Influence of Policy and Legal Framework on ICT Innovation

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Abstract

This paper reviews the influence of policy and legal framework on ICT innovation by critically looking at the policy objectives. To further reveal the objectives of the study, survey research design was conducted to reveal how software innovations policy are influenced. The study revealed that a great extent of respondents views economic factors to be having great influence in innovation of software. The study recommends that future study should be focused on the legal issues influencing the adoption of ICT innovations by businesses and the impact of ICT innovation policies on business performance of the ICT firms.

Keywords - *Policy, ICT Innovation, Legal Framework.*

I. INTRODUCTION

An electronic copy can Technology has a huge potential positively affect the lives of people and foster economic growth, and many opportunities have been created to individuals, companies, and many nations across the globe. The potential of information and communication technologies to transform the global society according to the Global Information Technology (GITR) is incredible However, across the globe, many regions and billions of people are still not connected or served enough though they still have significant opportunities to improve their societies (Mattsson, 2016).

The present era is that of a dynamic digital disruption with so many changes that are technologically driven with rapid innovation and evolution on how technology is used by people. If there is a right strategy that is in place, there can be the development of powerful capabilities that can aid in reinventing the digital world and can lead to accelerating the social, political and economic benefits that only global connectivity strategies can solve and deliver. According to GITR, the assessment of about 143 economies on the role of ICT in supporting growth inclusively and the impact of ICT leads to economic and social transformation (Muchai, Dianah, & Peter, 2016).

Muchai et. al., (2016) further asserts that there has been liberalization of ICT markets in sub-Saharan Africa and this is a future strategy and countries like Kenya and Tanzania have begun to reap the benefits of liberalization as there has been an increased in private investment and new business models and services have been introduced in the countries that have embraced liberalization. In the region of East African, there has been liberalization of ICT markets in sub-Saharan Africa and this is a future strategy and countries like Kenya and Tanzania have begun to reap the benefits of liberalization as there has been an increased in private investment and new business models and services have been introduced in the countries that have embraced liberalization. The Innovation Prize for Africa which was started in 2011 was meant to make the innovation in African ecosystem stronger by ensuring that the best African innovators are rewarded for their efforts. The innovators from Africa are honored by IPA which motivates them to develop more new products.

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II. ICT INNOVATION IN KENYA

The main mission for ICT development in Kenya is to ensure that the services that pertain ICT are accessed efficiently and that the people of Kenya can rely on them. The country has a vision to ensure that it is ICT- driven because most of the countries that have made use of the potential that ICT has have achieved significant social, and economic development and the transformation is real (Muchai, Dianah, &Peter , 2016). The government of Kenya has therefore, recognized the potential has to develop social and economic policies for wealth and creation of employment and stimulation of investment ad innovation in the sector and ensure that there is universal access according to the COMESA model which is based on certain principles like development of infrastructure, human resource, participation of the stake holders and development of an appropriate policy and regulatory framework.

The Kenyan government launched the Vision 2030 which is a long-term strategy for the country that

gives a lot of recognition to science, technology and innovation (ST&I) as the main way to be able to achieve advancement in economically, politically and environmentally. ST&I and other strategies are crucial for the improvement of technology, and innovation. For Kenya to be able to harness science, technology and innovation, the government has to put in place effective regulatory policies. There has been the growth of ICT in Kenya which can be shown by the number of telephone lines, internet service providers (ISPs), and the rising internet users, broadcasting stations and liberalization of the mobile cellular market and there are now two cellular mobile operators. Over 70% of the people in the country have access to television, and over 95% have access to radio services. The government of Kenya in the year 1997 released a policy guiding postal and telecommunication sector that allowed competition and the Kenya Communication Act was enacted in 1998 (Mambi, 2010).

According to GoK (2015), the ICT innovation issues are currently considered in much legislation. Some of the legislation include; Science and Technology Act 1977, The Kenya Corporation Act 1998 and the Kenya Communication Act of 1998. All these legal frameworks were set to ensure that there is support for ICT development and investment, to ensure there is healthy competition and make ICT affordable and accessible and make sure that the issues of Privacy, cybercrimes, ethical and moral conduct, copy rights and intellectual property rights and piracy are amicably addressed.

III. RESEARCH PROBLEM

Economic activity as well as technological activity are information based and therefore matters less who gets hurt in the transfer of this information (Baker, 2010). This paradigm shift brings in fresh ethical and legal issues which are mainly related to factors such as the right to information,itellectual property, the right to privacy which is endangered by the emphasis on the free movement of information, and the protection of the economic concern of the owners of intellectual property (Benjamin, 2005). With the presence of different categories of private information like; private communication, Personal privacy, information about possessions and privacy of the body, individuals and corporate organizations struggle to ensure that this kind of information only remains within them. These categories have proved challenging to maintain since the start of technological innovation (Baker, 2010).

There are numerous software innovators in Kenya some with individual ideas while others share same aspects or intentions of technology. These give rise to the presence of completion, and the notion of the first come first serve basis (Rivette & Kline, 2000). Intellectual Property Right glitches aroused with the prosperity of Information Technology. Exclusively in the software innovation industry, intellectual property and piracy is of great importance. The massive increase in claims of private ownership of intellectual property regulations and software intellectual property apply to more types of units are more obstructive of what may be done with those substances to which they apply, and are longer lasting than ever before. Apparently, never before in the history of intellectual property rights one could have experiment within such a short period, as a decade or so, such a massive gain in their economic importance (Kitch & Perhan, 1989). With the emergence of new technologies every single day, formation of legal policies and regulations that govern the innovation of software products is a major challenged being faced by the government, policy makers and other stakeholders in the ICT industry. This study therefore aimed at examining the legal policies influencing software innovation in Kenya.

IV. OBJECTIVE OF THE STUDY

The main objective of the study was to assess the influence of policy and legal framework on ICT innovations.

V. LITERATURE REVIEW

A. Software Innovation

Software innovation refers to the systematic application of technological and scientific knowledge, methods, and experience in the design, testing, implementation and documentation of software (Laplante, 2007). In the past few decades, the world has witnessed fundamental shifts in the manner in which software's are developed and deployed. Before this development in software engineering there existed relatively few software systems which were custom built and ran on a limited number of frequently disconnected computers (Apiwattanapong & Harrold, 2002).

Software innovation is now widely adopted especially in the nations that are developing and may be relevant in all the market even in developed markets. Mobile phones uptake and the mobile money services in the sub-Saharan Africa is now an emerging issue for example mobile banking innovations and as such billions of individuals are about to have smart phones around the globe at Silicon Valley, Venture firms and other communities where engineering is practiced at a higher level. There are many emerging areas that have experienced tremendous technological advancement like in mobile finance where there is the capability to include services. There is the need for the development of relevant software in the field of mobile finance. These software innovations are those that make it possible to send, receive and save money in a straightforward manner which is an important component of the economy currently (Bensen & Hunt, 2010).

B. Innovation And Policies

The ICT sector needs policy objectives which ensure that there is an enabling environment for services to be provided for the benefit of the general public. Legal and regulatory frame need to be developed to invest in growth and sustenance of ICT, IT and broadcasting innovation and the provision of services and resolving disputes once they occur (Henning, Florian, 2016). It is also fundamental to ensure that fair competition is promoted; innovation and investment in the ICT sector are also not neglected. It is necessary to ensure that the social responsibility is adhered to through the development (R&D) of the codes of practice by all the companies that have been licensed to broadcast. In the recent time, the government of Kenya insisted of digital migration. Promoting research and development is another paramount way of ensuring that there is development and improvement in research and innovation. There also ought to be a policy to ensure that their universal access to and the viability of the public service broadcasting.

C. Government Regulations

Governments across the world set jurisdiction to ensure that regulations and licensing in the ICT industry are set to ensure public safety, welfare, well-being and other interests of the general public are considered by technicians when creating software. It is with this that software innovators are examined and permitted or denied to practice professional services to the general public (Layton, 1986). In cases where public safety, welfare or property is concerned, it is most likely required that an engineer is registered or licensed. Some jurisdictions have an "industrial exemption" that authorize engineers to work internally for an organization without licensure as long as they are not making ultimate decisions to discharge product to the public or posting engineering services directly to the public (American Council of Engineering Companies, 2007).

The government helps with the provision of services efficiently and it does this by providing a framework on how the services should be provided to the people in an improved manner. Communication and information is crucial to the citizens and the people who are in business. There are strategies that the government ought to realize for it to set up the best strategies in setting up the Information Technology Infrastructure (Kathuria, 2016). The government encourages private and public utility providers to share their capacity. Supporting the development, deployment and maintenance of a community that can perform many purposes and centers where the general public can access ICT services. The regulations set by the government enables the ICT industry to grow through the increase of the awareness among the stakeholders of the opportunities that are provided by different ICT innovations (GoK,2015).

The government ensures that there is the introduction of measure and introduce laws that can create an enabling environment for ICT to grow and become globally competitive. It achieves this through promoting fiscal policies that are favourable to ensure that the products that result from ICT innovation are of high quality and can compete globally and through the promotion of duty-free zones is crucial in providing a budgetary allocation that will help boost the growth of ICT innovation (GoK,2010).

D. Industry Related & Economic Factors

The ICT industry is involved in reducing performance and him functionality of devices is at all costs. The devices produced are also of higher energy efficiency which lowers the system power consumption through improved energy per operation and ensures that leakages are controlled. There are finances required when there is a need to strengthen the technical capabilities, and the ICT companies spend a lot of money in staff training of the employees so that they can keep with the fast pace of change in technology (Muchai, Dianah, & Peter, 2016). To develop a highly skilled human resource that can work in the ICT sector and train minds that are highly innovative need finances. Countries need ICT innovation awareness and there is a lot of resources that is required to ensure that innovation is intensified and to strengthen the ICT innovation performance framework and developing the right policy environment and deepen innovation which is vital for the success of ICT. There is also need for collaborations and partnerships and coordinating research and development (Kshetri, 2016).

VI. RESEARCH METHODOLOGY

The study adopted a survey research design with the target population being software firms in Nairobi. The researcher used systematic random sampling for the study. This technique provided a broad perspective on software innovators in the target software firms. The technique produced estimates of overall population parameters with greater precision. The main instrument for data collection was structured questionnaires that allowed for uniformity of responses to questions. A comparison of data collected with theoretical approaches and documentaries cited in the literature review was done. Further, data obtained from various respondents were compared against each other in order to get more relevant on the issues under study. The data was then coded using numerals in order to put them in limited number of categories and analysed using the Statistical Package for Social Sciences (SPSS) Version 20.

A. Model for analysis

This study adopted use a linear regression model to establish the relationship that existed between the variables. The model predicted the extent to which

each of the four independent variables are related. This provided the magnitude and direction of relationship between each of the independent variables with dependent variable.

The proposed regression model of the study was as follows:

$Y = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$

Where: Y is the Innovation of ICT products

β_o= Represents the Innovation of ICT products when $(X_1, X_2, X_3) = 0$

X_1 = ICT Regulations

X_2= ICT innovation Policies

X_3= Economic factors

β_1, β_2 and β_3, represent the coefficient of X_1, X_2 and X_3

ε represents the error term

VII. RESEARCH FINDINGS

A. Regression results

Table 1: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig.
.7879[a]	.7802	.7709	40.3056836	0.010

From the table 1 above, there is a significant relationship between the dependent and independent variable as the P-value is less than 0.05 significance level. In addition, the R value is 0.7879 indicating that there is a positive relationship between independent and dependent variable. While R is 0.7802 indicating that the independent variable explains 78.02% change on the dependent variable.

Table 2: ANOVA Table

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	26466.215	4	6616.554	4.073	0.021[a]
Residual	22743.674	70	1624.548		
Total	49209.889	74			

Predictors: (Constant), ICT Regulations, ICT innovation Policies, Economic Factors

Dependent Variable: Innovation of ICT Products

Test of Hypothesis Using ANOVA

F-calculated (4.073) is greater than F-critical (0.021)

Conclusion: We reject Null hypothesis; hence legal systems have an influence the innovation of ICT products in Kenya.

Table 3: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	.041	.258		.930	.000
ICT Regulations	.494	.077	.297	3.798	.002
Economic Factors	.430	.070	.188	3.290	.001
ICT Innovation Policies	.413	.062	.013	.215	.001

a. Predictors: (Constant), ICT Regulations, ICT innovation Policies, Economic Factors

b. Dependent Variable: Innovation of ICT Products

The established multiple linear regression equation is:

$Y = 0.041 + 0.494X_1 + 0.430X_2 + 0.413X_3$

From the regression model above, every unit change on ICT regulation there is 0.494 unit change on ICT products, all other factors held constant. While every unit of change on economic factors there is 0.430 unit change on ICT products all other factors held constant. While for every unit change in ICT innovation policy, there is 0.413 unit change in ICT products. From table 3 above ICT regulation, economic factors and ICT innovation policies influence innovation of ICT products as p-values were less than 0.05 significance level.

Table 4: Correlation of the Variables

Correlations		ICT Regulations	ICT Innovation Policies	Economic Factors
ICT Regulations	Pearson Correlation	1	.657**	.704**
	Sig. (2-tailed)	.030	.310	.230
ICT Innovation policies	Pearson Correlation	.657**	1	.241**
	Sig. (2-tailed)	.030	.400	.000
Economic Factors	Pearson Correlation	.530*	.289**	1
	Sig. (2-tailed)	.130	.130	.240

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

* Correlation is significant at the 0.05 level (2-tailed).

The correlation results presented on Table 4 shows positive linear association between ICT regulations and ICT innovation. A high positive linear association was established between ICT policy and

economic factors, the results imply there is a strong correlation between the variables under study.

VIII. SUMMARY

The findings revealed that a greater extent of respondents agreed that economic factors influence innovation of software's. These were mainly influenced by the cost of the software developed as market of product is driven by forces of demand and supply. The market of the software developed is determined by competitive advantage it offers over other software already in the market. In addition the market niche determines who will buy the product hence innovators assess the market size for their product before launching into the market. The innovations are driven by cost of production since returns are a function of fixed cost and variable cost. So e they do not produce over priced products that most end users may not afford.

Regarding ICT regulations: most respondents agreed to a greater extent government regulates on development of new technologies. This occurs mainly through issuance of ICT licenses by the relevant government bodies, provision of incentives such as tax holidays. The government regulates usage of ICT innovations and regulations as they are charged with formulation of policies, procedures and regulation on ICT usage and innovation. The findings further revealed that ICT innovators' capacities are limited to what the government considers legal.

Factors related to ICT innovation policies influence innovation of ICT products to a greater extent. Innovators were concerned with patents and copyrights as this enabled them own their innovation and earn royalties. Liabilities companies incur from legal suits are costly hence they ensure such cases are avoided at all cost. Hence companies train/educate staff on matters patents and copyright this capacity builds them on the legal right and ownership of original work creators. The software innovators work according to applicable safety-related policies and regulations and internal policies that minimize liability risks. Further, companies provide training/education on policy issues to software innovators in order to equip them with skills that will enable them innovate software products that do not poses health risk or hazard to property or environment.

The software innovation firms used various techniques to mitigate legal liability, the techniques that these firms used to a very great extent techniques included: Safety analysis (e.g. hazard, fault tree, and effect analysis), Software testing independent from software development, Formal verification, and Bug tracking (of safety/liability-critical defects). Traceability of liability-related requirements was used to a great extent while Architectural/design reviews was established used by the ICT innovation firms to a moderate extent.

IX. CONCLUSION

Based on the regression coefficients of the variables, it can be concluded that ICT Regulations, ICT innovation Policies, economic factors had a significant impact on the innovation of ICT products, as P-Value were less than the significance level of 0.05**.** Innovators focus on identifying and meeting the consumer needs within a specific niche of the market. Innovators of ICT products enhance competitive advantage by enhancing performance, effectiveness and efficiency of the ICT products in the market. Forces of demand and supply regulate the available market for the innovations. Innovators have same target market but how they position their items enable them get clients. Most of innovators yearn to earn a living from the innovation hence they ensure they produce innovations that are cost effective to their target market in order to make sales.

Information communication technology innovation policies ensure that innovators of original work enjoy exclusive rights and benefits of their work. This enables them to enjoy a strong market position baring others from commercially using from your innovation this reduces competition in the market. Law suits and legal liability from copying or imitating patents serve as experience to new innovators to avoid copying patented work. Workers of innovating companies are trained on patent and copyrights so as reduce legal liabilities. Most companies have internal policies, procedures, guidelines on innovation to help regulate innovations.

Government regulation of ICT sector is of uttermost importance it protects the rights of players in the market, the environment as well as holds the players accountable. The license offered by government provides terms and conditions under which innovators are to operate within such as advertising laws, privacy, employment and labor laws as well as safety and health regulations. This ensures there is sanity among the innovators in the market, also regulated are the end users of the innovation so that they operate within a legal framework.

X. RECOMMENDATIONS

There is a need to revolutionize software innovation in Kenya and help bridge the digital divide by developing the ecosystems that can be utilized by ICT innovators. The investment in ICT education and infrastructure is vital in enhancing ICT innovation and the government needs to ensure that an enabling environment for the ICT innovators is created by developing regulations and policies that are sound. The government needs to equip all learning institutions with ICT facilities in order to promote ICT innovation among the youth.

The government needs to continuously strive to simplify the legal hurdles faced by ICT innovators. It should focus on enhancing simplicity, usefulness and cost benefit of complying with legal issues, policies

and regulations in the ICT industry. The government should have policy co-ordination with comprehensive and wide-ranging strategy to foster and strengthen innovation of ICT products. This would help address social and environmental goals while building a lasting foundation for future economic growth as a result competitiveness in the ICT industry. Governance of policies towards innovation of ICT products is also important as innovation often requires efforts from many government departments, ministries and government agencies, and from the national and sub-national levels.

Awareness creation on new ICT innovation policies and regulations for innovators must be a priority for the policy makers in order to enhance the economic impact of software innovation on the country. The policy makers like ministry of industrialization and enterprise development should educate ICT innovators more about the legal issues relating to the ICT products being released in the market to minimize legal liabilities for the innovators with an aim of enhancing technical capabilities of ICT entrepreneurs to allow widespread use of emerging technologies in the country. Finally, coordination of ICT policies and regulations at different levels must also be taken into account to avoid duplication of efforts and ensure a coherence of policies at different levels.

XI. SUGGESTED AREAS FOR FUTURE RESEARCH

Future study needs to focus on the legal issues influencing the adoption of ICT innovations by businesses and the impact of ICT innovation policies on business performance of the ICT firms. In addition, future research may examine the knowledge and understanding of ICT firms on government enforcements on ICT laws thus, enrich the efforts that have been made in this study.

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