

# Determinants of Cloud Computing Adoption and Performance of Small and Medium E-Commerce Enterprises in Nairobi County

Brian Ruto Cheptumo, Dr. Benard Lango

**Abstract**— Cloud computing presents an opportunity for organizations to leverage affordable, scalable, and agile technologies. However, even with the demonstrated value of cloud computing, organizations have been hesitant to adopt such technologies. Access to a shared pool of programmable computer resources, along with pay-as-you-go services, are just some of the benefits of cloud computing. The main objective of the study was to examine the determinants of cloud computing adoption and performance of small and medium electronic commerce enterprises in Nairobi, Kenya. Specifically, the study investigated the influence of technological readiness and determined the influence of Comprehensive advantages of cloud computing adoption and performance of electronic commerce enterprises in Nairobi, Kenya. The study was underpinned by Technology Organization Environment Model and the Technology Acceptance Model. The study targeted 119 online e-commerce enterprises in Nairobi. A sample of 91 online e-commerce enterprises was drawn. The study conducted both descriptive and inferential analysis. The inferential analysis found that the determinants of cloud computing in this study i.e. Technological readiness and Comprehensive advantage had strong correlation ( $r = .773$ ) with performance of E-commerce enterprises in Nairobi County. Specifically, Technological Readiness also had positive significant influence with performance of E-commerce enterprises; and Comprehensive Advantage also had a positive significant influence on performance of E-commerce enterprises. The study recommended for increased awareness on cloud computing to enable E-commerce enterprises understand the benefits of cloud computing in their business to improve performance. The study will be useful to E-commerce entrepreneurs, Cloud service providers, IT experts and the general public.

**Index Terms**—Cloud computing, E-commerce enterprises, Technological Readiness, Comprehensive Advantage

## I. INTRODUCTION

In the business world, the migration towards web-based transactions is a remarkable progress in the virtual business and commercial activities, which gave birth to the electronic business (e-business) and electronic commerce (e-commerce). Cloud computing adoption by organizations is on the rise, with [1] predicting that the worldwide public cloud services market will grow by 16.5 percent in 2016 to a

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total of \$204 billion, up from \$175 billion in 2015. According to the statistics portal, the total number of cloud-based users around the world is approaching 3.4 billion, which is about half of the total population of the world in 2018. In Kenya, the adoption of cloud services is being led by the public sector. According to research done last year by the Communications Authority (CA) and the Kenya National Bureau of Statistics (KNBS), 35% of all government institutions have some form of cloud service as compared to 22% of businesses in the private sector. Because of the tremendous growth of this technology, every type of business should be well aware of the wave which is largely shaking the whole industry. Successful initiatives such as the e-citizen platform, whose purpose is to have public services accessible conveniently from the Internet, has evolved how government services are offered to the citizens.

Kenya recently adopted a digital economy blueprint meant to further develop the ICT sector and e-commerce activity. User penetration is above the regional average, with revenues expected to have a positive annual average growth of 16.4% by 2025. With revenue of KSH 101 billion and a share of 76.1%, e-Commerce generated the highest digital revenues in 2020 [2]. Most of the Internet users access one or more cloud services. For example, many users have a Google, Yahoo, or Hotmail Web-based e-mail account. These are what would be called global cloud services because they are hosted by data centers outside of Kenya. Other Global Cloud applications popular in Kenya include WhatsApp, Twitter and Facebook. A study conducted jointly by KNBS and CA of Kenya in 2016 indicated that 90% of enterprises surveyed use computers in their business activities. 53% of those enterprises have a website while 39% were connected to the Internet. 61% hosted their websites locally while 37% had their websites hosted internationally. The study further noted that 26.5% of the enterprises received orders over the Internet and 32.7% placed their orders over the Internet. When it comes to connectivity, majority of the enterprises, 81%, accessed Internet through fixed broadband while 40.5% used mobile broadband.

[3] contended that e-commerce is booming in Kenya; they point out that it is now the most typical channel used by entrepreneurs to sell their goods. Facebook and Instagram are two excellent online marketplaces for people to sell their goods. According to statistics, at least 5 out of 10 Kenyans have purchased an item they initially saw online. This demonstrates how powerful social media is. Kenya's market for smartphones is expanding as well. In 2015, 83% and 58% of Kenya's 44.35 million people had access to mobile devices

and the Internet, respectively. Kenya was the 21st most connected country in the world in that same year, with an estimated 26.1 million Internet users. Of those, 99.9% used mobile data to access the Internet. In compared to 2011, when only 7% of all phones sold in the nation were smartphones, 58% of all phones sold during that time frame were smartphones [4].

Cloud computing is an Information Technology (IT) innovation that allows users to temporarily utilize computing infrastructure over the network, which is supplied as a service by a cloud provider at possibly one or more levels of abstraction [5]. [6] indicated there is global evidence from public sectors on the use of cloud computing services that has supported the expected benefits of increased efficiency and cost reductions, as well as mobile device solutions, sensor-based data collection, and real-time analytics with some countries in Europe and Asia have benefited from cloud computing, and its use is increasing in improving the performance of service delivery to citizens. According to [7], cloud computing's efficiency in increasing firm profitability has been unsuccessful in most Kenyan enterprises due to a lack of cloud computing technology and cloud computing policy conformance with statutory regulation.

## II. STATEMENT OF THE PROBLEM

Small and medium businesses in developing countries are struggling to muddle through the rapid market variations forcing adoption of various state-of-the art information technologies such as Cloud computing to advance their business operations [7]. Firms are increasingly attempting to integrate business processes into their existing Information System (IS) applications and build internet-based technologies for transacting business with trading partners. Despite the many benefits that cloud computing may provide organizations, adoption rates in several developing nations remain low [8]. To enhance competitive advantage, developing cloud computing capability is an important undertaking because it not only rapidly changes the way that enterprises buy, sell, and deal with customers but it is also becomes an integral part of any enterprises' business tactics [8]. The adoption of cloud-based services can help organizations ensure a seamless and timely flow of information. Most SMEs then often carry out manual processes and make use of low-cost IT solutions that may only be sufficient for short term use and may not be able to scale as the organization grows [9]. The major challenge for traditional IT environments has been the upfront setup costs and the increasingly complex management issue of software, hardware and networking equipment which also require specialist staff for implementing and maintaining IT services [10]. There is insufficient research that identifies the present levels of cloud computing in the context of online enterprises in emerging nations [11]. Therefore, there is a need to establish the current situation for e-commerce enterprises in Nairobi County.

### A. Objectives

This study examined the determinants influencing of cloud computing adoption and performance of small and medium E-commerce enterprises in Nairobi County. The study was guided by the following specific objectives:

- i) To assess the influence of technological readiness in cloud computing adoption and performance of small and medium E-commerce enterprises in Nairobi County.
- ii) To determine the influence of the comprehensive advantage in cloud computing adoption and performance of small and medium E-commerce enterprises in Nairobi County.

### B. Scope of the Study

This study focused on the factors that influence cloud computing adoption by small and medium electronic commerce enterprises in Nairobi County. The study also narrowed down the geographical scope by limiting the same to selected 91 E-commerce businesses from various industries in Nairobi County owing to the diversity of business within the area. The study targeted 119 online e-commerce enterprises in Nairobi. A sample of 91 online e-commerce enterprises was drawn

## III. LITERATURE REVIEW

The study was guided by the Technology Organization Environment Model (TOE) and Technology Acceptance Model (TAM). The TOE is an organizational level theory that provides a framework for technology adoption by an enterprise. It identifies strengths and weakness in the adoption and diffusion of technological innovation which are caused by the specific technological, organizational and environment contexts of the firm [12]. The framework consists of three pillars, namely, technology, organization, and environment. The technology pillars define some factors related to the tools, software, IT infrastructure, etc. that can affect individual's or organizations' application for cloud computing. The organizational category captures the firm's ability to gain expertise in the use of various resources to support the application of firm information systems. Environmental components include various industrial factors such as market factors, competitors, and vendors' support, directly or indirectly affecting the operation of enterprises. These are external environmental factors that impact the business's decision to implement new technology. Therefore, TOE provides a clear theoretical basis and a consistent empirical support and the likely outcome of new technology adoption in a firm [13]. TAM explains the user process of taking up and using a new innovation [14]. It is an enhancement of the Theory of Reasoned Action (TRA). This model is used in a wide range of studies to justify the relationships between user's technology acceptance and the perceived usefulness (PU) and perceived ease of use (PEOU) [15]. TAM is often integrated with DOI to assess main innovation adoption drivers. According to [14] perceived usefulness is concerned with how a user believes adopting a new technology will help improve their performance.

Perceived ease of use is the degree to which a person believes that using a particular system would be free from effort. In this research, the technology acceptance model helps to understand how perceptions influence cloud adoption. According to TAM, a firm will adopt cloud computing based on two factors: they believe it easy to use or it provides benefits that will enhance the firm's operations.

IV. CONCEPTUAL FRAMEWORK

Conceptual framework is the graphical representation of variables, i.e., the dependent variable and the independent variables.

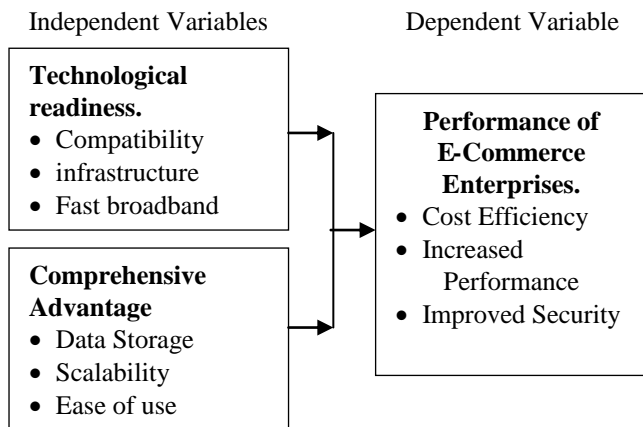


Fig 1: Conceptual Framework

1) Technological Readiness

Organizations, which have reached a level of sophistication in terms of technological readiness, are usually seen to be highly integrated in terms of computerized processes and are considered as better prepared to adopt IT innovation; hence they can attain greater benefits. that organizations are more likely to adopt cloud computing when there is a higher availability of IT resources in the organization [16]. Cloud computing is essentially a broad variety of distributed and grid computing that differs in terms of services, architecture, deployment, and geographic dispersion and requires a team with high technical skills in cloud to effectively improve organization performance [17]. In German, there is a slow adoption rate of cloud computing especial the use of PaaS solution due to factors mentioned such as security and privacy concerns, and also fast broadband internet access [18]. Majority of enterprises use cloud computing services in industrialized countries, however in the majority of poor nations, the situation is quite different. IT provides services to users as a utility on a pay-per-use basis. Since individuals would only pay for what they required and desired at the time, the amount of money that the businesses would really spend is lower. Cloud-based related innovations, creativity, and service performance are becoming essential sources of economic and societal development in sub-Saharan Africa and beyond, especially for economies that are implementing cloud computing [19].

2) Comprehensive Advantage

Cloud Computing is predominantly concentrating on conveyance of solid administration, secure, deficiency tolerant, maintainability and adaptable frameworks for facilitating Internet based application services and programs [20]. Cloud Computing clients don't commonly possess the physical framework filling as host to the product stage being referred to, rather, they maintain a strategic distance from capital use by leasing use from a specialist and outsider supplier [21]. For enterprises, the cloud's scalability of computing resources is a key feature [15]. Cloud computing provides excellent prospects for corporate growth by allowing an enterprise to scale up or down in accordance with its computing needs [22]. Access to cutting-edge middleware and data services through cloud computing boosts developer productivity and code quality by reducing errors, testing expenses, and increasing accuracy, which in turn improves application delivery [23].

3) Performance of E-commerce Enterprises

Numerous researches have verified that cloud computing enables businesses to make better use of their software and hardware investments while improving their performance [24], [25]. This is accomplished through virtualizing systems, which is a natural progression of data centers, hence improving the performance of businesses and institutions Cloud computing also lowers software costs, resulting in improved organizational efficiency. Businesses no longer need to purchase separate software programs for each computer [26]. Enterprises ought to use cutting-edge technology that gives them a competitive advantage to adapt to the ever-changing business environment. Cloud computing minimizes or eliminates the need for businesses to manage information technology systems, depending on the service model — IaaS, PaaS, or SaaS. With a SaaS subscription, the consumer is not concerned with where or how the software is managed or run because those details are concealed from them. Instead, the cloud service provider makes sure the product is constantly accessible to the customer. As a result, businesses don't rely on their own infrastructure and footprint in terms of facilities [23]. Cloud computing is affordable for businesses [27].

For decentralized teams, cloud computing offers a centralized platform for development, testing, deployment, data storage, and IT management [28]. Through integrated product teams that concentrate on developing products with the needs of the customer in mind, this enhances team communication, resource sharing, and eliminates duplication. According to [28] cloud computing facilitates cross-functional team cooperation through resource sharing and enhanced hardware consumption, and that organizations may be run from any location and at any time. Since data and programs may be accessed using any sort of device with an internet connection thanks to cloud computing, they are always accessible [27]. According to [29] cloud computing is safer than on-premises systems, even though it may not be the best option for storing extremely sensitive data.

V. EMPIRICAL LITERATURE

1) *Technological readiness and Performance of E-commerce Enterprises*

Organizations, which have reached a level of sophistication in terms of technological readiness, are usually seen to be highly integrated in terms of computerized processes and are considered as better prepared to adopt IT innovation; hence they can attain greater benefits [30]. It is therefore, hypothesized that organizations are more likely to adopt cloud computing when there is a higher availability of IT resources in the organization. Cloud computing technologies have advanced and made it possible to communicate globally and to use remote data centers, servers, and other ICT facilities that initially require access to dedicated computing resources on site. Any cloud system, including PaaS, SaaS, and IaaS, can be implemented as a private cloud, a public cloud, a hybrid cloud, or a community cloud, according to [31]. A private cloud is only delivered and maintained within a company. Management and operation, however, might not necessarily take place within the organization. A public cloud offers services that may be accessed by the general public over the Internet using common APIs. An amalgam of deployment techniques using both private and public infrastructures is known as a hybrid cloud. As opposed to a community cloud solution, which involves numerous organizations using cloud infrastructures with shared security, mission, and interest considerations [29].

2) *Comprehensive Advantage and Performance of E-commerce Enterprises*

Numerous scholars have assessed the projected benefits of technology progress using perceived benefits [32]. The advantages of cloud computing include flexibility, simple data analysis, faster deployment, lower expenses for IT and IT staff, and accessibility everywhere [33]. According to [34], the implementation of cloud computing may speed up corporate communications, increase inter-organizational coordination efficiency, improve consumer communications, and improve access to market information mobilization. [24] found that using the cloud has strategic advantage which include assisting organizations in gaining a competitive edge and forging beneficial connections with other organizations; and informational advantage which entails facilitating easier access to information and enhancing information accuracy. With cloud computing, the installation and upkeep of the information system are no longer the organization's responsibility because they are now managed by the cloud computing vendor, which lowers the organization's IT-related expenditures. This justification suggests that those who utilize cloud computing should see significant benefits. Researchers are motivated to look at strategies and solutions that might aid small businesses in growing their operations and maintaining a competitive advantage by recent advancements in new technology. In general, Cloud computing delivers distributed systems with virtualized environments and on-demand provisioning with little management involvement or engagement from the service provider [27].

VI. RESEARCH GAPS

[32] study on adoption of cloud computing by SMEs in Nairobi County Kenya provided a methodology gap as it used exploratory research design while the current study used descriptive research design. In the study by Wanjiru and Yusuf (2020) [35] Computing and Performance of County Governments in Kenya, the study provides a contextual gap since it targeted County government of Nyandarua while the current study targets online SMEs. The study by [7] developed a framework and targeted SMEs in Meru County thus, providing a contextual and methodical gap. The study by [36] examined the customers' perspective on cloud computing adoption by the banking sector in Malaysia and thus provides a theoretical and contextual gap as the study focused on banking industry while the current study is on E-commerce enterprises in Nairobi County. The study by [33] also focused on banking sector in Saudi Arabia.

VII. RESEARCH METHODOLOGY

A descriptive research design was used in the study. The target population of the study consisted of business managers, IT officers, cloud computing vendors, staff or representatives from 119 online e-commerce enterprises with official premises and operating in Nairobi city. A sample of 91 was drawn from the targeted population. In this study multiple linear regression analysis was carried out as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon \dots\dots\dots (i)$$

- Where,
- Y=Performance of E-commerce Enterprises
- $\beta_0$ = Y Intercept (Constant)
- $X_1$ = Technological Readiness
- $X_2$ = Comprehensive Advantage

VIII. RESEARCH FINDINGS AND DISCUSSIONS

A. *Response Rate*

The sample size was 91 respondents working in e-commerce enterprises in Nairobi County. The researcher distributed 91 questionnaires to the respondents where 80 were filled and returned which account for 87.9% % of the response rate.

B. *Pilot Study*

A 10% (10) of the entire sample size (91) was used. Pre-testing helped to detect deficiencies like unclear directions, insufficient space to write response, wrong phrasing of questions, vague questions etc. The pilot study was done at online shop in Nairobi County. The pilot study tested for reliability and validity of the questionnaire. The Cronbach's alpha coefficients for the study variables were above 0.7 and thus, found to be reliable. As on Validity of the research instrument, content and face validity were achieved through expert opinion while factor analysis was used to achieve construct validity. In factor analysis, principal components analysis with varimax rotation was used where items with factor loading below 0.5 were removed and will not be used in the subsequent analysis. Further KMO values were all above 0.5 implying that the sample is adequate while

Bartlett’s Test of Sphericity values were all below 0.05 indicating significance of the data. We can conclude that the data collection instrument passed both validity and reliability tests.

C. Descriptive Statistics

Measure of central tendency was used for the descriptive statistics where the responses from the questionnaires using a Likert scale were analyzed.

1) Technological Readiness

The first objective of the study was to assess the influence of technological readiness in cloud computing adoption by small and medium E-commerce enterprises in Nairobi County. In this study, technological readiness in Cloud computing was measured by compatibility, Organization Infrastructure, Fast Broadband, Level of ICT Expertise, knowledge on cloud computing, and level of privacy. The statistics found in Table 1 below indicated that the average technological readiness was 3.60 and standard deviation of .599. This translated to agree from the Likert scale. Thus, based on the statistics, respondents agreed implying that there was significance statistical evidence to suggest agreement with the technological readiness indicators. The standard deviation of .599 also indicated that there was minimal variation of the responses from the average technological readiness of 3.60.

Table 1: Technological Readiness

Technological Readiness	SD %	D %	N %	A %	SA %	M	SD
Compatibility	3.8	13.8	11.3	41.3	30	3.80	1.130
Organization infrastructure	1.3	18.8	8.8	37.5	33.8	3.84	1.130
Fast broadband	0	15	7.5	41.3	36.3	3.99	1.025
Level of ICT expertise	1.3	18.8	10	42.5	27.5	3.76	1.094
Cloud Computing knowledge	1.3	13.8	8.8	40	36.3	3.96	1.061
Level of Privacy	2.5	21.3	8.8	38.8	28.8	3.70	1.174
<b>Average Technological Readiness</b>						<b>3.60</b>	<b>.599</b>

From the Table 1 in relation to Technological readiness, compatibility was agreed by 71.3% of the respondents as a factor in technological readiness that influence the adoption of cloud services by E-commerce enterprises (M = 3.80, SD = 1.130). Organization infrastructure was also opined by majority of the respondents (71.3%) as another factor that influence adoption of cloud services by E-commerce enterprises (M = 3.84, SD = 1.130). The presence of a fast broadband internet was also agreed by 77.6% as a factor that influence the technological readiness of the E-commerce enterprises (M = 3.76, SD = 1.094); the level of ICT expertise was also agreed by 70% to influence adoption of cloud services (M = 3.76, SD = 1.094); knowledge on cloud computing was also agreed by 76.3% as a factor related to technological readiness to influence the adoption of cloud services. Lastly 67.6% of the respondents opined that the

level of privacy related to the cloud services was a factor that influence E-commerce enterprises to adopt cloud services (M = 3.70, SD = 1.174).

Thus, in this study, the presence of fast broadband internet (77.6%) was a major factor related to technological readiness followed by the E-commerce enterprises knowledge on cloud computing (76.3%), compatibility of the E-commerce enterprises with cloud services (71.3%), organization infrastructure readiness to embrace cloud services (71.3%), the level of expertise (70%) and the finally, the privacy related issues with cloud computing (67.6%). [17] argued that Cloud computing is essentially a broad variety of distributed and grid computing that differs in terms of services, architecture, deployment, and geographic dispersion and requires a team with high technical skills in cloud to effectively improve organization performance. On level of privacy, [29]) posited that cloud computing is safer than on-premises systems, even though it may not be the best option for storing extremely sensitive data.[37] Nduati et al (2015) asserted that managerial support, ICT cost, and a businesses' capacity for knowledge directly impact an organization's ability to successfully embrace ICT in Kenya.

2) Comprehensive Advantage

The second objective of the study was to investigate the influence of Comprehensive advantage in cloud computing adoption by small and medium electronic commerce enterprises in Nairobi County. Comprehensive advantage was measured by data storage, scalability, ease of use, sharing and collaboration, easily accessible, and pay-as you go. The statistics found in Table 2 below indicated that the average cloud infrastructure was 3.41 and standard deviation of .515. This translated to agree from the Likert scale. Thus, based on the statistics, respondents agreed implying that there was significance statistical evidence to suggest agreement with the cloud infrastructure indicators. The standard deviation of .515 also indicated that there was minimal variation of the responses from the average Comprehensive advantage of 3.41.

Table 2: Comprehensive Advantage

Comprehensive Advantage	SD %	D %	N %	A %	SA %	M	SD
Data storage	0	18.8	5	41.3	35	3.93	1.077
Scalability	1.3	17.5	5	42.5	33.8	3.90	1.098
Ease of use	2.5	21.3	8.8	38.8	28.8	3.70	1.174
Sharing and Collaboration	1.3	27.5	3.8	37.5	30	3.68	1.209
Easily accessible	3.8	21.3	8.8	36.3	30	3.69	1.220
pay-as-you-go	0	25	5	41.3	28.8	3.74	1.133
<b>Average Comprehensive Advantage</b>						<b>3.60</b>	<b>3.41</b>

Respondents (76.3%) agreed the availability of Data storage facilities influence their comprehensive advantage the E-commerce enterprises to use cloud services (M = 3.93, SD = 1.077). Scalability of the cloud services was also agreed by 76.3% as a factor that influence adoption of cloud services by E-commerce Enterprises (M = 3.90, SD = 1.098). Only

67.6% believed the ease of use of cloud computing as a factor for their adoption by E-Commerce enterprises (M = 3.70, SD = 1.174). The ability to share and collaborate in cloud services was also seen as an influencing factor by 67.5% of the respondents (M = 3.68, SD = 1.209). The aspect of cloud service being easily accessible was also an influencing factor on its adoption by E-commerce Enterprises as agreed by 66.3% (M = 3.69, SD = 1.220). Finally, 70.1% agreed that since cloud services operate on pay as you go basis, that a factor that influence its adoption by E-commerce enterprises.

In relation to Comprehensive advantage, the availability of data storage facilities and scalability of the cloud services were the most influential factors at 76.3% while cloud computing operating under pay as you go basis was at 70.1%, ease of use at 67.6%, sharing and collaboration at 67.5%, and accessibility aspect being the least influential at 66.3%. Managerial understanding of the competitiveness of the cloud computing for its survival in the market is extremely important for its adoption [38]. [36] opined that the perceived ease of use, usefulness, cost and attitudes toward cloud influence the behavioral intention in adopting cloud computing in banks in Malaysia. [39] posited that relative advantage, cloud complexity, competitive pressure as some of the factors that are critical to adoption of cloud computing by organizations.

*3) Performance of E-Commerce Enterprises*

The Main objective of the study was to investigate the determinants of cloud computing adoption and performance of small and medium electronic commerce enterprises in Nairobi County. The performance of E-Commerce enterprises was measured by Cost efficiency, increased sales, improved market visibility, improved security, ease management of IT systems, and centralized workplace. The statistics found in Table 3 below indicated that the average cloud infrastructure was 3.42 and standard deviation of .408. This translated to agree from the Likert scale. Thus, based on the statistics, respondents slightly agreed implying that there was significance statistical evidence to suggest agreement with the cloud infrastructure indicators. The standard deviation of .408 also indicated that there was minimal variation of the responses from the average cloud infrastructure of 3.42.

**Table 3: Performance of E-Commerce Enterprises**

Performance of E-Commerce Enterprises	SD %	D %	N %	A %	SA %	M	SD
Cost Efficiency	3.8	25	3.8	30	37.5	3.93	1.077
Increased sales	25	23.8	2.5	30	41.3	3.90	1.098
Improved Market Visibility	2.5	23.8	5	35	33.8	3.70	1.174
Improved Security.	2.5	23.8	8.8	40	25	3.68	1.209
Ease of management of IT systems	2.5	20	5	40	32.5	3.69	1.220
Centralized workplace.	0	16.3	16.3	36.3	31.3	3.74	1.133

**Average Performance of E-Commerce Enterprises 3.60 3.42**

From Table 4.14 above, respondents agreed (67.5%) that cloud computing is cost efficient (M = 3.73, SD = 1.302). Cloud computing has also led to increase in sales by E-commerce enterprises as agreed by 71.3% of the respondents (M = 3.84, SD = 1.267). There is also improved market visibility as opined by 68.8% of the respondents (M = 3.74, SD = 1.230); improved security was also as a result of cloud computing adoption as agreed by 65% of the respondents (M = 3.61, SD = 1.175). Cloud services also led to ease management of IT systems (M = 3.80, SD = 1.174) and also that the E-Commerce enterprises enjoy a centralized workplace (M = 3.83, SD = 1.053).

In terms of performance of E-commerce enterprises, ease of management of IT systems had the highest rating at 72.5%, increased sales at 71.3%, improved market visibility at 68.8%, centralized workplace at 67.6%, cost effectiveness at 67.5%, and finally, improved security at 65%. [35] found cloud computing influence performance of county governments in Kenya. The cloud service provider makes sure the product is constantly accessible to the customer thus, businesses don't rely on their own infrastructure and footprint in terms of facilities [23]. The need for physical security necessary to protect IT infrastructure is eliminated by cloud computing [29] The benefits of cloud security and claims to have complete security capabilities. Customers don't have to worry about managing security, system configurations can be infused with all security features, information about security issues are included, compliance and security are integrated, economies of scale allow for security innovation and improvements to benefit all customers [40].

*D. Inferential Analysis*

*1) Correlation Analysis*

Correlation analysis was used to determine the magnitude, significance, and direction of the relationship. Pearson correlation analysis (r) was used to determine the strength of association between independent variables (Cloud Infrastructure, Technological Readiness, Competitive Pressure, Comprehensive Advantage) and the dependent variable (Performance of e-commerce enterprises in Nairobi County).

**Table 4: Correlation Matrix**

		Performance of E-commerce enterprises
<b>Technological Readiness</b>	R	.434**
	Sig	.000
	N	80
<b>Comprehensive Advantage</b>	R	.684**
	Sig	.000
	N	80

Technological Readiness also has a positive weak correlation with performance of E-commerce enterprises in

Nairobi County ( $r = .434, P = .000$ ). Thus, an increase in Technological Readiness would lead to an increase in performance of E-Commerce enterprises. Comprehensive advantage has a positive strong significant correlation with performance of E-commerce enterprises in Nairobi County ( $r = .684, P = .000$ ). An increase in competitive pressure would lead to an increase in performance of E-commerce enterprises in Nairobi County.

2) ANOVA

The ANOVA was used to determine whether the model was a good fit for the data. The p-value of the F- ratio generated should be less than 0.05 for the equation to be statistically significant at 5% level of significance. In this study, the F-Calculated  $(4,75) = 27.911$ , and the p-value =  $0.000 < 0.05$ . Thus, at least one of independent variables in (Cloud Infrastructure, Technological Readiness, Competitive Pressure, and Comprehensive Advantage.) is fit and significant in explaining the performance of small and medium E-commerce enterprises in Nairobi County.

Table 5: ANOVA Test

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	7.848	4	1.962	27.911	.000 <sup>b</sup>
Residual	5.272	75	.185		
Total	13.210	79			

a. Dependent Variable: Performance of e-commerce enterprises

b. Predictors: (Constant), Cloud Infrastructure, Technological Readiness, Competitive Pressure, and Comprehensive Advantage.

3) Regression Coefficients

Multiple linear regression was done to the relationship between the independent variables and the dependent variable. The regression coefficients are as shown in Table 6 All the variables have significant relationship with performance of E-commerce enterprises in Nairobi County, since P-values are less than 0.05.

Table 6: Regression Results

a.. Dependent Variable: Performance of E-commerce Enterprises

Technological Readiness has a direct significant relationship with performance of E-commerce enterprises in Nairobi County ( $B = .211, P = .021$ ). This is also supported by t-statistics  $2.343 > t\text{-critical} (1.990)$ . Technological Readiness also has positive correlation with performance of E-commerce enterprises in Nairobi County i.e. Beta ( $r = .310$ ). Holding other factors constant, for a unit of Performance by E-commerce enterprises .211 of Technological Readiness is needed. According to [34] if the previous experience of an organization firms' with IS are compatible and existing information infrastructure matches the cloud computing infrastructure, then the changes introduced by cloud computing services will be consistent

with existing practices. Thus, with this correlation it implies that the complexity and compatibility of cloud computing might be a barrier to the adoption of cloud computing [18] also found that technological factors have a major influence on the adoption by SMEs in German. Comprehensive Advantage has a direct significant relationship with performance of E-commerce enterprises in Nairobi County ( $B = 1.117, P = .000$ ). This is also supported by t-statistics  $7.384 > t\text{-critical} (1.990)$ . Comprehensive Advantage also has positive correlation with performance of E-commerce enterprises in Nairobi County i.e. Beta ( $r = 1.411$ ). Holding other factors constant, for a unit of Performance by E-commerce enterprises 1.117 of Comprehensive Advantage is needed.

The model can be fitted as follows:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \epsilon \dots\dots\dots(i)$$

$$Y = 1.108 + .211TR + 1.117CA \dots\dots\dots(ii)$$

IX. CONCLUSIONS

Technological Readiness has a direct significant relationship with performance of E-commerce enterprises in Nairobi County. the findings are contrary to [34] who found Technological readiness to have a negative significant influence on adoption of cloud computing in high tech industries in China. Comprehensive Advantage has a direct significant relationship with performance of E-commerce enterprises in Nairobi County. the findings are supported by [33] who found a factor related to benefits of cloud computing to have a significant influence on its adoption in the Saudi banking sector. The findings are contrary to [34] who found that relative advantage to have a negative significant influence the adoption of cloud adoption in China. The study found a relative advantage was barrier to cloud computing adoption. E-commerce enterprises need to be ready for embracing cloud computing. They need to invest in IS that are also compatible with cloud computing. IT is dynamic and how fast an organization responds to the changes in technologies gives it a competitive advantage. Investment in good and fast network connectivity is necessity while embracing cloud computing. The issues of power failure should also be addressed and Enterprises need to have power back up to continue enjoying the services. Training on

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.108	.237		4.668	.000
Technological Readiness (TR)	.211	.090	.310	2.343	.021
Comprehensive Advantage (CA)	1.117	.151	1.411	7.384	.000

cloud computing services is also important in order to share the knowledge on the benefits as well as clear out the misconceptions. Cloud computing offers a lot of benefits to E-commerce enterprises. The E-commerce Enterprises should make the decisions to embrace cloud services based

on strategic fit with their organizations. There is no need to just adopt all that is trending but consider the needs of the E-commerce enterprises so that they can benefit optimally to improve their performance.

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