001). Netchaeva (2002) states that Singapore has a government portal, 'E-Citizen' used for public service delivery that enhances people's participation in democracy making it the first nation in the world to conduct population census online. In most African countries E-governance implementation process is slow and those countries that have implemented E-governance, helps their citizens in matters related to health, agriculture, small businesses and job opportunities (Mutula, 2002).

The Kenyan county governments are increasingly using knowledge management systems such as the internet, intranet, extranet, Communication systems, collaborative systems and decision support systems. These systems have resulted to improved efficiency and effectiveness in the service delivery to the citizens of Kenya, businesses and employees (Koriret al, 2014). Ekpo (2008), highlights benefits associated to the use of these systems such as good governance by empowering the local population and allowing them to participate in matters affecting their lives, making employees, business persons and the residents more aware the services available to them, reducing corruption by promoting good governance, strengthening reform initiatives, reducing the potential for corrupt behavior, strengthening relations between government employees and citizens, allowing tracking activities and monitoring and control behavior of government employees by the citizens (Shim & Eom, 2008). E-government can transform citizen service, provide access to information to empower citizens, enable their participation in government and enhance citizen economic and social opportunities (Zachary, 2015). However, other studies have found a less significant effect of E-governance implementation. For instance, a study on the implementation of the integrated financial management system (IFMIS) in two municipal councils in Kenya found modest improvements in good governance based on indicators such as participation, responsiveness, transparency, accountability, and efficiency and effectiveness (Waema, 2009). E-government implementation success factors include good strategy formulation, internal and external drive, employee competence and enough funding. Some of the challenges faced in implementation in Kenya are weak ICT infrastructure and poor project management and design (Gichoya, 2005; Wamoto, 2015). To promote the use of systems developed by E-governance projects, stakeholder engagement, awareness campaigns, training and change management are critical (Onedego & Moturi, 2016).

### 2.3. Conceptual Framework

The relationship between the research variables (independent variable and the dependent variable) and shown the relationship diagrammatically as shown in figure 2.1 below. The independent variables include the four pillars of E-government implementation namely; knowledge management systems, processes, resources and human capacities while the dependent variable is service delivery.

#### 2.3.1. Knowledge Management Systems for E-governance Implementation

Knowledge management systems defined as any kind of Information Technology System that captures, stores, retrieves knowledge, improves communication, locates knowledge resource mines repositories for hidden knowledge, captures and uses knowledge (Saade, Nebebe, & Mak, 2011). These systems are categorized as; Communication systems, Collaboration systems, Decision support systems,

and Intranets and Extranets. Organizations/ governments that have adopted these systems have experienced socio-economic growth, improved the supply side of governance as well as facilitation of human development (Al-dabbagh, 2011). Governments throughout the world are investing in information and knowledge management by putting in place the right knowledge management systems (Saade et al., 2011). They are adopting knowledge management systems to enable them capture knowledge possessed by employees, citizens, and other government agencies for improved service delivery. It is clear today that information/knowledge management is a key factor in governance (Muthee, 2014).

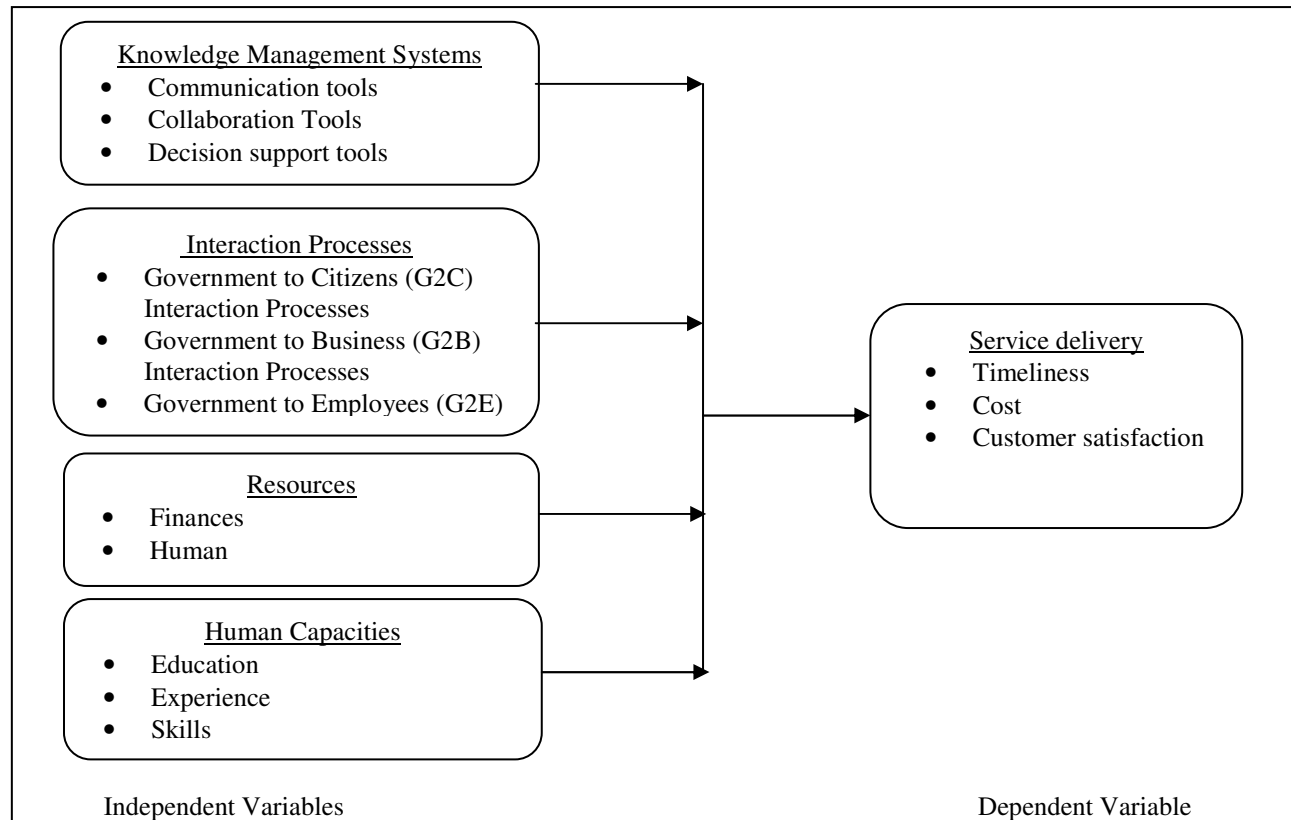


Figure 1: Conceptual Framework

### 2.3.2. Processes for E-governance Implementation

Knowledge management processes, is a series of actions and steps taken for organizations/ governments to be able to retrieve, store, use, share knowledge with the citizens, business persons as well as other government agencies (Bandor, 2007). The efficiency of processes are enhanced by the use of knowledge management systems which allows sharing of databases and resources held within government repositories and the blending of skills and capabilities (Alshehri & Drew, 2010). Easy adoption of new knowledge management processes for Government to Citizen (G2C), Government to Business (G2B) and Government to Employee (G2E) interactions, reforms in governmental organizations require initiation of a change in culture and altitude of all stakeholders, training of users of systems, and putting in place appropriate supporting ICT infrastructure to enable online processes that are efficient to both the users and the governments (Bernhard, 2013).

### 2.3.3. Resources for E-governance Implementation

As Nkohkwo & Islam (2013) states, resources necessary for successful implementation of E-governance are; Infrastructure, finances and people resources. These resources remain the main backbone for e- governance implementation and greatly affect service delivery (Ndou, 2004; Ebrahim&Irani, 2005).

### 2.3.4. Human capacities for E-governance Implementation

The factors influencing the success of ICT implementation tend to be "situation-specific" or contingent. He goes further to argue that, with the introduction of knowledge management systems, there is a danger of lack of fit between the "tools" and the "task" (Ebrahim&Irani 2005, p 604), Heeks (2002, p 102). According to (Nkohkwo &Islam, 2013) awareness, human attitude, learning content/resources, accessibility, trust, public support, knowledgeable personnel, gender in-equality, low citizen participation, training and capacity building, E-record readiness are some human resources needed for successful E-governance adoption.

### 3. Research Design and Methodology

This research adopted the descriptive research design to which is deductive and fact finding in nature using both quantitative and qualitative approaches to explain the effect of the pillars of E-governance on service delivery in Machakos County. Machakos County was chosen for the study because it has been highly ranked in surveys on county performance and service delivery and received a lot of media attention. The County Government of Machakos was established by the Constitution of Kenya 2010, article 176. For effective services delivery Machakos County government has put in place systems such as Integrated Financial Management Information Systems (IFMIS), Revenue Management System, Government Human Resource Information System (GHRIS) and E-Procurement among others (County Government Act, 2013). This research design sought to portray the characteristics of knowledge management systems, processes, resources, and human capacities.

#### 3.1. Sampling

Machakos county covers a total area of 6,208 sq km and has a total population of 1,098,584 and a population density of 177 persons per sq km (KNBS 2010). It is divided into 4 regions (Table 1). The County executive is divided into 10 departments (Lubale, 2012) each with its own clear mandate on services to offer (County Government Act, 2013). The target population of the study is 563,790 persons (KNBS,2012). The composition of the target population includes Machakos County clients aged 18 years to 70 years totaling 548,174 persons, 5,866 employees (GOK, 2016) and 9,750 business persons of Machakos County. The Machakos county clients are those persons who receive the various services offered by the county government, Employees provide services to county residents/clients and the business persons. Business persons are contractors, suppliers, and other licensed business persons who are contracted by the County government to provide goods, services and contractual works (Prequalification list of Contractors, 2015/2016). The finite universe defined for this study, is the total population of the residents of Machakos County with individual clients, employees and business persons as sampling units. The researcher constructed a comprehensive, appropriate and reliable sampling frame using lists of supplier prequalification, staff roll and licensed businesses for the study as provided in the table below.

Region	Population	$n_i = n \cdot p_i$	Sample size
Machakos	262,314	$(262,314/563,790) \cdot 385$	<b>180</b>
Mwala	75,868	$(75,868/563,790) \cdot 385$	<b>52</b>
Yatta	124,130	$(124,130/563,790) \cdot 385$	<b>84</b>
Kangundo	101,478	$(101,478/563,790) \cdot 385$	<b>69</b>
<b>Total</b>	<b>563,790</b>		<b>385</b>

Table 1: Sampling Frame

The sample size for this study was 385 respondents which was determined using Krejcie and Morgan (1970) formula. The study adopted both stratified and random sampling techniques to obtain a representative sample. The population of Machakos County was divided into regions (strata) and samples were randomly picked from each strata using proportional allocation method. Kothari (2004) formula  $n_i = n \cdot p_i$  where  $p_i$  represents the proportion of the population included in the stratum  $i$  and  $n$  represents the total sample size. The number of elements selected from stratum  $i$  is  $n \cdot p_i$ . Interval sampling was used to get the respondents to be interviewed from the four strata identified as regions by the National Bureau of Statistics (2012).

#### 3.2. Data Collection, Analysis and Interpretation

In this study, primary data was collected by use of a structured questionnaire with both closed and open ended questions which were precisely determined in advance. The questionnaire was designed to collect feedback on knowledge management systems, processes, resources and human capacities to access their effect on service delivery. The questionnaire was constructed keeping in view concept of service delivery measured by cost, time and customer satisfaction. The researcher relied heavily on the conceptual framework to ensure all operationalized variables were included in the questionnaire. This ensured that the various aspects of the research problem were included in the research instrument. Pilot testing was done to determine how respondents would react to the various questions in the questionnaire and it gauged the effectiveness of the questionnaire. Reliability analysis was subsequently done using Cronbach's Alpha which measured the internal consistency by establishing if certain item within a scale measures the same construct. Gliem and Gliem (2003) established the Alpha value threshold at 0.7, thus forming the study's benchmark. Cronbach Alpha was established for every objective which formed a scale. Table 2 shows knowledge management systems had the highest reliability ( $\alpha = 0.875$ ), followed by interaction processes ( $\alpha = 0.855$ ), Resources capability ( $\alpha = 0.835$ ), and people capacities ( $\alpha = 0.820$ ). This illustrates that all the four variables were reliable as their reliability values exceeded the prescribed threshold of 0.7.

Scale	Cronbach's Alpha	Comment
Knowledge management systems	0.875	Reliable
Interaction processes	0.855	Reliable
Resources capability	0.835	Reliable
People capacities	0.820	Reliable

Table 2: Reliability Analysis

The study targeted a sample size of 385 respondents from which 250 filled in and returned the questionnaires making a response rate of 64.5%. This response rate was satisfactory to make conclusions for the study as it acted as a representative. According to Mugenda and Mugenda (2003), a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. Based on the assertion, the response rate was good. The quantitative data was analyzed by descriptive statistics using statistical package for social sciences (SPSS). In addition to measures of central tendencies, measures of dispersion and graphical representations were used to tabulate the information. To facilitate this Likert Scale were used to enable easier presentation and interpretation of data. Data was presented in tables, charts and graphs. Content analysis was also used in processing of this data and results presented in prose form. In addition, a multivariate regression model was applied to determine the relative importance of each of the four variables with respect to performance. Multiple regressions is a flexible method of data analysis that may be appropriate whenever quantitative variables (the dependent) is to be examined in relationship to any other factors (expressed as independent or predictor variable). Relationships were linear, independent variables may be quantitative or qualitative and one can examine the effects of a single variable or multiple variables with or without the effects of other variables taken into account, (West & Aiken, 2013). The regression model was as follows:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$$

Where:

Y = Service delivery

$\beta_0$  = Constant Term

$\beta_1, \beta_2, \beta_3$  and  $\beta_4$  = Beta coefficients

$X_1$  = Knowledge Management Systems

$X_2$  = Interaction Processes

$X_3$  = Resources

$X_4$  = Human Capacities

$\epsilon$  = Error term

#### 4. Results

##### 4.1. Respondents' Demographic Profile

This section presents the demographic information. Particularly the areas investigated include gender distribution, age category, and period of engagement with the county government. The gender distribution of respondents indicates that, of the 250 respondents; 38 (15.2%) employees were male and 22 (8.8%) female making a total of 60 (24%) employees, 46 (18.4%) business persons were male and 19 (7.6%) female making a total of 65 (26%), and 75 (28.8%) residents were male and 50 (20%) female making a total of 125 (50%) residents who did not belong to the other two groups. The total male respondents were 159 (63.6%) and female respondents were 91 (36.4%). As indicated in the methodology section, the survey targeted county government employees, business persons and other residents who did not fall in the other two categories of Machakos County. Analysis of category of the respondents that 60 (24.0%) of the respondents were county government employees, 65 (26.0%) were business persons and 125 (50%) of the respondents were residents who did not fall in either of the other two categories.

The study targeted respondents who are above 18 years and therefore can access or provide county government services. Analysis of the age indicated that out of the 60 employees interviewed, 10 respondents (4%) of the 250 respondents were aged between 18 to 29, 12 (4.8 %) 30-39 years old, 20 (8%) 40-49 years and 18 (7.2%) 50-59 years. Out of the 250 respondents, 65 business persons interviewed indicated that 16 (6.4%) 18 to 29 years old, 24 (9.6%) were between 30-39 years, 12 (4.8%) were between 40-49 years, 10 (4%) aged between 50-59 years and 3 (1.2%) were aged between 60 and more years old. Out of the 125 residents 47(18.8%) were 18 to 29 years old, 48 (19.2%) 30-39 years, 18 (7.2%) 40-49 years, 12 (4.8%) aged between 50-59 years. The totals of were 73 (29.2%) 18-29 years old, 84 (33.6%) 30-39 years old, 50 (20%) 40-49 years old, 40 (16%) 50-59 and 3 (1.2%) 60 and more years.

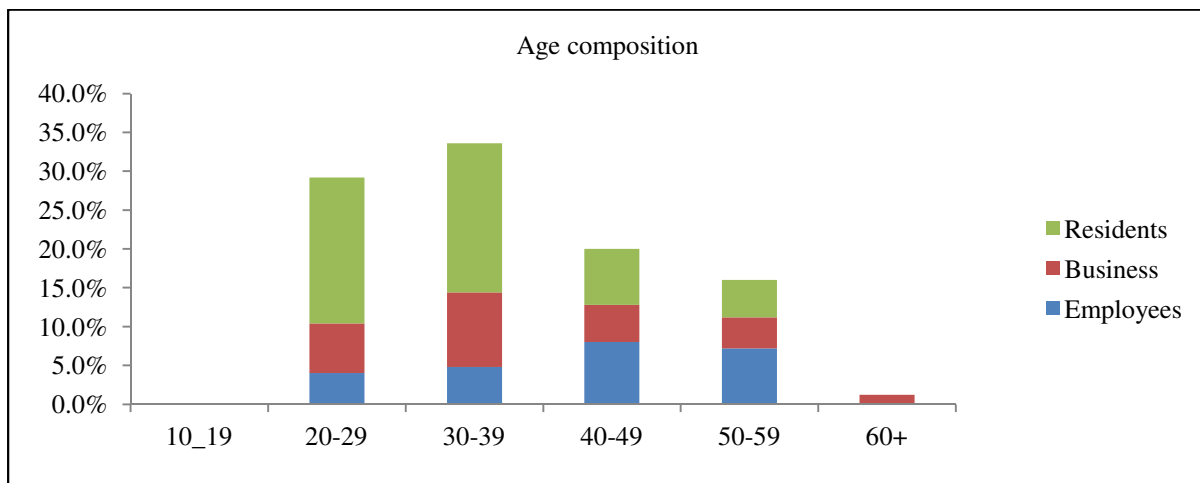


Figure 2: Age composition of the respondents

When respondents were asked the period of time in which they had been engaged with Machakos county government, out of the 250 respondents 11(4.4%) employees said they have engaged for less than a year, 8 (3.2 %) for 13-24 months, 7 (2.8%) for 25-36 months, 13 (5.2%) for a period between 37-48 months and 21 (8.4%) were engaged for more than 49 months. 7 (2.8%) business persons said they have engaged for less than a year, 18(7.2%) for 13-24 months, 11 (4.4%) for 25-36 months, 8 (3.2%) for a period between 37-48 months and 21(8.4%) were engaged for more than 49 months. 18 (7.2%) residents said they have engaged for less than a year, 38 (15.2%) for 13-24 months, 57 (22.8%) for 25-36 months, 47 (18.8%) for a period between 37-48 months and 96 (38.4%) were engaged for more than 49 months. 18 (7.2%) of the respondents said they have engaged with Machakos County government for less than 1 year, 38 (15.2%) for 13-24 months, 51 (20.4%) 25-36 months, 47 (18.8%) 37-48 months while 96 (38.4%) have engaged for over 49 months. It should be noted that this is the first time that county governments have been implemented in Kenya and is still a learning phase on devolution of services.

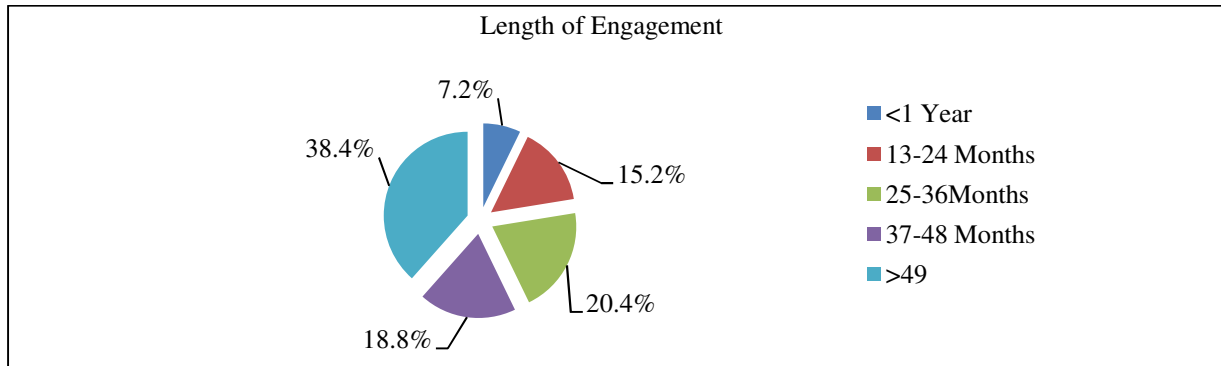


Figure 3: Length of Engagement with Machakos County Government

4.2. Knowledge Management Systems in Machakos County

4.2.1. Access to Internet

The Internet first became available in Kenya in the year 1993, with full internet access being established in 1995 (Kumar, 2016 p 691). Kenya is now the leader in sub-Saharan Africa's internet access and connectivity (Wangalwa, 2014). When respondents were asked if they used internet while accessing or providing services, 201 (80.4%) said yes while 49 (19.68%) said No. It can thus be eluded that more than three quarters of the respondents use internet to access or provide services in Machakos County. For respondents who access the internet, when asked what connection mode they used 32(12.8%) employees, 29 (11.6%) business persons and 72(28.8%) residents (133 respondents) translating to 53.2% used data. 14 (5.6%) employees, 17(6.8%) business persons and 33(13residents (64 respondents) translating to 25.6% used WIFI while 4 employees translating to 1.6% used fiber optic. According to Elbahnasawy, (2014) the use of new technologies enables higher transparency of administrative processes in government. The availability and continued expansion of internet connectivity via mobile phones is a significant opportunity that has expanded access even in rural areas in the country.

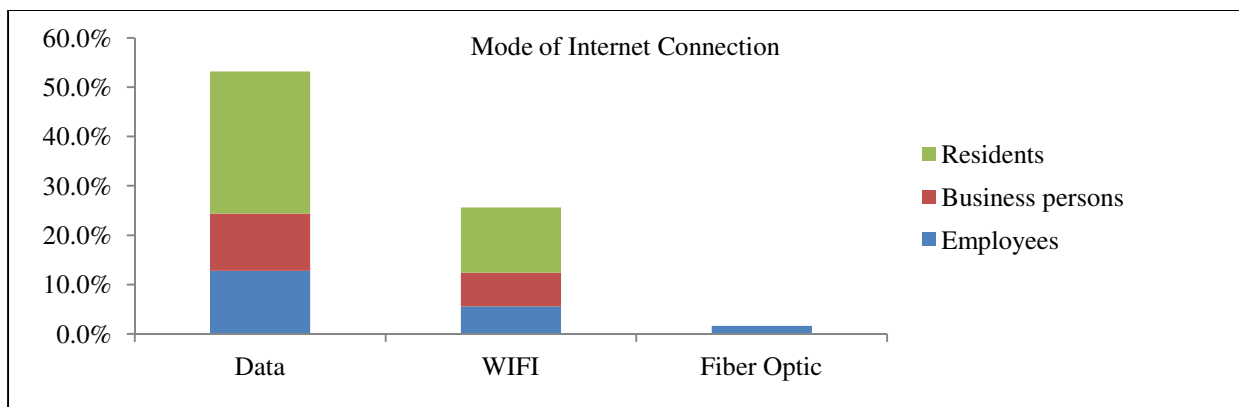


Figure 4: Mode of Internet Connection

4.2.2. Communication Tools Mainly Used by Respondents

When asked, the communication tools the respondents mainly used, majority of the respondents agreed that they frequently used the following electronic gadgets for communication, phone (Mean = 4.35, std deviation = 0.17), laptop (mean = 4.27, std deviation = 0.24), desktop (mean = 3.94, std deviation = 0.18) and tablet (mean = 3.14, std deviation 0.67)

Communication Tools	Mean	Std Deviation
Desktop Computers	4.27	0.17
Mobile Phone	4.35	0.24
Laptop	3.94	0.18
Tablet	3.14	0.67

Table 3: Extent to which respondents employed the following devices in Communication

#### 4.2.3. Collaboration Tools Mainly Used By Respondents

When asked, the collaboration tools the respondents mainly used, they agreed that they frequently used the following electronic tools; Facebook (mean = 4.05, std deviation = 0.67), whatsapp (mean = 2.45, std deviation = 0.49), skype (mean = 2.17, std deviation = 0.22), twitter (mean = 1.62, std deviation = 0.44), video conferencing (mean = 1.60, std deviation = 0.81) and email (mean = 1.44, std deviation = 0.5367). Findings are corroborated by Netchaeva (2002) who noted that different governments are using various collaborative tools to serve their citizens electronically depending on the needs of the citizens.

Collaboration Tools	Mean	Std Deviation
Facebook	4.05	0.67
Twitter	1.62	0.44
WhatsApp	2.45	0.49
Email	1.44	0.53
Video Conferencing	1.60	0.81
Skype	2.17	0.42

Table 4: Extent to which respondents employed the following electronic Collaboration Tools

#### 4.2.4. Extent to Which Respondents Employed the Following Electronic Decision Making Tools

From the analysis, majority of the respondents agreed that they frequently used the following electronic tools that support decision making in service provision/access: government human resource information system (GHRIS) (mean = 4.36, std deviation = 1.25). E-procurement systems (mean = 4.25, std deviation = 0.17), integrated financial management information Systems (IFMIS (mean = 4.21, std deviation = 0.32) and Revenue Management System (mean = 4.15, std deviation = 0.14).

Decision Making Tools	Mean	Std Deviation
Integrated Financial Management Information Systems (IFMIS	4.21	0.32
Revenue Management System	4.15	0.14
Government Human Resource Information System (GHRIS)	4.36	1.25
E-Procurement systems	4.25	0.17

Table 5: Extent to which respondents employed the following electronic Decision Making Tools

#### 4.3. Processes Involved in E-Service Provision

From the analysis as shown in Table 6, majority of the respondents agreed that county government had made substantive progress in implementing electronic service provision in the following areas. Emergency services (mean = 4.36, STD dev = 0.14), hospital services (mean = 4.14, std dev = 0.11), revenue collection (mean = 3.75, std dev = 0.25) and payment of parking fees (mean = 3.92, std dev = 0.36).

Processes involved in	Mean	Std Deviation
Payment of Parking Fees	3.92	0.36
Revenue Collection	3.75	0.25
Emergency Services	4.36	0.14
Hospital Services	4.14	0.11

Table 6: Extent to which the county citizens interacted with the county government electronically to access the following services

From the analysis show in Table 7, majority of the respondents agreed that county government frequently employed electronic means in the following areas: payment of suppliers and contractors (mean = 4.48, std dev = 0.36), tender application, processing and approval (mean = 4.21, std dev = 1.36), filling of tax returns (mean = 4.02, std dev = 0.36) and business permit application (mean = 3.94 std dev = 0.27). The findings confirm Bissell (2012) observation that the government should transform its processes to create new relationships between the government and its citizens.



Processes involved in	Mean	Std Deviation
Business Permit Application	3.94	0.27
Tender application, processing and approval	4.21	1.32
Payment of suppliers and contractors	4.48	0.36
Filling of Tax returns	4.02	0.14

Table 7: Extent to which the county business persons used different processes for interaction with county government electronically to access the following services

From the analysis show in Table 8, majority of the respondents agreed that the county government frequently employed electronic means in the following areas: vacancy advertisements (mean = 4.39, std dev = 0.28), publication of shortlist (mean = 4.28, std dev =0.44), online applications (mean = 4.14, std dev = 0.14), and training and development (mean =3.84, std dev =0.27). the findings conform with Shim and Eom, (2008).The use of ICTs can reduce corruption by promoting good governance, strengthening reform initiatives, reducing the potential for corrupt behavior, strengthening relations between government employees and citizens, allowing tracking activities and monitoring and control behavior of government employees by the citizens.

Processes involved in	Mean	Std Deviation
Vacancy Advertisements	4.39	0.28
Online applications	4.14	0.14
Publication of shortlist	4.28	0.44
Training and development	3.84	0.27

Table 8: Extent to which the county employees used processes in accessing the following E services

4.4. Resources in Place for E-Governance

4.4.1. Funds Allocation for E-governance Implementation

Figure 5 below reveals most respondents 129 (51.6%) Disagreed that the county government had allocated enough funds for E-governance implementation, while 2 respondents (0.8%) strongly agreed, 30 (12%) agreed, 48 (19.2%) strongly disagreed and 41 respondents (16.4%) didn't know. The findings were echoed by Salem (2003) who cited that in order to implement E-government services; the government needs to have adequate funds.

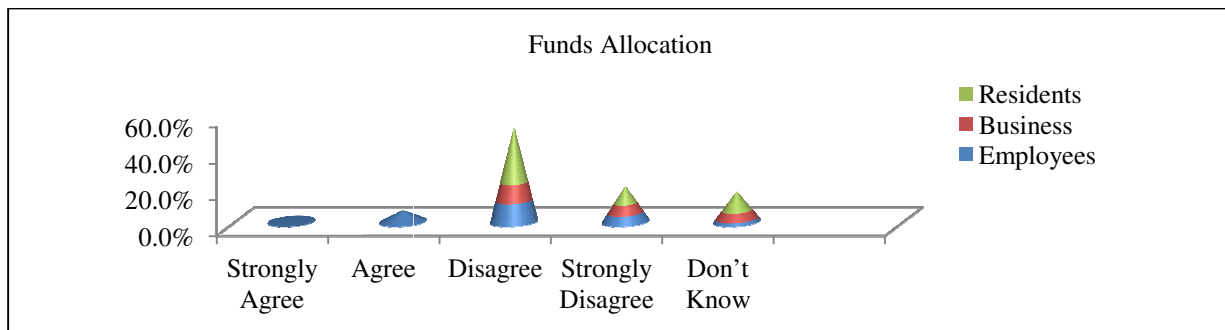


Figure 5: Allocation for e governance implementation

4.4.2. Infrastructure in Place for E-governance Implementation

The research sought to assess the Infrastructural adequacy for implementation of E-governance in Machakos County government. From the analysis show in Table 9, majority of the respondents agreed that that the county government has Quality of Infrastructure in the following areas that support E-governance implementation: adequate buildings for e-governance implementation (mean =4.35) electronic gadgets (mean =4.25), electronic bandwidth (mean = 4.14) computers (mean =4.12 and surveillance cameras (mean =3.95). The findings concur with the argument by Mutula, (2002) that one of the key prerequisites for implementing E-government services is to have the necessary infrastructure in place, such as computer hardware and software, together with reliable telecommunications services for connectivity.

Infrastructure	Mean	Std deviation
Buildings/Office space	4.35	0.36
Electronic Bandwidth	4.14	0.25
Electronic Gadgets	4.25	0.36
Computers	4.12	0.22
Surveillance Cameras	3.95	0.36

Table 9: Quality of Infrastructure in Place for E-governance implementation

4.5. Human Capacity for E- Governance

4.5.1. Level of Education and ICT Literacy

Figure 6 reveals that those respondents with degree and above were 96(38.4%), diploma 96(38.4%), secondary 47 (18.8%) and primary 11 (4.4%). According to Kuriyan and Ray (2009), for better implementation of E-government and performance, education level of employees and citizens is vital. Figure 6 indicates that 115(46.0%) 67 residents, 16 employees, 32 business persons of gained their ICT knowledge through self-learning followed by certificates 54 respondents translating to 21.6%,19 residents, 17 employees, 18 business persons. Diplomas 40 (16.0%) 17 Residents, 14 employees, 9 business persons and degrees 35 (14.0%) 18 residents, 11 employees, 6 business persons. (6 2.4%) respondents had no ICT knowledge. ICT skills, processes, resources and people determine the success or the failure of the E-governance implementation (Salem, 2003).

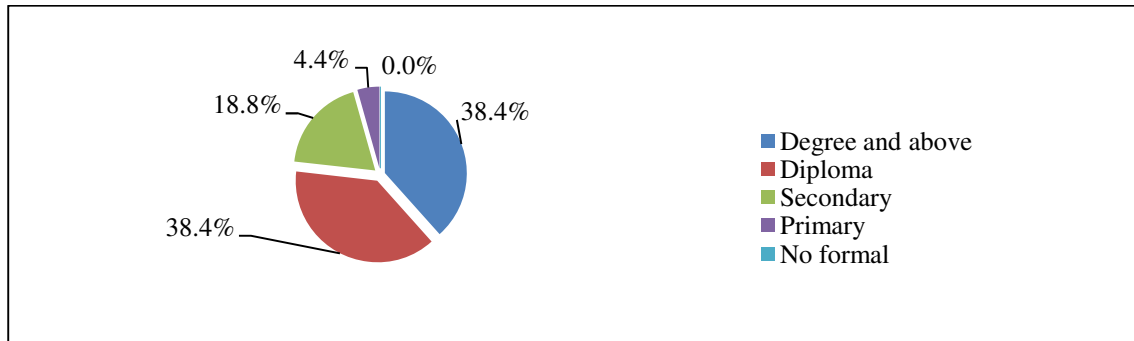


Figure 6: Level of Education of the respondents

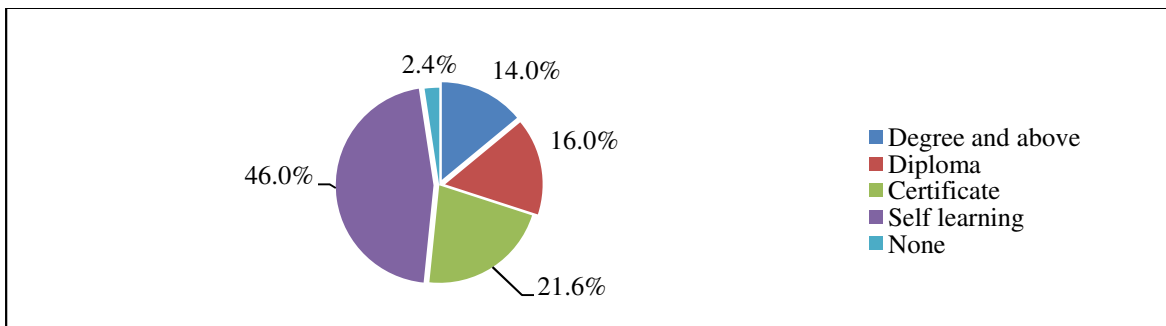


Figure 7: Period Experiences with ICTs

4.5.2. Quality of Human Capacities for E-governance

From the analysis, majority of the respondents agreed that county government has made adequate provision for ICT skills development (mean =4.30), county government has staff who are experts in their areas of work (mean = 4.22), county government has the right systems for ICT skills development (mean = 4.14) and county government has improved citizens' formal education (mean =4.00).

Human Capacities	Mean	Std deviation
County government has improved citizens' formal education	4.00	0.22
County government has the right systems for ICT skills development	4.14	0.14
County government has Staff who are experts in their areas of work	4. 22	0.43
County Government has made adequate provision for ICT skills development	4.30	0.44

Table 9: Quality of human capacities for E-governance implementation in Machakos County

4.6. Service Delivery by County Government

4.6.1. Time Taken Previously versus Time Taken Currently

The study compared the time taken previously with manual systems and currently with knowledge management systems in performing the following tasks. Results obtained from comparative analysis show that majority of the respondents as shown by 59% indicated that payment/ receiving hospital services had improved from 6-12 hours with manual system to less than one hour with the current system majority of the respondents (65%) agreed that receiving of emergency services improved from 1 to (with manual system) to less than one hour (with the current system as supported by 70% response in support. The study also revealed that majority of the respondents(85%) agreed that Business permit Application improved from more than 12 hours (with Manual System) to 6-12 hours(with the current system as supported by 70% response in support ) respondents(65%) agreed that Tender applications,

improved from 6-12 hours (with Manual System) to less than an hour with the current system as supported by 75% response in support )and that the respondents(65%) agreed that Procurement Processing, improved from more than 12 hours (with Manual System) to less than an 1 hour with the current system as supported by 60% response in support).Further the study also revealed that respondents (88%) agreed that payment for goods and services offered, improved from more than 12 hours (with manual system) to less than an 1hour with the current system as supported by 80% response in support) and finally majority of the respondents (62%) agreed that payment of parking fees, improved from more than 1-5 (with manual system) to less than an 1hour with the current system as supported by 90% response in support. Therefore, results reveal that time taken during manual system were many hours unlike in electronic system where processes were done within few hours.

Tasks	Previously (Manual System) in Hours				Currently (knowledge management Systems) in Hours			
	<1	1-5	6-12	>12	<1	1-5	6-12	>12
Business permit Application	2%	3%	10%	85%	0%	23%	70%	7%
Tender applications,	0%	3%	32%	65%	75%	10%	5%	10%
Procurement Processing	65%	12%	14%	9%	75%	13%	6%	6%
Payment for goods and services offered	3%	4%	5%	88%	80%	10%	5%	5%
Payment of Parking Fees	3%	2%	5%	90%	20%	62%	10%	8%
Receiving Emergency Services	14	15%	59%	12%	70%	15%	3%	12%
Payment/ receiving Hospital Services	65%	12%	14%	9%	18%	74%	5%	3%

Table 10: Time Taken previously versus time taken currently

#### 4.6.2. Impact of Digitization of Government Services on Transport, Communication and Labour costs

From the analysis majority of the respondents indicated that E-governance led to a decrease in the following: communication costs = (mean = 4.22), transport costs (mean = 4.18) and labour costs (mean = 4.12).

Factor of access/Provision of services	Mean	Std deviation
Transport Costs	4.18	0.25
Communication Costs	4.22	0.12
Labour costs	4.12	0.04

Table12: Impact of E-governance on Transport, Communication and Labour costs

#### 4.6.3. Satisfaction Levels with the following E-services

The study sought to establish satisfaction levels with the following E-services offered by the government. From the analysis majority of the respondents indicated that they were satisfied with tender applications (mean =4.18) accessing emergency services (mean = 4.31) business permit application (mean = 4.30) and payment/receiving hospital services (4.06). From the analysis, majority of the respondents agreed that fairly satisfied payment of taxes (mean =3.55), payment of parking fees (mean =4.41) and procurement processing (mean = 3.35). The findings concur with the research by Elbahnasawy, 2014 E-government services costs should result in higher transparency of administrative processes.

E-services	Mean	Std deviation
Business permit Application	4.30	0.25
Tender applications	4.18	0.25
Procurement processing	3.35	0.04
Payment for services and goods	3.95	1.25
Payment of taxes	3.55	0.54
Payment of Parking Fees	3.41	0.16
Accessing Emergency Services	4.31	0.44
Payment/Receiving Hospital Services	4.06	0.25

Table 11: Satisfaction levels with the following E-services

#### 4.7. Regression Analysis

In this study, a multiple regression analysis was conducted to test the influence among predictor variables. The research used statistical package for social sciences (SPSS V 21.0) to code, enter and compute the measurements of the multiple regressions. The model summary is presented in the table below. The study had four independent (predictor) variables and the Model summary is presented in the table below.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.874	0.763	0.746	0.223

Table 12: Regression Model Summary

#### 4.7.1. Coefficient of Multiple Correlations

The degree of linear relationship between the Service Delivery and the four predictor variables- knowledge management systems, processes, resources and people capabilities was found to be:  $R = 0.874$ . The goodness of fit on the regression equation assumed for this study was a near perfect direct linear relationship between Service delivery and the four pillars of e-governance.

#### 4.7.2. Coefficient of Multiple Determinations $R^2$

Adjusted R squared is coefficient of determination which tells us the variation in the dependent variable due to changes in the independent variable. From the findings in the above table the value of adjusted R squared was 0.746 an indication that there was variation of 74.6 percent on service delivery in Machakos County due to changes in Knowledge management systems, interaction processes, resources capability and people capacities. This shows that 74.6 percent changes in service delivery in Machakos County could be accounted to Knowledge management systems, interaction processes, resources capability and people capacities.

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	2.188	4	0.547	4.161	0.002
	Residual	32.205	245	0.131		
	Total	34.393	249			

Table 13: Analysis of Variance

Critical value 2.50

From the ANOVA statics, the study established the regression model had a significance level of 0.2% which is an indication that the data was ideal for making a conclusion on the population parameters as the value of significance (p-value) was less than 5%. The calculated value was greater than the critical value ( $4.161 > 2.50$ ) an indication Knowledge management systems, interaction processes, resources capability and people capacities all affect service delivery in Machakos county. The significance value was less than 0.05 indicating that the model was significant.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.342	1.023		1.312	.001
	Knowledge Management Systems	.311	.118	.213	2.636	.002
	Interaction Processes	.341	.125	.207	2.728	.000
	Resources Available	.322	.124	.206	2.597	.001
	People Capacities	.365	.098	.311	3.724	.000

Table 14: Coefficients<sup>a</sup>

From the above regression equation it was revealed that knowledge management systems, processes, resources and people capabilities held to a constant zero, the service delivery in Machakos county would be at 1.34, a unit increase on reliance on knowledge management systems would enhance service delivery in Machakos county by a factors of 0.311, a unit increase in reliance on ICT tools that promote interaction processes would enhance service delivery in Machakos county by factors of 0.341, unit increase in resources capability would promote service delivery in Machakos county by a factors of 0.322, and a unit increase in people capacities especially in ICT field would promote service delivery in Machakos county by a factors of 0.365, and. All the variables were significant as their significant value was less than ( $p < 0.05$ ).

## 5. Summary and Discussion

The objective of the study was to evaluate the effect of E-governance pillars in public service Delivery in Machakos County. One of the things to note is that county governments being a creation of the Constitution of Kenya 2010 are still "young" in Kenya. The results depict that overall about 60.8% of respondents have engaged with the county government for less than 4 years. The county governments are also in the learning process on provision of services that have been devolved from/ the central government. There is an opportunity to integrate E-governance as a key part of institutionalizing these changes.

### 5.1. Knowledge Management Systems for E-Governance

The findings of the study showed that majority of the respondents used mobile phones as a communication device. County government should invest more in Electronic gadgets especially desktops and laptops. Besides, the findings revealed that some of the respondents were using internet with majority on data internet connection and only few employees are on fiber optic. Further the findings revealed that majority of the respondents frequently used Facebook, Twitter and Whatsapp to collaborate with other residents with little activity reported for Instagram and Skype. The fact that a majority of the population has access to mobile phones presents

an opportunity for E-governance implementation. The concept of M-governance has emerged, which aims at providing fast and easy access of public services to citizens through mobile devices (Kyem, 2016). It has been applied in countries such as India to provide public services electronically. For the m-government concept to be successfully applied, systems and applications need to be developed where mobile phones can be used for accessing county government services. Sensitization and training is important since a large number of the population that has mobile phones internet access which is mainly used for accessing social media. The county government can target social media platforms such as Face book, Twitter and WhatsApp for creating awareness on services available online. Hence the use of new technologies by local governments should provide effectiveness and efficiency in order to improve services to citizens (Bhatnagar, 2004; Kuriyan and Ray, 2009; Madon, 2009).

### *5.2. Processes Involved in E-service Provision*

The findings of the study showed that the county government and citizens interaction (G2C) processes such as e-parking fee payment and e-revenue collection systems were frequently good but services such as e-hospital services, e-emergency services are rarely good. On government to businesses interaction processes, the interaction processes were frequently good such services are e-permit processing (new application, renewal) e-tender processes that is one can search for available tenders online, apply online, and it's approved online, payments by the county government to its suppliers and contractors. From the findings of the government to employees (G2E) interaction processes, the interaction processes were frequently good though not always good. These services are vacancy advertisements, online applications and publication of shortlist, training and development.

### *5.3. Resources in Place for E-governance*

The study findings revealed that Employees and business persons disagreed on that government has allocated enough funds for e-governance implementation. Respondents agreed that the county government has the quality of infrastructure in place is adequate (buildings, electronic bandwidth, electronic gadgets, computers and surveillance cameras). The main barrier to the adoption/implementation of an e-government initiative for public sector organizations is the lack of adequate resources (Ebrahim and Irani, 2005). For these reasons, there is need for county government to provide sufficient resources necessary for e-government implementation and sustenance.

### *5.4. Human Capacity for E- Governance*

The findings of the study indicated that most of the respondents had degrees and diplomas in their formal education. In terms of those respondents with ICT literacy levels the findings showed that majority of them gained their knowledge through self-learning. Majority of respondents agreed that county government has improved citizens' formal education, County government has the right systems for ICT skills development, County government has Staff who is experts in their areas of work, County Government has made adequate provision for ICT skills development. Further findings indicated that majority of respondents had between 3 to 5 years of experience with ICT.

### *5.5. Service Delivery by County Government*

The findings of the study showed that majority of the respondents spend a lot of time using manual system as compared to when using electronic system to access various services in the county offices. For example, when applying for business permit, parking fees payment, payment of goods and services, receiving emergency services among other services. The study findings also revealed that majority of the respondents were not satisfied with the services offered by the county government. Also, the findings showed that the cost of e-services in the county greatly decreased with digitization of county processes as mentioned by majority of the respondents. It also showed that the cost of the factors of access/provision of services (transport, communication and labour) has decreased.

In the recent report by the Office of Management and Budget (OMB) which evaluated e-government initiatives, found that 17 of the 26 executive departments and agencies were rated as unsatisfactory, and 9 only received a mixed-results rating (Holliday, 2002). Majority of the respondents were not satisfied with the e-services offered by the county government. Therefore, citizens should be allowed to participate in the implementation of E-governance by bringing new ideas including techniques, methods and innovation in local government settings so that quality e-services can be delivered and accepted by the citizens (Silcock, 2001).

## **6. Conclusion and Recommendations**

The study concludes that effective penetration and utilization of ICT in the public service for high-end value-adding operations in county government is crucial to enhance effective and efficient services that satisfy the citizens and other stakeholders. ICT penetration and utilization in the county government has not reached the levels necessary to reap the benefits of ICT in service delivery. The study concluded that availability of knowledge management systems, training on their use, ability to use various electronic platforms and perception had significant influence of the service provision. The study concludes most common challenges plaguing the successful implementation of e-government initiatives in counties are ICT infrastructure along with other issues such as human resources, financial resources, Internet access and connectivity, digital divide and illiteracy. Further study concluded that the county government has not ensured that there is enough electronic bandwidth, computers and surveillance cameras for E-governance implementation. The study further concluded that majority of the respondents were fairly satisfied with the services offered by the county government. The cost of e-services in the county decreased as mentioned by majority of the respondents. The study concluded that there was need for the county government to sensitize its citizens and employees on the use of other collaboration and communication tools other than the mobile phones and the desktops since few respondents use them. Also, employees should be

trained on how to use all types of social media for example Telegram, Twitter, MySpace; Instagram and so on to make communication efficient.

The analysis undertaken in this study reveals that a number of steps can be taken to improve effectiveness in E-governance implementation for enhancing public service delivery in County governments. The study recommends that the county citizens should be sensitized on the importance of using E-government services. It also recommends that the county government should ensure that they are offering services which are timely and satisfactory to the citizens. The study further recommends that the county government should digitize all its services to enable citizens to access them anytime they want irrespective of where they are. Since the county revenue has increased due E-governance, the study recommends that county government allocate more finances for e governance implementation. The county government should invest more on human capacity development and ICT infrastructure. E-governance as a factor that influences management styles in organizations. An assessment of E-governance and its relationship to organizations performance. The impact of E-governance on national and county government operations. An assessment of E-governance and its influence on NGOs in Kenya.

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