



**FACTORS AFFECTING EFFECTIVE IMPLEMENTATION OF PAPERLESS AUTOMATION PROJECTS IN KENYA'S
LABORATORY PROFICIENCY TESTING PROGRAM**

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LABORATORY PROFICIENCY TESTING PROGRAM**

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Accepted: May 10, 2022

ABSTRACT

This study sought to investigate the precursors to paperless automation projects at the Kenya National HIV Proficiency Testing programme. The study applied a descriptive research design since it was concerned with describing the characteristics of individuals as well as groups. This study got its sample frame from 130 staff of National HIV Proficiency Testing Centre in their office premises in Nairobi County. The study used a five-point Likert scale to develop the questionnaire to use along with two measures of central tendency, standard deviation and mean, to describe the data. The data was then examined using the SPSS to conduct regression analysis, descriptive analysis and inferential analysis. The results were then presented using graphs and tables. According to the results of the study, there is a strong positive correlation between each of the independent variables and the dependent variable. Additionally, the multiple regression model showed a strong relationship with the data associated with the variables indicating that it is a good predicting model. Further, the study found a statistically significant relationship between all the independent variables and the dependent variable. Lastly, the study found that Staff Competencies is the strongest determinant of Effective implementation of Paperless Automation Projects followed by Resource Planning, Technology, and Top management Support, respectively. The study concluded that the organisation needs to ensure the commitment of resources continuously until the project is completed to the satisfaction of clients, within the promised timescale, without exceeding the financial allocation and to the highest quality standards achievable. It recommended the involvement of all the key stakeholders in paperless projects in performing critical roles towards the attainment of project implementation goals.

Key Words: Resource Planning, Technology, Management, Competencies, Paperless Automation Projects

CITATION: Ndirangu M. M., & Wabala S. (2022). Factors affecting effective implementation of paperless automation projects in Kenya's laboratory proficiency testing program. *The Strategic Journal of Business & Change Management*, 9 (2), 940 – 963.

INTRODUCTION

This chapter explored the reasons behind paperless projects in Kenya. According to Chakava (2015), many industries, not just globally but also recently in Kenya have adopted paperless technologies in their operations. In the age of M-Pesa and E-Government, the challenges and factors that have led to the adoption of these technologies may seem clear, especially in the business world. However, due to the changing nature of technology and operations, the justifications for paperless automation of operations in the public a sector needs to be highlighted. This study sought to find out what precursors lead to the implementation considerations of paperless automation.

Reports from Atrium (2011) show an instant 20% accepted productivity gain over paper processes by enabling scientists to document experiments, find and reuse information, and collaborate more efficiently. Paper costs extend far beyond the purchase price of a ream of paper. A government conducted study by Alameda County, California illustrates that only 10-11 per cent of the lifecycle cost of paper is traced back to its purchase price. Paper documentation accumulates additional costs through copying, delivery, handling, storage, and retrieval .Another study from PricewaterhouseCoopers, a major public accounting firm, looked into the costs of specific document-oriented actions. The results found that "the average organization spends about \$20 in labour to file each paper document, approximately \$120 in labor searching for each misfiled document, and \$220 in re-creation of a document" (McKorry, 2009).

Closer to Kenya, public health facilities have also been undertaking paperless automation projects. According to a study over 15 health facilities in Uganda, the barriers that hinder implementation of electronic records include the time involved for a practice to convert to digital from paper records, the training of health professionals on the new systems, and computer literacy. Other challenges noted include financial cost associated with

purchasing the new paperless software system and availability of technical support (Kanagwa, 2016).

In recent years, Kenya has been at the fore front of adopting and even coming up with new technologies in line with paperless automation. The Capital Markets Authority (CMA, 2013) and the Nairobi Securities Exchange (NSE), set November 2013 as the deadline for dematerialization of all securities listed at the exchange. Dematerialization refers to the process of converting paper certificates into electronic form. The paperless system the National Transport Safety Authority (NTSA) introduced in 2016 enabled the taxman collect up to 70 per cent of revenue. Before this, acquiring a logbook in Kenya would take one up to 30 days. However, it's now possible to do this in just ten minutes with the new system under the Sh800 million Transport Infrastructure Management System (Kajilwa, 2016).

Statement of the Problem

Kenya has the fifth-largest number of persons living with HIV in the world, and HIV continues to be a leading cause of adult morbidity and mortality (KENPHIA ,2018). As at December 2016, the Kenya National HIV PT scheme used paper based forms to submit test results from individuals, which in today's technology era poses the question why still use paper based methods when other more efficient methods are available to the program.

A study conducted by Kimathi (2017) found that the decentralization of the health sector as part of Kenya's devolved structure in 2013, whilst being well intentioned, experienced a number of teething problems including the lack of adequate managerial support from the national Government to devolved county health units which has led to a lot of mistrust between the national and county governments. In echoing these findings, Tsofa *et al.* (2017) posited that the devolved structures had managers who lacked proper managerial skills which has led to rampant misuse of resources and left the communities feeling disempowered.

Research Objectives

This study was carried out to determine the factors affecting the effective implementation of on effective implementation of paperless automation projects in Kenya's Laboratory proficiency testing program. The study was guided the following specific research objectives;

- To determine the influence of resource allocation on effective implementation of paperless automation projects in Kenya's Laboratory proficiency testing program.
- To find out the influence of technology on effective implementation of paperless automation projects in Kenya's Laboratory proficiency testing program.
- To establish the influence of top management support on effective implementation of paperless automation projects in Kenya's Laboratory proficiency testing program.
- To find out the influence of staff competencies on effective implementation of paperless automation projects in Kenya's Laboratory proficiency testing program.

LITERATURE REVIEW

Theoretical Review

Diffusion of Innovation

The Diffusion of Innovation (DOI) theory which was propagated by Rogers (1995) suggests that there are three main sources influencing the adoption and diffusion of an innovation, namely perceptions of innovation characteristics, characteristics of the adopter, and contextual factors. The DOI theory sees innovations as being communicated through certain channels over time and within a particular social system. Rogers further asserts that individuals are seen as possessing different degrees of willingness to adopt innovations, and thus it is generally observed that the portion of the population adopting an innovation is approximately normally distributed over time. Sahin (2006) identified four elements of the DOI theory, namely: innovation – an idea, practice or project that is seen

as new by an individual or different unit of adoption; communication channels – a process that provides a platform for participants to create and share information with each other in order to reach a common understanding; time; and social systems – a collection of interrelated units involved in joint problem solving to as to achieve a common goal.

Technology Acceptance Theory

Davis *et al.*(1989) established that the Technology Acceptance Model (TAM) is used to explain why a particular system may or may not be acceptable to users. It hypothesizes that there are two beliefs, perceiving usefulness and perceiving ease of use, which are variables that primarily affect the user acceptance. The TAM suggests that these external variables indirectly affect individuals' attitude toward technology acceptance by influencing perceived usefulness and perceived ease of use. External variables might include individual user attributes, social factors or those related to their job tasks. TAM has evolved to become a key model in understanding predictors of human behaviour toward potential acceptance or rejection of the technology (Marangunić & Granić, 2015).

Planning Fallacy Theory

A fundamental axiom of planning fallacy is that the future is perceived to be rosier than the past; realistically pessimistic lessons from the past fade from a planner's attention in light of optimistic plans of the future (Kahneman, 2011). This describes most modern information technology projects, especially where the project team members don't have much experience in the paperless automation field of work. Project risks are not well planned for, let alone thought of as exemplified by the fact that while forecasting the outcomes of risky projects, managers make decisions based on delusional optimism rather than weighing of gains, losses and probabilities thereby overestimating benefits and underestimating costs (Madhavan,2016). Indeed, proponents of the planning fallacy theory adopt an internal perspective when forecasting their personal completion times of assigned tasks, and lending no

credence to previous experience with similar tasks (Buehler *et al.*, 1994).

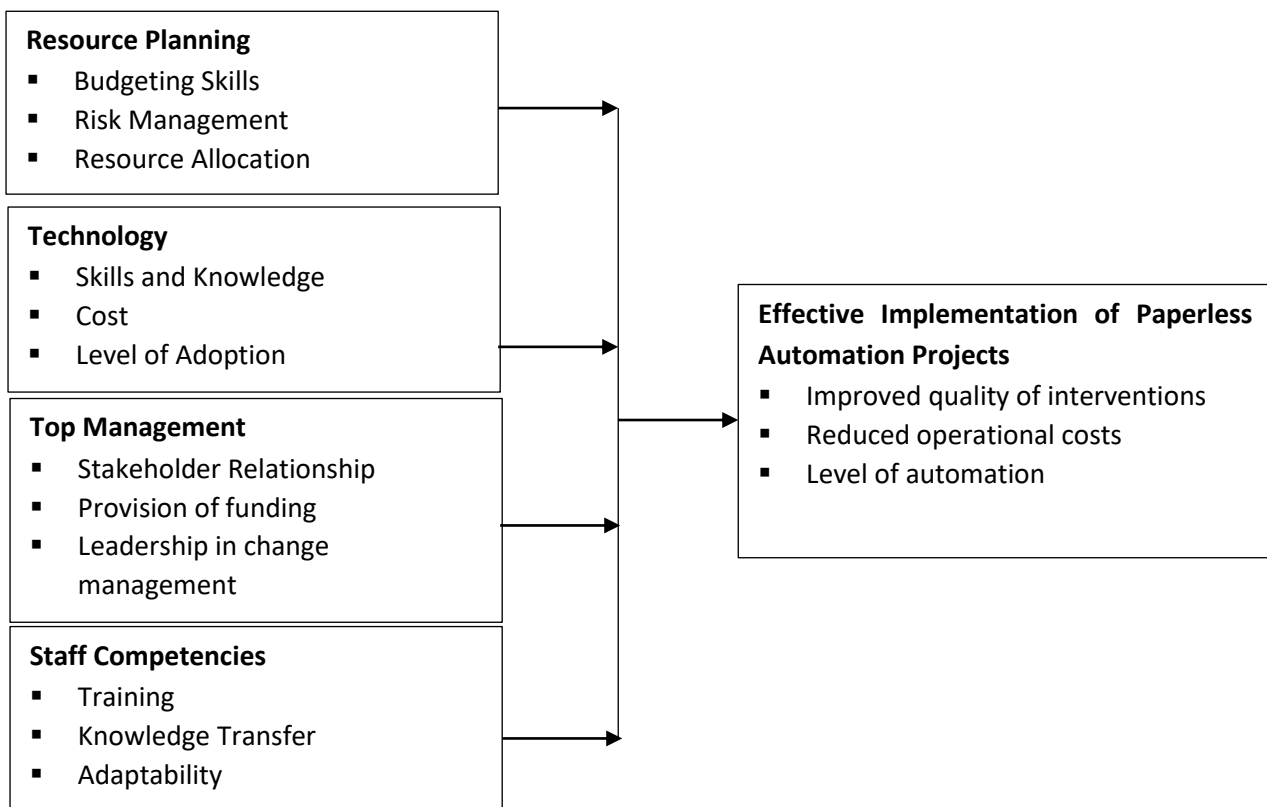
Systems Theory

According to Chikere and Nwoka (2015), the systems theory holds that organisations are collections of parts or elements which are interrelated and work together as a whole; as such, the nature of the organisation and interaction amongst the parts determines the characteristics of the system. Mele *et al.* (2010) posited that the focus by the theory on interactions and resultant relationships creates a distinction between the behaviour of the whole autonomous entity and the behaviour when the elements interacts with other elements. It further distinguishes between an open

system – where there are exchanges of energy, matter, people and information; closed system – where there are only exchanges of energy; and isolated systems – where there no exchanges of any elements.

Conceptual Framework

According to Rocco and Plakhonik (2009), a conceptual framework develops a means through which the study can be grounded in the relevant knowledge bases that lay the foundation of problem statement and research questions and is made up of the theoretical and empirical work relevant to the study. Figure 1 below, represented the conceptual framework for this study.



Independent variables

Dependent variable

Figure 1: Conceptual Framework

Empirical Review

Kapur (2010) opined that budgeting skills in paperless automation projects are determined by the identification of project sponsors because these

are the individuals responsible for owning the budget and schedule and makes approximately 80% of the project implementation decisions. A different perspective by Barman (2013) revealed that owing

to difficulties brought about by manual accounting systems such as the lack of financial discipline, the budgeting skills in use by many public organisations were inadequate in terms of establishing budgetary control, consequently, automated systems had to be installed progressively and focused initially on critical applications.

Genesis and Oluwole (2018) ascertained that technology involves the application of scientific knowledge and innovative skills and tools to ensure greater efficiency and effectiveness of operations; thus, apparent inefficiencies such as poor record keeping and high storage needs have made the overdependence on paper by many organisations to be counter-productive and provided a foundation for making a business case for paperless automation. Indeed, this was proven when the adoption of paperless technology led to enhance knowledge management and skills in conveying information electronically to virtually anywhere in the world.

The larger the organisation, the more complex the paperless project, and the greater the scale of the stakeholder relationships that need to be managed by the project manager across an extended network of actors including both human and non-human (such as technology). These stakeholders were all involved in performing critical roles towards the attainment of project implementation goals through the use of intermediaries such as contracts, specifications, schedules and money (Roy, 2014).

The lack of knowledge on how to use technology and low computer literacy are factors that affect the adoption of paperless automation projects. In summary, there is a need for computer education. Owner-managers need to attend training programs that will enlighten them on the benefits associated with the use of ICT. In addition, there is the general issue of skills and training. Apulu, Latham and Moreton (2013), however, argue that owner-managers need to conduct training sessions for staff that will assist in creating awareness on the benefits of adopting technology in organizations.

A study carried out by Ross and Venkatesh (2016) revealed the use of paperless systems such as Hospital Information Systems (HIS) are able to contribute towards the improvement of the quality of healthcare in hospitals in developing countries through the reduction in the waiting times for patients which leads to greater satisfaction in the services rendered; and they also lead to significant improvements in the quality and accuracy of information pertaining to patients and other administrative aspects of healthcare.

METHODOLOGY

This study applied a descriptive research design since it was concerned with describing the characteristics of individuals as well as groups at the National HIV Proficiency Testing Centre clearly including what will be measured, the measurement methods, as well as a clear definition of the target population. The study focused on a target population of 21,656 staff working in various health facilities across 47 counties. These are the staff who had direct or indirect interaction with the Paperless initiatives. The study extracted its sample frame from 21,656 staff working in various health facilities across 47 counties. The study applied Cochran's formula for calculating the sample size of 392. The study used self-administered questionnaires on 130 respondents from the target population who were given two weeks to complete the questionnaires. There was a drop and pick arrangement for the completed questionnaires. The study used a five-point Likert scale as per the recommendations of Boone, Jr. and Boone (2012) to develop the questionnaire to use along with two measures of central tendency, standard deviation and mean, to describe the data. The data was then examined using the Statistical Package for Social Sciences (version 20) to conduct descriptive analysis and inferential analysis.

The inferential analysis included Pearson Correlation Coefficient analysis, regression analysis, Analysis of Variance (ANOVA) where the f-test was also assessed, along with the Beta Coefficient

analysis. The results were then presented using graphs and tables.

The analysis used a multiple regression model to capture the variables of the study as follows:

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

Where;

Y = the project's dependent variable (Implementation of Paperless Projects)

X₁= the first independent variable (Resource Planning)

X₂= the second independent variable (Technology)

X₃= the third independent variable (Top Management Support)

X₄= the fourth independent variable (Staff Competencies)

ε = the error term

β₀= the constant term

According to the formula, Y is determined by changes in X₁, X₂, X₃ and X₄. Beta coefficient is the extent to which a unit change in any of the Xs influences Y. The constant refers to the value of Y when X is zero.

FINDINGS AND DISCUSSION

Descriptive Statistics

Resource Planning

The descriptive statistics pertaining to resource planning were presented in Table 1. According to the results, 83% of the respondents either agreed or strongly agreed that budgeting skills in paperless automation projects in the organisation are determined by the identification of project sponsors because these are the individuals responsible for owning the budget and schedule and makes approximately 80% of the project performance

decisions. This was consistent with Kapur (2010). Additionally, 91% of the respondents either agreed or strongly agreed that advancements in technology and the resultant automated systems and processes have led to greater efficiencies across all disciplines in the organisation including budgetary skills. This tallied with the findings of Gekara and Nguyen (2018). Further, 72% either agreed or strongly agreed that the organisation has been able to manage the risk of project cost overruns by estimating the inputs needed for the project execution, acquiring the resources and distributing them effectively and efficiently. This echoed the findings of Dave *et al.* (2015).

The results also showed that 50% of the respondents either agreed or strongly agreed that the organisation has ensured the commitment of resources continuously until the project is completed to the satisfaction of clients, within the promised timescale, without exceeding the financial allocation and to the highest quality standards achievable which partially backed up the findings of Kerzner (2017). However, the 50% who were either neutral or disagreed about this indicates that a considerable proportion of people who are unconvinced. Additionally, 63% of the respondents either agreed or strongly agreed that donor support influences paperless projects at the organisation, and that material resources when provided adequately leads to improved new product quality. This was consistent with Gibbert, *et al.* (2014).

Lastly, 63% of the respondents either agreed or strongly agreed that efficiency of automated systems incurs start-up and on-going costs, so policy makers have provided greater financial reimbursement for the organizations due to the adoption of automated systems which was aligned with Najaftorkaman, (2015).

Table 1: Descriptive Statistics of Resource Planning

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Budgeting skills in paperless automation projects in the organisation are determined by the identification of project sponsors because these are the individuals responsible for owning the budget and schedule and makes approximately 80% of the project performance decisions	0%	3%	14%	23%	60%
Advancements in technology and the resultant automated systems and processes have led to greater efficiencies across all disciplines in the organisation including budgetary skills.	0%	3%	6%	37%	54%
The organisation has been able to manage the risk of project cost overruns by estimating the inputs needed for the project execution, acquiring the resources and distributing them effectively and efficiently.	0%	3%	25%	60%	12%
The organisation has ensured the commitment of resources continuously until the project is completed to the satisfaction of clients, within the promised timescale, without exceeding the financial allocation and to the highest quality standards achievable.	0%	6%	45%	38%	12%
Donor support influences paperless projects at the organisation, and that material resources when provided adequately leads to improved new product quality.	0%	13%	24%	18%	45%
Efficiency of automated systems incurs start-up and on-going costs, so policy makers have provided greater financial reimbursement for the organizations due to the adoption of automated systems.	0%	23%	15%	35%	28%

Technology

The findings of the descriptive statistics of technology were presented in Table 2. Accordingly, “the organisation has ensured strong knowledge management capabilities; useful online skill sets that will enable users to appreciate effective navigation in a digital environment; appropriate systems analysis and design; and a set of tools that will facilitate the manipulation of the paperless automation” had a mean of 3.9655 indicating that the vast majority of respondents were in agreement with this. This was consistent with Wang (2010). Further, “advanced technologies within the paperless environment have compelled the organisation to provide training opportunities for its employees to up skill them and enhance their knowledge” had a mean of 3.6092 also indicating that most of the respondents agreed with this

assertion. This echoed the findings of Middleton *et al.* (2009). Additionally, “project managers in the organisation have ensured that they conduct accurate return-on-investment computations in order to determine whether the projected benefits outweigh the costs of introducing paperless technology by identifying an evaluation period” had a mean of 3.2644 indicating that most of the respondents agreed with this and echoed the findings of Brinkerhoff (2017). The results also found that “paperless technology has led to the reduction of overhead costs at the organisation due to reduced consumption of paper, printing, photocopy and storage” had a mean of 3.9195 indicating that the majority of respondents were in agreement with this statement. Additionally, “the adoption of paperless technology at the organisation has been influenced by individuals’

beliefs and personal characteristics such as the level of education and age” had a mean of 3.4368 reflecting that most of the respondents agreed with this assertion. This tallied with Obeidat (2015). Further, “the adoption of paperless technology in the form of electronic data capture (EDC) and electronic health records (EHR) by the organisation was carried out through the use of clinical trials which resulted in emerging databases of information” had a mean of 3.4828 also indicating

that most of the respondents agreed with this. This was consistent with Gupta (2015).

Given that all the standard deviations were so low, it is clear that all the responses were concentrated tightly around the average responses indicating a low variation in the responses. Further, the high mean scores for all the indicators of Technology are a reflection that it plays a very significant role in the effective implementation of paperless automation projects.

Table 2: Descriptive Statistics of Technology

	N	Mean	Std. Dev.
The organisation has ensured strong knowledge management capabilities; useful online skill sets that will enable users to appreciate effective navigation in a digital environment; appropriate systems analysis and design; and a set of tools that will facilitate the manipulation of the paperless automation.	302	3.9655	1.30694
Advanced technologies within the paperless environment have compelled the organisation to provide training opportunities for its employees to upskill them and enhance their knowledge.	302	3.6092	1.34126
Project managers in the organisation have ensured that they conduct accurate return-on-investment computations in order to determine whether the projected benefits outweigh the costs of introducing paperless technology by identifying an evaluation period.	302	3.2644	1.26178
Paperless technology led to the reduction of overhead costs at the organisation due to reduced consumption of paper, printing, photocopy and storage.	302	3.9195	1.16358
The adoption of paperless technology was influenced by individuals’ beliefs and personal characteristics such as the level of education and age.	302	3.4368	1.37841
The adoption of paperless technology in the form of electronic data capture (EDC) and electronic health records (EHR) by the organisation was carried out through the use of clinical trials which resulted in emerging databases of information.	302	3.4828	1.32824
Valid N (listwise)	302		

Top Management Support

The results relating to the descriptive statistics of top management support are presented in Table 3. According to the results, 62% of the respondents either disagreed or were neutral towards the assertion that stakeholders in paperless projects were all involved in performing critical roles towards the attainment of project implementation goals through the use of intermediaries such as contracts, specifications, schedules and money. This was inconsistent with Roy (2014). Additionally, 68% of the respondents were either in agreement or strongly in agreement that the application of an electronic management system enables managers

in the organisation to improve stakeholder relationships by ensuring the simultaneous availability of information to all stakeholders, thereby maintaining equity in the treatment of all stakeholders, thereby maintaining equity in the treatment of all stakeholders. This tallied with the findings of Carter (2014). Further, 77% of the respondents either agreed or strongly agreed that top management support was critical in overseeing funding approvals, and ensuring enough financial resources, donor support, availability of human resources and provision of resources on time influence positively to the performance of paperless

projects. This was consistent with Nyandika and Karanja (2014).

The results also showed that 52% of the respondents either disagreed or were neutral towards the assertion that effective implementation of paperless projects is dependent upon the formulation of policies and procedures, as well as the establishment of a legal framework for the application of electronic systems which would inform the provision of funding by the top management of the organisation. This contradicted the findings of Heung and Won (2014). Additionally, 58% of the respondents either agreed or strongly agreed that the organisation has been able to

establish competencies in providing leadership in change management through coordination of diverse teams so as to ensure the implementation of paperless technologies such as the financial management information system. This partially corroborated the findings of World Bank (2015). Lastly, 59% of the respondents either agreed or strongly agreed that the change management process has been made more seamless and successful through the carrying out of interactive and collaborative meetings between top management and subordinate employees so as to iron out any outstanding issues regarding the adoption of paperless systems. This echoed the findings of Kabanaya-Kamau (2011).

Table 3: Descriptive Statistics of Top Management Support

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Stakeholders in paperless projects were all involved in performing critical roles towards the attainment of project implementation goals through the use of intermediaries such as contracts, specifications, schedules and money.	0%	36%	32%	10%	22%
The application of an electronic management system enables managers to improve stakeholder relationships ensuring the availability of information to all stakeholders, maintaining equity in the treatment of all stakeholders, maintaining equity in the treatment of all stakeholders.	0%	13%	23%	6%	59%
Top management support was critical in overseeing funding approvals, and ensuring enough financial resources, donor support, availability of human resources and provision of resources on time influence positively to the performance of paperless projects.	0%	0%	23%	6%	71%
Effective implementation of paperless projects is dependent upon the formulation of policies and procedures, as well as the establishment of a legal framework for the application of electronic systems which would inform the provision of funding by the top management of the organisation.	0%	13%	39%	6%	43%
The organisation has been able to establish competencies in providing leadership in change management through coordination of diverse teams so as to ensure the implementation of paperless technologies such as the financial management information system.	0%	13%	29%	3%	55%
The change management process has been made more seamless and successful through the carrying out of interactive and collaborative meetings between top management and subordinate employees so as to iron out any outstanding issues regarding the adoption of paperless systems.	13%	0%	29%	12%	47%

Staff Competencies

The results relating to the descriptive statistics of staff competencies are shown in Table 4. Accordingly, “the organisation conducts training sessions for staff that assists them in creating awareness on the benefits of adopting technology” had a mean of 3.6552 indicating that the majority of respondents agreed with this statement. This was consistent with Apulu *et al.* (2013). Additionally, “lack of computer literacy among the organisation employees and a lack of knowledge regarding the benefits of information systems have affected information systems adoption” had a mean of 2.9655 indicating that a moderate majority of respondents agreed with this. This echoed the findings of Ifinedo (2012). Further, “staff competencies in the organization’s paperless projects have been enhanced through cross-project knowledge transfer where one project benefits from the knowledge and learning of another project” had a mean of 3.7816 indicating that most of the respondents were in agreement with this statement. This tallied with Zhao *et al.* (2015).

The results also showed that “knowledge transfer in projects requires cooperation, open communication, trust, and shared location in order to ensure that all stakeholders are involved in the

buy-in of the knowledge transfer to avoid any hostility and foster harmony in the process” had a mean of 4.3103 indicating that the vast majority of respondents agreed with this. This corroborated the findings of Bellini *et al.* (2016). Additionally, “the organisation has ensured the retention of employees who are versatile and even trained employees into all-rounders who are able to adapt to change so that they are to perform in dynamic environments” had a mean of 2.2069 indicating that most of the respondents disagreed with statement. This contradicted the findings of Tariq *et al.* (2011). Further, “the organization’s employees are adaptable enough to seek challenges and engage in job crafting behaviours such as innovation” had a mean of 3.5402 indicating that most of the respondents were in agreement with this. This was consistent with Ingusci *et al.*(2019).

Since all the standard deviations were so low, it is clear that all the responses were concentrated tightly around the average responses indicating a low variation in the responses. Further, the high mean scores for all but one of the indicators of Staff Competencies are a reflection that it plays a very significant role in the effective implementation of paperless automation projects.

Table 4: Descriptive Statistics of Staff Competencies

	N	Mean	Std. Dev.
The organisation conducts training sessions for staff that assists them in creating awareness on the benefits of adopting technology.	302	3.6552	1.24665
Lack of computer literacy among the organisation employees and a lack of knowledge regarding the benefits of information systems have affected information systems adoption.	302	2.9655	1.35070
Staff competencies in the organization’s paperless projects have been enhanced through cross-project knowledge transfer where one project benefits from the knowledge and learning of another project.	302	3.7816	1.13532
Knowledge transfer in projects requires cooperation, open communication, trust, and shared location to ensure that all stakeholders are involved in the buy-in of the knowledge transfer to avoid any hostility and foster harmony in the process.	302	4.3103	.78222
The organisation has ensured the retention of employees who are versatile and even trained employees into all-rounders who are able to adapt to change so that they are to perform in dynamic environments.	302	2.2069	1.21174
The organization’s employees are adaptable enough to seek challenges and engage in job crafting behaviours such as innovation.	302	3.5402	1.04330
Valid N (listwise)	302		

Effective Implementation of Paperless Automation Projects

According to the results, 85% of the respondents either agreed or strongly agreed that the use of paperless systems has contributed towards the improvement of the quality of healthcare in the organisation through the reduction in the waiting times for patients which leads to greater satisfaction in the services rendered. Additionally, 78% of the respondents either agreed or strongly agreed that paperless systems in the organisation ensure quality improvements such as the improvement in the communication between patients and primary care provider through the patient portal. Further, 52% of the respondents either disagreed or were neutral towards the assertion that deficiencies in the underlying legislation, inability to guarantee electronic signatures, and ultimately the cost of institutionalizing fail-safes for the aforementioned problems are beyond the affordability of the organisation. This contradicted the findings of Hu and Chi (2016).

The results also showed that 82% of the respondents either disagreed or were neutral towards the assertion that the piloting of a paperless systems led to increased annual cost savings for the organisation. This was inconsistent with Mak (2016). Additionally, 72% of the respondents either agreed or strongly agreed that paperless systems have contributed towards the improvement of healthcare provision through the automation of workflow which enhances organizational processes by automating repetitive tasks and minimizing the likelihood of human error within these processes. Further, 62% of the respondents either agreed or strongly agreed that automated inventory management has played an important role in healthcare provision by the organisation since it ensures the availability of products when needed on demand for patient care which could lead to loss of life in extreme situations. This tallied with the findings of McQuown(2016).

Table 5: Descriptive Statistics of Effective Implementation of Paperless Automation Projects

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Use of paperless systems has contributed towards the improvement of the quality of healthcare in the organisation through the reduction in the waiting times for patients which leads to greater satisfaction in the services rendered.	0%	0%	15%	28%	58%
Paperless systems ensure quality improvement in the communication between patients and primary care provider.	0%	13%	9%	28%	51%
Deficiencies in the underlying legislation, inability to guarantee electronic signatures, and ultimately the cost of institutionalizing fail-safes for the aforementioned problems are beyond the affordability of the organisation.	0%	18%	33%	3%	45%
The piloting of a paperless systems led to increased annual cost savings for the organisation.	0%	39%	43%	3%	15%
Paperless systems have contributed towards the improvement of healthcare provision through the automation of workflow which enhances organizational processes by automating repetitive tasks and minimizing the likelihood of human error within these processes.	0%	13%	15%	17%	55%
Automated inventory management has played an important role in healthcare provision by the organisation since it ensures the availability of products when needed on demand for patient care which could lead to loss of life in extreme situations.	0%	0%	38%	21%	41%

Inferential Statistics

Pearson Correlation Analysis

The Pearson's Correlation Coefficient (r) is the proportion of the covariance of two variables representing a set of numerical data, and standardised to the square root of the variances (Hall, 2015). The results pertaining to the Pearson Correlation coefficients of the study were presented in Table 6. According to the results, all the

independent variables, Resource Planning, Technology, Top Management Support, Staff Competencies had positive correlations of $r = 0.743$; $r = 0.815$; $r = 0.767$; and $r = 0.798$, respectively with the independent variable, effective implementation of Paperless Automation Projects. The results also showed that all the p -values of the independent variables were well below 0.05 indicating a statistically significant relationship between each independent variable and the dependent variable.

Table 6: Pearson Correlation Coefficients

		Correlations				
		Resource Planning	Technology	Top Management Support	Staff Competencies	Project Efficiency
Resource Planning	Pearson Correlation	1				
	Sig. (2-tailed)					
Technology	Pearson Correlation	.339**	1			
	Sig. (2-tailed)	.002				
Top Management Support	Pearson Correlation	.387**	.627**	1		
	Sig. (2-tailed)	.002	.000			
Staff Competencies	Pearson Correlation	.695**	.314**	.621**	1	
	Sig. (2-tailed)	.000	.004	.000		
Project Efficiency	Pearson Correlation	.743	.815**	.767**	.798**	1
	Sig. (2-tailed)	.003	.000	.001	.000	

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

Multiple Regression Analysis

The results pertaining to the Multiple Regression model of the study were shown in Table 7. According to the table, the R Square value for all the variables was 0.734 indicating that the results

explained 73.4% of the variation in the effective implementation of Paperless Automation projects whenever there was a one percent change in the four independent variables.

Table 7: Multiple Regression Model

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.845 ^a	.734	.692	.15068

a. Predictors: (Constant), Staff Competencies, Technology, Resource Planning, Top Management Support

Analysis of Variance

The results of the Analysis of Variance of the study were presented in Table 8. The results indicate that the ANOVA F-test score, calculated value F_{cal} at 5% level of significance is equivalent to 152.267 which is greater than the F critical value (F_{crit}) of 2.45 indicating that there is a significant relationship

between all the independent variables and the dependent variable of Effective implementation of Paperless Automation projects; while the p-value of 0.000 is less than 0.05 indicating that there is a statistically significant relationship between each of the independent variables and the Effective implementation of Paperless Automation projects.

Table 8: Analysis of Variance

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	58.359	4	14.589	152.267	.000 ^b
Residual	28.456	297	.096		
1 Total	86.815	301			

a. Dependent Variable: Effective Project Implementation

b. Predictors: (Constant), Staff Competencies, Technology, Resource Planning, Top Management Support

Beta Coefficient Analysis

The results of the Beta Coefficients of the study variables were shown in Table 9. The values of the constants and coefficients enabled the generation of the following multiple regression model:

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

$$= 3.552 + 0.439X_1 + 0.367X_2 + 0.168X_3 + 0.684X_4 + 0.258$$

Where, Y refers to the dependent variable (Effective implementation of Paperless Automation Projects), X_1 refers to the Resource Planning variable, X_2 refers to the Technology variable, X_3 refers to Top Management Support variable, and X_4 refers to the Staff Competencies.

Table 9: Beta Coefficients

Model	Coefficients ^a				
	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
(Constant)	3.552	.258		6.883	.000
Resource Planning	.439	.134	.439	4.233	.000
Technology	.367	.072	.556	6.036	.000
Top Management Support	.168	.061	.176	1.768	.007
1 Staff Competencies	.684	.116	.674	5.920	.000

a. Dependent Variable: Effective implementation of Paperless Automation Projects

CONCLUSIONS AND RECOMMENDATIONS

The results of the descriptive statistics of resource planning showed that the majority of the respondents agreed that all the examined aspects of resource planning were critical towards the effective implementation of paperless automation projects. However, the three most important aspects included: advancements in technology and the resultant automated systems and processes

have led to greater efficiencies across all disciplines in the organisation including budgetary skills; budgeting skills in paperless automation projects in the organisation are determined by the identification of project sponsors because these are the individuals responsible for owning the budget and schedule and makes approximately 80% of the project performance; and the organisation has been able to manage the risk of project cost overruns by

estimating the inputs needed for the project execution, acquiring the resources and distributing them effectively and efficiently, respectively.

According to the descriptive statistics of technology, all the examined aspects of technology are important determinants of the effective implementation of paperless automation projects. Nonetheless, the three most critical aspects included: the organisation has ensured strong knowledge management capabilities, useful online skill sets that will enable users to appreciate effective navigation in a digital environment, appropriate systems analysis and design; and a set of tools that will facilitate the manipulation of the paperless automation; paperless technology has led to the reduction of overhead costs at the organisation due to reduced consumption of paper, printing, photocopy and storage; and advanced technologies within the paperless environment have compelled the organisation to provide training opportunities for its employees to upskill them and enhance their knowledge, respectively.

The results of the descriptive statistics of top management support indicate that the majority of respondents affirmed the importance of five out of the six examined aspects of top management support. Amongst the five that were supported, the three most important included: top management support was critical in overseeing funding approvals, and ensuring enough financial resources, donor support, availability of human resources and provision of resources on time influence positively to the performance of paperless projects; the application of an electronic management systems enables managers in the organisation to improve stakeholder relationships by ensuring the simultaneous availability of information to all stakeholders, thereby maintaining equity in the treatment of all stakeholders; and the change management process has been made more seamless and successful through the carrying out of interactive and collaborative meetings between top management and subordinate employees so as to iron out any outstanding issues regarding the

adoption of paperless systems, respectively. However, the respondents disagreed that stakeholders in paperless projects were all involved in performing critical roles towards the attainment of project implementation goals through the use of intermediaries such as contracts, specifications, schedules and money.

According to the descriptive statistics of staff competencies, five out of the six examined aspects of staff competencies had the greatest influence on the effective implementation of paperless automation projects. Among the five, the three most critical included: knowledge transfer in projects requires cooperation, open communication, trust, and shared location in order to ensure that all stakeholders are involved in the buy-in of the knowledge transfer to avoid any hostility and foster harmony in the process; staff competencies in the organization's paperless projects has been enhanced through cross-project knowledge transfer where one project benefits from the knowledge and learning of another project; and the organisation conducts training sessions for staff that assists them in creating awareness on the benefits of adopting technology, respectively. However, the majority of the respondents disagreed that the organisation has ensured the retention of employees who are versatile and even trained employees into all-rounders who are able to adapt to change so that they are to perform in dynamic environments.

The descriptive statistics of effective implementation of paperless automation projects showed that the majority of the respondents affirmed the importance of four of the six examined aspects of the effective implementation of paperless automation projects. These four aspects included: the use of paperless systems have contributed towards the improvement of the quality of healthcare in the organisation through the reduction in the waiting times for patients which leads to greater satisfaction in the services rendered; paperless systems in the organisation ensure quality improvements such as the

improvement in the communication between patients and primary care provider through the patient portal; paperless systems have contributed towards the improvement of healthcare provision through the automation of workflow which enhances organizational processes by automating repetitive tasks and minimizing the likelihood of human error within these processes; and automated inventory management has played an important role in healthcare provision by the organisation since it ensures the availability of products when needed on demand for patient care which could lead to loss of life in extreme situations, respectively. However, the majority of respondents disagreed that: deficiencies in the underlying legislation, inability to guarantee electronic signatures, and ultimately the cost of institutionalizing fail-safes for the aforementioned problems are beyond the affordability of the organisation; and the piloting of a paperless systems led to increased annual cost savings for the organisation.

Advancements in technology and the resultant automated systems and processes have led to greater efficiencies across all disciplines in the organisation including budgetary skills. Budgeting skills in paperless automation projects in the organisation are determined by the identification of project sponsors because these are the individuals responsible for owning the budget and schedule and makes approximately 80% of the project performance.

The organisation has ensured strong knowledge management capabilities; useful online skill sets that will enable users to appreciate effective navigation in a digital environment; appropriate systems analysis and design; and a set of tools that will facilitate the manipulation of the paperless automation. Paperless technology has also led to the reduction of overhead costs at the organisation due to reduced consumption of paper, printing, photocopy and storage.

Top management support was critical in overseeing funding approvals, and ensuring enough financial

resources, donor support, availability of human resources and provision of resources on time influence positively to the performance of paperless projects. The application of an electronic management systems enables managers in the organisation to improve stakeholder relationships by ensuring the simultaneous availability of information to all stakeholders, thereby maintaining equity in the treatment of all stakeholders.

Knowledge transfer in projects requires cooperation, open communication, trust, and shared location in order to ensure that all stakeholders are involved in the buy-in of the knowledge transfer to avoid any hostility and foster harmony in the process. Staff competencies in the organization's paperless projects has been enhanced through cross-project knowledge transfer where one project benefits from the knowledge and learning of another project. The organisation conducts training sessions for staff that assists them in creating awareness on the benefits of adopting technology.

Use of paperless systems contributed towards the improvement of the quality of healthcare in the organisation through the reduction in the waiting times for patients which leads to greater satisfaction in the services rendered. Paperless systems in the organisation ensure quality improvements such as the improvement in the communication between patients and primary care provider through the patient portal.

The organisation needs to involve a Project Sponsor with a wide network who will mobilise funding and ensure that there are resources throughout the lifecycle of the project to the satisfaction of clients and other stakeholders. The organisation's leadership should benchmark with paperless automation projects outside Kenya to determine effective ways of establishing a legal framework for the application of electronic systems which would inform the provision of funding by the top management. The organisation should also involve all the key stakeholders in paperless projects in performing critical roles towards the attainment of

project implementation goals through the use of intermediaries such as contracts, specifications, schedules and money.

Areas of Further Study: More work needs to be done by local researchers on the implementation of

paperless automation projects in the healthcare industry. Additionally, local researchers need to be encouraged to focus on the determinants of the implementation of paperless automation projects since this has been ignored.

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