AN ENHANCED MODEL FOR ADOPTION OF LOCAL SOFTWARES: A CASE OF KENYA

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Abstract

Purpose: This study attempted to explain how adoption of local software development is affected by the individual, technological, environmental and organizational determinants in Kenya.

Methodology: In this framework, explanatory research design was used. The population for this study was the 347 IT and ICT companies which provide software services in Kenya and their customers/users. The list was obtained from members of Kenya ICT Providers Association. A sample of 35 managers from firms was taken and also 70 users. Purposive sampling was applied to select the product managers while random sampling was used to select the 70 customers. In this study, primary data was collected using a structured questionnaire. The researcher used Statistical Package for Social Sciences Version 20 (SPSS) to generate the descriptive statistics and inferential results. Confirmatory Factor Analysis was used to analyze the data. Structural Equation Modeling using Analysis of Moment Structures was used to validate the research model. Post study interview was carried out to test the applicability of the model. Data collected from interview wasanalyzed and presented using SPSS.

Results: It's therefore recommended that the software developments individuals and companies should consider these factors so as to develop software which are competitive and be able to sell to the local and international markets.

Policy recommendation: The study recommended that future studies can then investigate whether this status quo had changed. In addition, the study had contributed to communication audit methodology because of its rigorous and methodical approach in verifying the existence and effectiveness of communication in POSSspromote idealized influence, intellectual stimulation, inspiration motivation and individualized consideration as they influence performance positively.

Keywords: *individual, technological, organizational and environmental factors,*

1.0 INTRODUCTION

Software is critical in today's markets. The importance of information and communication technologies, and thus the software that makes them function, is growing rapidly in both industrial and consumer markets. E-commerce, the Internet, enterprise-integration systems, and wireless networking are just some of the high-profile systems and applications dependent on effective software development. For software development, modern agile software development models address certain parts of this problem space (Boehm and Turner 2004). They are thus gaining more and more attention in many industrial product development organizations.

1.1 Statement of the Problem

Adoption rate of local software dev**elopment in Kenya is very low.** The biggest challenges facing software innovators in Kenya are the skill to package the software products, and the capital for marketing. Many Kenyans build **software** that never **grows** beyond a few customers. Many customers frequently opt for better packaged and marketed software from India, US or UK, even when these have to be overhauled to suit the Kenyan market. In doing so, the customers deny the local products the much needed breathe of life required to enable them survive in the competitive software marketplace (Kabugi, 2013).

The majority of studies relating to technology diffusion and adoption have been conducted in developed countries. Most of the studies focus on individual adoption behaviours and decisions. They do not necessarily lend themselves to studying organizational adoption of technology (King and Gribbins, 2002). Therefore, there is need for a research to come up with adoption model that suits the developing countries like Kenya and also a model that looks at the individual level of adoption and also the organization level.

In addressing the factors influencing software adoption in organizations there is the need for a model that specifically highlights these issues. Relatively little research has examined a model for the adoption of local software, either as a unique task or in the context of local software development in Kenya. This study attempts to explain how adoption of local software development is affected by the individual behaviours, technological, environmental and organizational determinants in Kenya.

1.5.2 Specific Objectives

- To establish the effect of individual, technological, organizational and environmental factors on the adoption of local software development.
- To analyse the effect of individual, technological, organizational and environmental factors on the adoption of local software development.
- To formulate the model for adoption of local software development.
- To evaluate the model for adoption of local software development.

2.0 LITERATURE REVIEW

2.1 Empirical Review

According to Robbins &Judge (2001), an organization is a consciously co-ordinate social unit composed of two or more people that function on a relatively continuous basis to achieve a common goal or set of goals. Communication is the cement of an organization's activities. According to Mbiti (2009), communication is the lifeblood of any organization. It permeates all aspects of social life and promotes interaction between individuals and groups (Robbins& Judge, 2007). In the school context, it is unimaginable to run any of the activities therein without a proper communication system (Mbiti, 2009). Communication can make or break any human organization. It has an intricate nature and structure which can be quite demanding but useful in the context of institution administration. According to Deetz (1992), we participate in organizations in almost every aspect of our lives. Further, he states that we are born in organizations, educated by organizations, and spend much of our lives working for organizations i.e. from birth to death; organizations impact every aspect of our lives. The cord that binds together all organizational activities is effective communication. This is in agreement with Robbins& Judge (2007) who states that we organize together what we cannot accomplish individually, and organizing happens through effective communication. Many institutions perpetually take deliberate efforts to ensure effective communication as a means of strengthening their production.

2.2 Theoretical review

2.2.1 Adoption Theories

Diffusion of innovations (Rogers, 1995; 2003) looks at the stages that a new technological innovation takes for acceptance in the market over a period of time and specific cultures. It seeks to explain how, why and the rate at which new technology spreads over time through cultures. The DOI found that individual characteristics, internal characteristics of organizational structure, and external characteristics of the organization are important antecedents to organizational innovativeness (Roger, 2003). These factors will affect the adoption rate of software and systems at the firm level.

3.0 Research methodology

In this framework, explanatory research design was used. The population for this study was the 347 IT and ICT companies which provide software services in Kenya and their customers/users. The list was obtained from members of Kenya ICT Providers Association. A sample of 35 managers from firms was taken and also 70 users. Purposive sampling was applied to select the product managers while random sampling was used to select the 70 customers. In this study, primary data was collected using a structured questionnaire. The researcher used Statistical Package for Social Sciences Version 20 (SPSS) to generate the descriptive statistics and inferential results. Confirmatory Factor Analysis was used to analyse the data and Structural Equation Modelling using Analysis of Moment Structures was used to validate the research model. Post study interview was carried out to test the applicability of the model. Data collected from interview wasanalysed and presented using SPSS.

4.0:RESULTS FINDINGS

Validated Model

The validated model in figure 4.18 has 90 % coefficient of determination which is a very high percentage indicating that the model is very good. The model has a good Chi-square of 14.260 and p value of 0.65. The higher the probability level (p value) associated with chi square, the better the fit. Amos reports the value of chi-squre as CMIN. Some of the construct exhibited stronger significance than others, this is through the –ve and +ve values on the figure. The –ve values will decrease the adoption of local software while the +ve values will increase the adoption of local software. The model is generic and can be used in any developing country. In the figure it is clear to view the correlation between the independent variables (covariance) and also the correlation between the independent and dependent variables (regression)
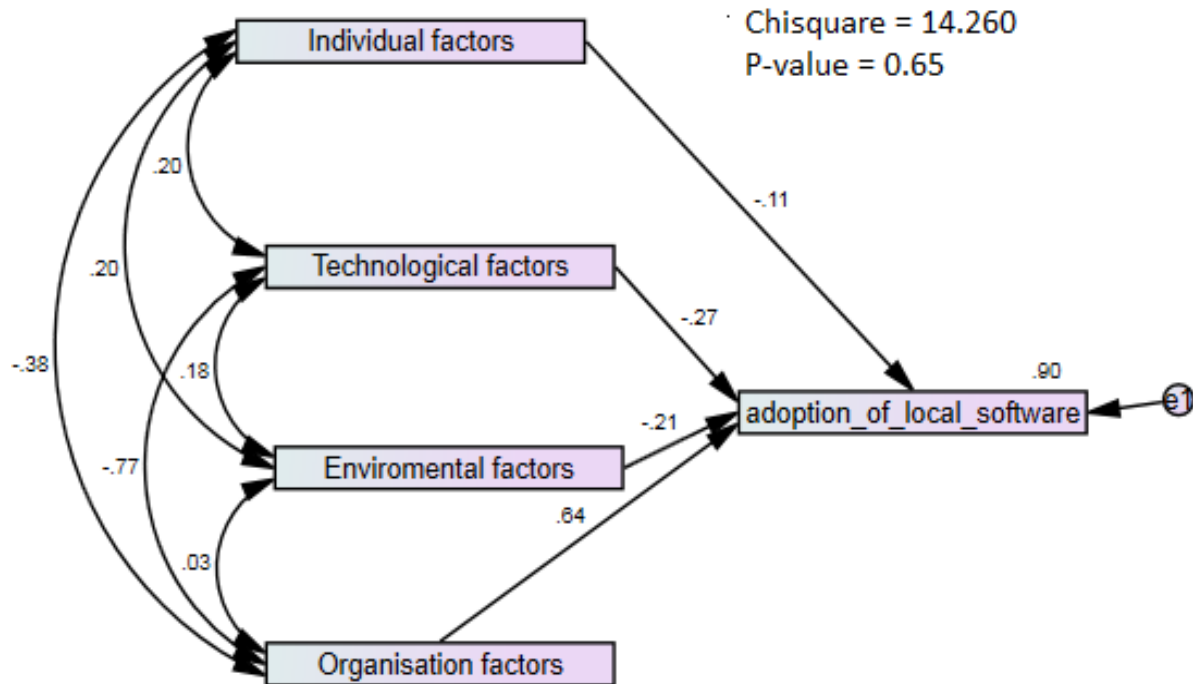
Figure 4.18: Validated Model

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1   DISCUSSION

This chapter finalizes the study by providing the summary of key findings, conclusions and recommendations. The summary, conclusions and recommendations are aligned to the specific objectives of the study.

5.2   Summary of Key Findings for the adoption of Local Software

5.2.1   Individual Factors and the Adoption of Local Software Development

This section examines the individual factors that influence the adoption of local software development in Kenya. The individual factors that influence the adoption of local software development include developers` entrepreneurial capability, perceived ease of use and perceived usefulness. The findings indicated that developers` entrepreneurial capability, perceived ease of use and perceived usefulness makes adoption of local software easier and faster. This was evidenced by the responses from the respondents concerning these variables

5.2.2   Technological Factors and the Adoption of Local Software Development

This section examines the technological factors that influence the adoption of local software development in Kenya. The technological factors that influence the adoption of local software development are compatibility of local software and the level of security and privacy. The findings indicated compatibility can make adoption of local software easier and faster. The findings also indicated that the level of security and privacy can make adoption of local software easier and faster. This was evidenced by the responses from the respondents who indicated that local software are more prone to virus attack, local software are more prone to programming bugs, local software are more prone to hacking by software hackers and that local software does not ensure that the private information is kept confidential.

5.2.3   Environmental factors and the Adoption of Local Software Development

This section examines the environmental factors that influence the adoption of local software development in Kenya. They include industry competition and the regulatory environment set by the government. The findings indicated that regulatory environment can influence the adoption of local software. This was evidenced by the responses from the respondents who indicated that the current legal requirements in local software development effectively accommodate the local software adoption. The findings indicated that industry competition makes adoption of local software easier and faster. This was evidenced by the responses from the respondents who indicated that their firm does not reduce the price of local software in order to get more market share of local software, their firm is faced with strong bargaining power from customers, their firm is not faced with strong bargaining power from suppliers, their firm is faced with threat of substitute of local and international software and that their firm is faced with threat of new entrants into local software development.

5.2.4 Organizational Factors and the Adoption of Local Software Development

This section examines the organizational factors that influence the adoption of local software development in Kenya. The organizational factors that influence the adoption of local software development are organization culture and organization size and resources. The findings indicated that it is their firm`s culture to encourage adoption of local software through promotion of local industry, their organization`s culture allows proper communication between developers, their organization`s culture allows proper communication between developers and customers and that their organization`s culture challenges the status quo and allows competition.

5.3   Summary of Key Findings for the adoption of Local Software and the objectives.

This chapter finalizes the study by providing the summary of how the four objectives were achieved. The summary here was aligned to the specific objectives of the study. The researcher carried out the research to achieve the following objectives:

To establish the effect of individual, technological, organizational and environmental factors on the adoption of local software development.

To analyze the effect of individual, technological, organizational and environmental factors on the adoption of local software development.

To formulate the model for adoption of local software development.

To evaluate the model for adoption of local software development.

5.3.1 To establish the effect of individual, technological, organizational and environmental factors on the adoption of local software development.

The first objective was achieved through multivariate regression modeling. The results reveal that individual factors, environmental factors, technological factors and organizational factors are statistically significant in explaining adoption of local software. The findings imply that there is a significant relationship between environmental factors, organizational factors, technological factors, individual factors and adoption of local software.

5.3.2 To analyze the effect of individual, technological, organizational and environmental factors on the adoption of local software development.

The second objective was achieved through multivariate regression analysis.The analysis revealed that thestrongest factor that influenced adoption was environmental factors . This was supported by a beta of -1.308. The factor that had the lowest impact adoption was technological factors with a beta of-0.059. All the factors except individual factors had a negative relationship with adoption of local software.

5.3.3 To formulate the model for adoption of local software development.

The third objective was achieved by validating the model and doing some modification so as to have a fit model. According to Lule et al, (2012), to modify the model, ie to see which variables are the best at explaining the variance in adoption, factors analysis and structural equation modeling should be used. In this case I used AMOS module to help me validate the model.

The main measures are of fit used were $\chi2$ /df, GFI, TLI and RMSEA, Chi-Square and p value. I first tested the degree of freedom when there is correlation between the four independent variables and the dependent variable. This did not give a good fit. I had to modify the model by having connections between the independent variables themselves and also correlation between the four independent variables and the dependent variable.

The result after modification gave a fit model with the recommended values for Chi-square,p value, $\chi2$ /df, GFI, TLI and RMSEA. I therefore came up with a model with all the variables indicating that Individual, Technological, Organizational and Environmental factors affect the adoption of local software. It is also concluded that the Individual, Technological, Organizational

and Environmental factors affect each other. The must be considered all so as to improve on the adoption of local software.

5.3.4 To evaluate the model for adoption of local software development.

The last objective was achieved by testing the model on adoption of local software development. This was done through a post study interview carried out at JKUAT to check if the model can be used to improve on the adoption of J-exams software. "Application of technology, organization, individual and environmental (toie) model in local software development adoption in JKUAT". The developers and users of J- exams software were interviewed on the application of the old models and the new model in adoption of local software. This was done so as to come up with compare the old models like TAM, TOE and DOI and the new model TOIE so as to ascertain that the new model was better than the old models if used in adoption of local software.

Data collected from the interview was analyzed again and the results discussed. The result of the analysis of the post study interview showed that the validated model TOIE was an improvement from other models such as TAM, TOE and DOI. Specifically, it possessed advantages which were nonexistent in TAM, TOE and DOI. In particular, it revealed the importance of individual factors in adoption of local software.

5.4   CONCLUSION

Based on the objectives and the findings of the study from the users the following conclusion can be made: There was insignificant relationship between adoption of local software and perceived ease of use and regulatory environment. On the other hand there was significant relationship between adoption of local software and perceived usefulness, compatibility and security and privacy. The users need software which is secure, compatible and useful to them. Developers should therefore consider these factors when developing software.

Based on the objectives and the findings of the study from the developers the following conclusion can be made: There was insignificant relationship between adoption of local software and perceived usefulness. There was a significant relationship between adoption of local software and developers` entrepreneurship capabilities, perceived ease of use, organization culture and organization size and resources, industry competition, regulatory environment. The developers of local software should consider these factors when developing.

It is therefore clear that even though some of the factors were not significant to the users, the same factors were important to the developers. This then required the combination of all the factors so as to come up with a final model. When the variables under the four main categories so as to come up with the main factors affecting adoption of local software development. It was therefore clear that perceived usefulness, developers` entrepreneurship capabilities, compatibility and security and privacy perceived ease of use, organization culture and organization size and resources, industry competition, regulatory environment affect the adoption of local software development. The above variables fall under Individual, Technological, organizational and environmental factors. The countries like India, USA, UK and other developing countries have put into consideration when developing and adopting their local software and this have made them have an edge over the developing countries.

There was correlation between the independent variables, this shows that they have a relationship to each other. Individual, Technological, organizational and environmental factors relate with each other and must be considered when developing the local software.

The final model is fit when the following four factors were combined, Individual, Technological, Organizational and Environmental factors. All the above factors were significant determinants of adoption of local software. Organization factors affect the adoption of local software the most. It is then followed by Technological factors. Environmental factors are the third factor to affect adoption of local software. Individual factors affect the adoption of local software development but at a low rate. All these factors must be considered when developing software.

The government should use these findings and be able to give tax incentives to the local software developers so that they can be able to invest more in the local software development. Also the government should be able to put strict laws concerning copyright and patents. This will enable the developers or the innovators of the technology to have the full rights on the innovation and be able to sell and meet the market demand.

The final model TOIE consists of the factors which are required in adoption of technology and software. It has the individual factors which is lacking in TOE and are very important and also have the Technological, environmental and organizational factors which is lacking in TAM model. It's therefore considered superior than the other earlier models

5.5   RECOMMENDATIONS

Based on the results, findings and conclusions the following recommendations have been deciphered. All the factors on the research either affect the users and the developers. The users need software which is useful, compatible and secure. It's therefore important to develop software which the user can see as making its work easier and is increasing the performance and effectiveness.

The developers must be able to have entrepreneurial knowledge and skills so as to be able to maintain the business and get advantage over the competitors. This is one of the reasons why India is one of the biggest producers of software.

There was a negative and significant relationship between adoption of local software and regulatory environment. It is therefore recommended to the government to give developers of local software incentives such as tax breaks and laws that place minimum requirements for development of local software and also the laws that will guard the copyright.

The study reveals that there was significant relationship between adoption of local software and organizational, technological, environmental and individual factors. It is therefore recommended that when developing local software all the above factors must be considered.

It's therefore recommended that the software developments individuals and companies should consider these factors so as to develop software which are competitive and be able to sell to the local and international markets. This will improve the economy of Kenya.

The model is generic and therefore can be implemented in other developing countries so as to boost the economy of the developing countries. Technology is the key to development.

Further studies to be carried out on the application of TOIE model in adoption of local software like M-kesho to ascertain the effectiveness of the model.

Further research can be carried out to map the model on a web based system to see if it is better.

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