Effects of Strategic Information and Communication Technology (ICT) on Airports' performance in Kenya

[1] **Rosemary Chebet Koros**

Ph.D Candidate ,Strategic Management in Jommo Kenyatta University of Agriculture and Technology, Kenya

+254 722 757700 P.O BOX 16778-80100 Mombasa , KENYA)

[2]Prof. G. S. Namusonge

Lecturer, School of Entrepreneurship, Leadership, Procurement and Management, JKUAT,

+254 722 89 60 92, P.O.BOX 6200-00200, NAIROBI- KENYA

[3]Prof. M.M. Sakwa

Lecturer, School of Entrepreneurship, Leadership, Procurement and Management, JKUAT, +254 59 09 65, P.O.BOX 6200-00200, NAIROBI- KENYA

ABSTRACT

This study aimed to determine the effect of Strategic Information and Communication Technology (ICT) on Airports' performance. The study findings indicated correlation co-efficient of 0.561 implying a positive relationship between Strategic Information and Communication Technology and airport performance. This was evidenced by the p value of 0.000 which is less than that of critical value (0.05). The study concluded that there was a significant positive relationship between Strategic Information and Communication Technology and airport's financial performance.

Key Words: Strategic Information and Communication Technology, Financial performance

1.0 INTRODUCTION

Iravo et al , (2013) states that one of the important questions in business has been why some organizations succeed and why others fail. Adei (2004) argues that information and communications technology has played a tremendous role in all areas of today's organizations success and is expected to drive organizations to greater and efficient performance. It provides the opportunity for organizations to be in any location on the globe, even the remotest of locality and establish transactions oceans away within fragments of time.

According to Czenter, (2002) organizations are expected to take advantage of the ICT revolution to establish a virtual presence in the international economy as an e-business on the internet. Onwuka&Eguavoen (2007) expressed that, advances in computer technology enable traders to meet demand for financial instruments such as swaps and futures with relative ease and that through ICT organizations increase their performance by their virtual expansion through the internet thus, expanding their market reach and domination. The benefits of technology, if efficiently embraced can be an engine that drives business performance in the organization; example is the online internet trade giant, ebay.com, which serves customers in almost all the countries from their American location.

Information and communications technology are the backbone and infrastructure of globalization and have played a crucial role in the creating of trans-world social spaces (Adei, 2004).According to Onwuka and Eguavoen,(2007) it will be difficult for a corporation to become a significant player in the global market place without an extensive use of information and communications technology.

Since the terrorist attacks in the United States, the environment surrounding the aviation industry has become very sensitive and has caused adverse impact to the entire aviation industry. Security at airports has been reinforced in all aspects, significantly deteriorated on-time performance, caused mass congestion at the airport, and caused a drastic increase in aviation management and operational costs. Owing to these issues, Information and communication technologies (ICTs) have a significant role to play here, for it is only with the strategic, widespread, intensive, and

innovative use of ICT in future airport development policies and programs, that the ambitious agenda of passenger convenience and airport security becomes much more possible to achieve (Koellinger, 2005).

1.2 Statement of the problem

According to Hitt&Brynjolfsson (2003) the basic nature of most organizations is to resist change. Many have not yet recognized that the explosion of technology is forcing a tidal wave of change that is profoundly affecting global organizations. The national airport security environment is no exception, and may be feeling the effects of this change sooner than the rest of society as a whole. Many tasks are enhanced by application of computers, communications, and information management systems; yet, random unskilled application of these tools can lead to disaster to organizations as they have not yet realized the full implication, both positive and negative, of the evolving technology in the global information age.

Hempell (2002) argues that firms with innovative experience are particularly well prepared to make productive use of ICT by introducing appropriate complementary innovations. ICT is indeed a relevant part of current technological change processes and an important factor that contributes towards growth. However, the magnitude of impact varies significantly between firms, sectors and countries and can either be hampered or promoted by external factors (Onwuka, 2007). Brynjolfsson and Hitt (2003) argues that information communication technology makes a positive and significant contribution to output growth at the firm level, but the implied returns increase if longer time differences are taken into account, which suggests that time-intensive complementary investments into organizational restructuring have to be undertaken and concluded that the returns to ICT investments usually do not occur immediately, but rather with a significant time lag and that they are very costly to implement and maintain especially for developing economies.

Facemire and Laustra (2005) noted that information technology has been introduced at checkpoints in order to deter terrorist and enhance airport security however according to McAllister (2001) the stringent security measures put in place have increased queuing times and

stress levels of the passengers. However Yang (2008), O'Reilly (2010) and Ashari (2011) indicate that there is a relationship between information communication technology and airport performance. On the other hand, studies by Hannan & Freeman (1983) show different results – there is no relationship between information communication technology and airport performance. The study by Timothy and Robyn (2011) finds out that information communication technology gives positive influence to performance and that effective information communication technology implementation has overall positive relationship with organization performance.

It was on the background of the above contradicting studies that the study was undertaken to determine the effects of information communication technology on performance of Airports.

1.3 Research objective

The study was guided by the following general objective

To establish the effect of strategic information and communication technology (ICT) on airports' performance in Kenya.

1.4 scope of the study

The study investigated the effect of use of strategic information and communication technology (ICT) on airports' performance in Kenya. This was due to the fact that liberalization has fundamentally altered the competitive landscape for the airline industry and as a result, competition has intensified for both local and international airports to gain a competitive advantage over rivals.

2.0 THEORETICAL FRAMEWORK

Contingency theory is a class of behavioural theory that claims that there is no best way to organize a corporation, to lead a company, or to make decisions. Instead, the optimal course of action is contingent (dependent) upon the internal and external situation. Historically,

contingency theory has sought to formulate broad generalizations about the formal structures that are typically associated with or best fit the use of different technologies.

The perspective originated with the work of Joan (1958), who argued that technologies directly determine differences in such organizational attributes as span of control, centralization of authority, and the formalization of rules and procedures. Some important contingencies for companies are listed below: technology, suppliers and distributors, consumer interest groups, customers and competitors, government, and unions.

3.0 RESEARCH METHODOLOGY

3.1 Research Design

The study employed a descriptive and correlational research designs to explore the status of employment of strategic management drivers in enhancing performance without manipulating them. To achieve our objectives the study collected both qualitative and quantitative data. Correlational research is basically concerned with assessing relationships among variables based on the premise that if a statistically significant relationship exists between two variables, then it is possible to predict one variable based on the information available on another variable (Mugenda, 2008).

3.2 Target population

For this study the target population comprised of 2078 respondents drawn from all departments and airports of Kenya Airports Authority. The respondents cut across the whole organization ranging from senior managers to support staff who were directly linked to the airport operations so as to get a balanced view from all the stakeholders.

3.3 Data Collection methods

The study used questionnaires to obtain qualitative data for analysis which was further validated by secondary quantitative data acquired through analysis of the companies' published final accounts and quarterly market reports.

4.0 RESEARCH FINDINGS AND RESULTS

4.1 Strategic Information and Communication Technology Analysis Results

Strategic Information and Communication Technology analysis is carried out in this section, first sample adequacy for Strategic Information and Communication Technology is tested followed by factor analysis, descriptive analysis and inferential statistics.

4.2 Sample Adequacy for strategic Information and Communication Technology factors

KMO and Bartlett's Test were conducted to test sample adequacy for strategic Information and Communication Technology measures before factor analysis was carried out. Hair *et. al.,* (2010) highlighted that Factor Analysis was necessary in research to test for construct validity and highlight variability among observed variables and to also check for any correlated variables in order to reduce redundancy in data. The findings in Table 4.1 showed that the KMO statistic for strategic Information and Communication Technology measures was 0.745 which was significantly high; that is greater than the critical level of significance of the test which was set at 0.5 (Field, 2000). In addition to the KMO test, the Bartlett's Test of Sphericity was also highly significant (Chi-square = 236.513 with 45 degrees of freedom, at $p < 0.05$). The results of the KMO and Bartlett's Test provided an excellent justification for factor analysis to be conducted.

Table 4.1: KMO and Bartlett's Test for strategic Information and Communication Technology factors

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.745
Bartlett's Test of Sphericity	Approx. Chi-Square	236.5
	Df	45
	Sig.	.000

4.3 Factor Analysis for Strategic Information and Communication Technology

The five items measuring the independent variable strategic Information and Communication Technology were subjected to a reliability test where a Cronbach's Alpha value of 0.781 was obtained. Factor analysis was then carried out on the five items where the following results were

obtained (see table4.2). According to David *et al.*(2010), the general rule of the thumb for acceptable factor loading is 0.40 or above.

Table 4.2 Thresholds of the Independent Variable Strategic Information and Communication Technology (ICT)

Strategic Information and Communication Technology (ICT) Indicators	**Factor Loadings**
1.Automation of processes plays an important role in performance of Airports.	**0.766**
2.Use of Information and Communication Technology is crucial in securing Airports from security threats	**0.788**
3.Personnel at all levels in the organization must embrace Information and Communication Technology in order to improve performance of Airports.	**0.570**
4.Use of automation is important because it enables faster processing of passengers	**0.770**
5.Use of automation is important because it gives Airports competitive advantage	**0.752**

All the five factors registered thresholds of above 0.4 and were thus considered for further statistical analysis.

4.4 Descriptive Statistics Results for Strategic Information and Communication Technology

The main objective was to evaluate the effects of strategic Information and Communication Technology on Airports' performance in Kenya. Result in table 4.3 indicated that42.9% agree that Automation of processes plays a very important role in performance of Airports while 31.4% agreed fairly important, 17.1% somewhat important,5.7% not so important while 2.9%said it was not important at all. On use of Information and Communication Technology 57.1% agreed it was very important while 25.1% agreed fairly important, 11.4% somewhat

important ,2.7% not so important, while 2.9%said it was not important at all. Personnel at all levels in the organization must embrace Information and Communication Technology in order to improve performance of Airports 31.4% agreed it was very important while 57.1% agreed fairly important, 5.7% somewhat important,2.9% not so important, while 2.9% said it was not important at all. Use of automation is important because it enables faster processing of passengers 57.1 % agreed it was very important while 28.6 % agreed fairly important, 11.4 % somewhat important ,2.9% not so important, while 2.9% said it was not important at all. Finally on use of automation is important because it gives Airports competitive advantage54.3 % agreed it was very important while 22.9 % agreed fairly important, 11.4 % somewhat important, 5.7% not so important, while 5.7% said it was not important at all.

The study findings are supported by Adei (2004) who argues that information and communications technology has played a tremendous role in all areas of today's organizations' success and is expected to drive organizations to greater and efficient performance. It provides the opportunity for organizations to be in any location on the globe, even the remotest of locality and establish transactions oceans away within fragments of time.

According to Czenter, (2002) organizations are expected to take advantage of the ICT revolution to establish a virtual presence in the international economy as an e-business on the internet. Onwuka&Eguavoen (2007) expressed that, advances in computer technology enable traders to meet demand for financial instruments such as swaps and futures with relative ease and that through ICT organizations increase their performance by their virtual expansion through the internet thus, expanding their market reach and domination.

Onwuka and Eguavoen,(2007) argued that it will be difficult for a corporation to become a significant player in the global market place without an extensive use of information and communications technology. Improved transportation as well as the emergence of containerization in land- and sea- based shipping has reduced both the handling requirement and transit time by more than two thirds.

Table 4.3 Effects of use of strategic Information and Communication Technology (ICT) on Airports' performance

STATEMENT	5	4	3	2	1
Effects of use of strategic Information and Communication Technology (ICT) on Airports' performance	**Very important**	**Fairly important**	**Somewhat important**	**Not So important**	**Not at all important**
1. Automation of processes plays an important role in performance of Airports.	42.9%	31.4%	17.1%	5.7%	2.9%
2. Use of Information and Communication Technology is crucial in securing Airports from security threats	57.1%	25.7%	11.4%	2.9%	2.9%
3. Personnel at all levels in the organization must embrace Information and Communication Technology in order to improve performance of Airports.	31.4%	57.1%	5.7%	2.9%	2.9%
4. Use of automation is important because it enables faster processing of passengers	57.1%	28.6%	11.4%	2.9%	2.9%
5. Use of automation is important because it gives Airports competitive advantage	54.3%	22.9%	11.4%	5.7%	5.7%

In a 'Yes' or 'No' question when respondents were asked whetherall the processes in Airports are Automated, majority 71.4% indicated 'Yes' while 28.6% indicated 'No'. When asked whether technology impact positively on the organization, 85.7% indicated 'Yes' while 14.4%

indicated 'No'. These results were close to those obtained when the respondents were also asked whether it is true that ICT has a positive impact on productivity. Sixty percent of the respondents indicated that employees fully embraced ICT in the airports in Kenya. Finally majority 82.9% agreed that ICT contribute to airports' security. The results are shown in the table below.

Table 4.4 Yes or No Questions on ICT and Airports' performance

Question	Yes (%)	No (%)
1. Are all the processes in Airports Automated?	28.6	71.4
2. Does technology impact positively on the organization?	85.6	14.4
3. Is it true that ICT has a positive impact on productivity?	80	20
4. Have the employees fully embraced ICT?	40	60
5. Does ICT contribute to airport security?	82.9	17.1

In open ended questions respondents were asked the effect of ICT on their duties. Their responses varied depending on the department the respondents worked for but generally most indicated that ICT and automation improved their productivity and were able to make use of airports' resources including the human resources. It also increased their speed when discharging their duties thus saves time. ICT is also highly used in communication and information processing and analysis. One of the impacts of automation on airports processes is that customers are able to use self-service facilities at the airports especially in accessing information and performing routine tasks. Automation has led to reduction of wastage, efficient service delivery and has improved airports' global ranking on technology ranking. Automation has led to attraction of business to the airports as it improves transparency in doing business. Concerning how automation improves security in airports, most respondents indicated that it's through thorough security checks without bias and has also improved surveillance and monitoring. It also helps in back-up of any material for security. Respondents were also to highlight how ICT drive business performance in airports. They indicated that it enhances communication between airports and other stakeholders, provides real-time information, monitoring of complaints handling systems as well as provision of resource management systems like ARMS, FIDs and AODBs.

4.5. Correlations Results for Strategic Information and Communication Technology versus organizational performance

The Pearson Correlation coefficient of strategic Information and Communication Technology versus organizational performance was computed and established as 0.561 (p-value=0.000). From table 4.5 it could then be concluded that there is a moderate positive linear relationship between the two variables since the correlation coefficient is between 0.4 and 0.6 according to Dancey and Reidy's (2004) categorization. Sabriet. et, al., (2004) in his study established a positive relationship between ICT and the performance of firms.

Table 4.5 Pearson Correlation of Strategic ICT versus organizational Performance

		STRATEGIC ICT	ORGANIZATIONAL PERFORMANCE
STRATEGIC ICT	Pearson Correlation	1	.561**
	Sig. (2-tailed)		.000
	N	105	105
ORGANIZATIONAL PERFORMANCE	Pearson Correlation	.561**	1
	Sig. (2-tailed)	.000	
	N	105	105

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

4.6 Regression Results for Strategic Information Communication Technology and versus Organizational Performance

The regression analysis shows a relationship R=0.561 and R^2=0.314. This meant that 31.4% of variation in the organizational performance can be explained by a unit change in strategic Information and Communication Technology (ICT). The remaining percentage of 68.6% is

explained by other variables namely, strategic customer focus, safety and security strategy, and strategic human capital. This is shown in table 4.6

Table 4.6 Model Summary for Strategic Information Communication and Technology versus Organizational Performance

R	R Square	Adjusted R Square
.561[a]	.314	0.308

a. Predictors: (Constant), STRATEGIC Strategic Information Communication and Technology

To test the significance of regression relationship between strategic Information Communication and Technology and organizational performance, the regression coefficients (β), the intercept (α), and the significance of all coefficients in the model were subjected to the t-test to test the null hypothesis that the coefficient is zero. The null hypothesis state that, β (beta) = 0, meaning there is no relationship between strategic ICT and organizational performance as the slope β (beta) = 0 (no relationship between the two variables). The results on the beta coefficient of the resulting model in table 4.13 shows that the constant α = 1.976 is significantly different from 0, since the p- value = 0.000 is less than 0.05. The coefficient β = 0.542 is also significantly different from 0 with a p-value=0.000 which is less than 0.05.

This implies that the null hypothesis β_1=0 is rejected and the alternative hypothesis $\beta_1 \neq 0$is taken to hold implying that the model Y=1.976+0.542 (Strategic ICT) + e, is significantly fit. The model Organizational Performance = α + β (Strategic ICT) holds as suggested by the test above. This confirms that there is a positive linear relationship between Strategic Information and Communication Technology (ICT) and organizational performance.

Table 4.7: Strategic Information and Communication Technology and Organizational Performance

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	1.976	.335		5.899	.000
	STRATEGIC ICT	.542	.079	.561	6.870	.000

a. Dependent Variable: ORGANIZATIONAL PERFORMANCE

Further, F-test was carried out to test the null hypothesis that there is no relationship between strategic Information Communication and Technology (ICT) and organizational performance. The ANOVA test in Table 4.8 shows that the significance of the F-statistic0.000 is less than 0.05 meaning that null hypothesis is rejected and conclude that there is a relationship between Strategic Information Communication and Technology (ICT) and Organizational Performance.

Table 4.8 ANOVA Results for Strategic Information Communication and Technology and Organizational Performance

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	16.909	1	16.909	47.202	.000[a]
	Residual	36.898	103	.358		
	Total	53.807	104			

a. Predictors: (Constant), STRATEGIC ICT

b. Dependent Variable: ORGANIZATIONAL PERFORMANCE

4.7 Discussions of key findings

The objective of the study was to establish the effects of use of strategic information and communication technology (ICT) on airports' performance in Kenya. Various methods were

used to arrive at the findings. These methods included descriptive statistics, parametric analysis and regression analysis. Descriptive statistics showed that automation of processes plays an important role in the performance of Airports and it gives the Airports a competitive advantage. It enables faster processing of passengers and is also crucial in securing Airports from security threats. Respondents agreed that personnel at all levels in the organization must embrace Information and Communication Technology (ICT) in order to improve performance of airports. Unfortunately the findings showed that not all the processes in the airports are automated. In the inferential statistics Pearson Correlation coefficient of strategic Information and Communication Technology (ICT)versus organizational performance was found to be moderate at 0.561 (p-value=0.000). It was found that 31.4% of variation in the organizational performance could be explained by a unit change in strategic information and communication technology (ICT). Further regression analysis confirmed that there is a positive linear relationship between Strategic Information and Communication Technology (ICT) and organizational performance.

4.8 Summary of Results

The study results revealed that Strategic Information and Communication Technology (ICT) was statistically significant in explaining organization performance of airports in Kenya. Therefore the study concluded that Strategic Information and Communication Technology (ICT) had an effect on performance of airports and that there exists a positive significant relationship between Strategic Information and Communication Technology (ICT) and performance of airports.

5.0 CONCLUSION

This study ultimately finds a positive correlation between Strategic Information and Communication Technology (ICT) and performance of airports in Kenya (r =0.561). Strategic Information and Communication Technology (ICT) sig. value is .000 (which is less than .05), it was concluded that there is a significant relationship between Strategic Information and Communication Technology (ICT) and performance of airports in Kenya. It can be concluded that there is a statistically significant association between performance of airports and Strategic Information and Communication Technology (ICT).

REFERENCES

Adei, S. (2004). Impact of Globalization on Management: The African African Social Values. International Review of Politics and Development

Ashari, Siti Fatimah, (2011). An Exploratory Study of Leadership Styles and The Effect on Performance Among Managers at Malaysia Airports Technologies Sdn, Bhd, College of Business University Utara Malaysia, Malaysia.

Czenter, A. (2002) Intellectual capital ROI: a current map of human capital antecedents and consequent, Journal of Intellectual Capital, Vol. 3 No. 3, pp. 223-47.

David E. Guest. (1999). Human Resource Management and Performance: a Review and Research Agenda, The International Journal of Human Resource Management.

Devaraj, S. and Kohli, R. (2003). Performance impacts of information technology development process and application. Industrial Marketing Management, discrimination: The case of airports, Journal of Urban Economics, Volume 74, p 12-24

Facemire, F., and Laustra, M. (2005). Improving Checkpoint Security. United States: The McGraw-Hill Companies.

Hannan and Freeman, (1983).The Liability of Newness: Age Dependence in Organizational Death Rates, Amarican Sociological Review, Vol.48, No.5 (Oct., 1983), pp.692-710.

Hempell, T. (2002). Does Experience Matter? Innovation and the Productivity of ICT in German Services, ZEW Discussion Paper 02–43, Centre for European Economic Research.(ftp://ftp.zew.de/pub/zewdocs/ dp/dp0243.pdf).

Hitt, L. &Brynjolfsson, E. (2003). Productivity, Business Profitability and Consumer Surplus:Three Measures of Information Technology Value. MIS Quarterly, Vol.20, No.2, pp.121-142.

Iravo, M., Ongori, J. &Munene, C. (2013). Factors affecting the performance of hotels and restaurants in Kenya. A case of Kisii County. *Interdisciplinary Journal of Contemporary Research in Business* . 4(12), 897-928.

Joan, T. A. (2007).Total Quality Management and performance; the role of organization support and co-worker support.*International journal of Quality & Reliability Management*, 24(6), 617-627.

Koellinger, P. (2005). Why IT matters - An empirical study of e-business usage, innovation and firm performance. DIW Berlin Discussion Paper 495.

Mugenda O.M &Mugenda A.G. (1999), Revised in 2003. Research Methods: Quantitative and Qualitative Approaches. Published by African Centre for Technology (ACTS) Nairobi-Kenya 1999.

O'Reilly, Charles A,(2010). How Leadership Matters: The Effects of Leaders Alignment on Strategy Implementation, The Leadership Quarterly. Orientated innovativeness in Japanese firms: A quadrad analysis.

Onwuka, E.C and Eguavoen, A. (2007).Globalization and Economic Development. The Nigerian Experience *Journal of Social Science* 14(1): 45-51.