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ABSTRACT

The main objective of this research was to investigate the influence of ICT strategies on performance of Kenya Railways Corporation. The specific objectives were to establish the influence of ICT systems and processes, ICT infrastructure, ICT service delivery and ICT support staff on performance of Kenya Railways Corporation in Nairobi City County, Kenya. The study was anchored on Resource Based View theory, McKinsey 7s Model and the Unified Theory of Acceptance and Use of Technology. The study adopted a descriptive research design. The target population consisted of 250 employees of Kenya Railways based at the Headquarters in Nairobi. The unit of observation was both the management staff and the support staff in the organization. Stratified random sampling technique was used to select a sample of 75 respondents whereby a 30% sample was taken from each stratum. The study collected primary data through a questionnaire which was administered through drop and pick method. The questionnaire was first checked for validity and reliability. The validity was checked by subjecting the questionnaire to a panel of peers to assess whether each measurement question in the questionnaire was essential, useful or necessary. Reliability of the questionnaire was tested through Cronbach's alpha test. The collected data was analyzed through descriptive and inferential statistics. The descriptive statistics included means, standard deviation and frequency distribution while inferential statistics entailed a regression analysis to establish the relationship between the study variables. The analyzed data was presented using pie charts, bar charts, percentages and frequency tables. The study found out that that KRC had adopted ICT systems to help manage its operations. The ICT systems influenced the performance of KRC to a great extent. The study also found out that KRC had put in place ICT infrastructure which enhanced efficient running of ICT solutions and service delivery in the organization, which eventually led to improved organization performance. The study recommended that there should be increased training of the staff on the use of ICT tools in the organization.

Key Words: *Organization Performance, Information and Communication Technology (ICT) ICT Systems and Processes*

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INTRODUCTION

Today, organizations of all types are utilizing Information and Communication Technologies (ICT) around the globe, not only for cutting costs and improving efficiency, but also for providing better customer service. Organizations in various sectors around the world, are adopting ICT to provide better services to their customers, (Apulu & Latham, 2011). The evolution of technology influences significantly the business by changing the industry infrastructure and business operations and by creating the premises for the emergence of competitive advantages for those organizations that are adopting ICT in their business processes (Ongori & Migiro, 2010).

Theoretical and empirical studies have demonstrated the necessity to gain and exploit the positive outcome of ICT adoption and implementation in organizations, such as, productivity growth, organization expansion, efficiency, effectiveness and competitiveness (Tarutė & Gatautis, 2014). For instance, Pillay (2016) indicated that ICT can improve efficiency and increase productivity by different ways including: improving efficiency in resource allocation, reducing transaction costs and technical improvement, leading to the outward shifting of the production function. Koellinger (2005) also asserts that ICT is not just a technological phenomenon but the impact of ICT as an enabler has become noticeable. Today, firms in both manufacturing and service sectors who use ICT more intensively are more productive, grow faster, invest more, and are more profitable.

Presently, the extensive use of ICT is changing the way people or companies work. Researchers like Hipp and Grupp (2005); Tidd *et al.* (2005) and Castellacci (2006) refer to ICT as a very important tool for innovation in this present era. The benefits of ICT for a firm includes saving of inputs, general cost reductions, higher flexibility and improvement in product quality (Mouelhi, 2009; Majumdar *et al.,* 2010). Bloom *et al.* (2009) ascertain that ICTs play a major role in networking and communication as firms use these technologies to facilitate communication among employees and reduce co-ordination costs. ICT enhances the production process in organizations as monitoring technologies could be used to reduce the number of supervisors required in the process (Hanna, 2003). Arvanitis and Loukis (2009) also advocate that the use of ICT has direct implications for firms. ICT helps in areas such as information gathering and dissemination, inventory control and quality control. Olugbenga (2006) argues that ICTs are being used for strategic management, communication and collaboration, customers' access, managerial decision making, data management and knowledge management since it helps to provide an effective means of organizational productivity and service delivery. There is a substantial long-term productivity gain with the use of ICT in organizations. Buhalis (2003) also notes that the application of ICT in businesses causes fundamental changes that can provide powerful strategic and tactical tools for organizations if properly applied and used. Although ICTs can add value to organizational strategies, success will only be achieved if they are integrated into the organization's business strategies (Brumec & Vrcek, 2002).

Railways Sector has been a reality in Kenya's economy for more than a century owing to the construction of the railway line from the coast moving westwards in Kenya and into Uganda. Together with transportation by road, the railway in Kenya comprises the main sources of transport of goods and passengers along Kenya's main urban areas. In spite of the challenges that Kenya's railways system has had since the mid-1980s, the railway line has remained a critical asset for establishment of a competitive transport system both for business enterprises and passenger services (KRC Report, 2016). The continued expansion and growth of the economy coupled with metropolitan demographics has created an urgent need to establish efficient rail system (KRC Strategic Plan, 2016).

Railway systems have improved in various fronts with extensive usage of ICT. Some of the most important advancements are in fields of security, operations, customer services and access to railway services. Management of railways, ticketing systems and availability of services are now more developed to be stronger catering to the need of larger customers (Aparajita, 2015). In Kenya, the development of SGR has led to adoption of new technologies in rail sector development like upgrade from metre gauge rail to standard gauge rail, shift to diesel electric locomotives and provision for electric traction, digital signalling of operations and ticketing (KRC Strategic Plan, 2016). The organization seeks to implement and maintain quality and reliable ICT resources to assist achieve its mandate as described in Kenya Vision 2030. For the railway transport sector in Kenya to remain relevant, compete and thrive amidst the competition posed by alternative modes of land transport, it is paramount to have a fully functioning efficient railway transport system. For Kenya, this cannot be achieved without modernization of the rail infrastructure (Kenya Railways, 2017).

Statement of the Problem

In Kenya, rail transport sector is the second most important in Kenya, after road transport, for both freight and passenger services (Kenya Railways, 2017). The challenges of running rail networks are immense, as rail operators need to deal with the complexity of rail networks, while maintaining services, and customer and staff safety. All these requirements need to be fulfilled while keeping costs at a reasonable level. It has been found that ICT solutions can significantly improve rail operations, improved performance and customer satisfaction (Owaineh, 2009). Kenya Railways is currently implementing its ICT Strategic Plan 2015 -2018. KRC has been employed ICT in all areas of Security, Operations, Customer Services and access to railway services.

Development of SGR also exposed Kenya to new technologies in rail sector development like upgrade from metre gauge rail to standard gauge rail, shift to diesel electric locomotives and provision for electric traction, digital signalling of operations and ticketing (KRC Strategic Plan, 2016). The ICT strategy is part of a restructuring plan, which is linked to the poor performance of the company, and which have also seen some of the long serving incompetent or underperforming managers being demoted or exiting the state corporation. There is need to improve the company's performance in all its areas of operations. Despite all these, very little is known on extent to which the ICT strategy has improved performance in Kenya railways.

A review of the existing literature showed that fewer researches had focused on the critical factors affecting strategic plan implementation. For instance, Masinde (2016) examined the challenges of implementing turnaround strategies at Kenya Railways Corporation; this study however did not show particularly how implementation of ICT strategy enhanced performance of the organization. Malit and Muendo (2017) also looked at the effect of information communication technology strategy implementation on organizational performance of insurance sector in Kenya. This study was however conducted in the insurance sector, whose operations are different from that of Kenya railways and therefore the findings cannot be generalized in this context. Namusonge (2016) also looked at the influence of information technology practices in procurement on organization performance of public institutions in Kenya. This study only focused on ICT implementation in the procurement function and did not focus on KRC. From this review, the researcher did not come across any empirical study that had been conducted on influence of ICT Strategy on performance of Kenya Railways Corporation which necessitated the need for this study.

THEORETICAL REVIEW

Resource Based View Theory

Resource Based View (RBV) theory is a competitive advantage theory developed by Wernerfelt in 1980s. The fundamental principle of the resource based theory is that resources can be a basis of an organisation's competitive advantage (Wernerfelt 1984). Wernerfelt notes that the bundles of valuable resources at the organization's disposal are key determinants of an organisation's competitive advantage. Firms' resources could be tangible or intangible. Hitt *et al.* (2005) revealed that resources can be categorized into three classes: physical, human and organizational capital which incorporates capital equipment, the skills of individual employees, patents, finances and talented management staff. Yin (2009) describes capabilities as intermediary outputs between resources and competitive advantage. Hitt *et al.* (2005) assert an organization's unique resources and capabilities provide the basis for a strategy An integration and most appropriate configuration of firm's resources and capabilities with inside knowledge helps firms achieve operational and strategic objectives (Kay, 2010).

The theory therefore emphasizes on the importance of internal resources of the firm as the source of performance and competitive advantage. The theory helps understand how ICT as a resource in the organization can be utilized to help in achievement of various benefits, in a bid to achieve competitive advantage. The theory also highlights how financial resources, human capital, among other resources, when used and configured effectively can enable the firm to perform and can provide a distinct competitive advantage.

McKinsey 7s Model

McKinsey 7s model was developed in 1980s by McKinsey consultants Tom Peters, Robert Waterman and Julien Philips with a help from Richard Pascale and Anthony G. Athos. The goal of the model was to show how 7 elements of the company: Structure, Strategy, Skills, Staff, Style, Systems, and Shared values, can be aligned together to achieve effectiveness in a company. The key point of the model is that all the seven areas are interconnected and a change in one area requires change in the rest of a firm for it to function effectively (Peters & Waterman, 1982). According to 7S McKinsey model, a well-aligned strategy means a strategy that is clearly articulated, is long-term, helps to achieve competitive advantage and is reinforced by strong vision, mission and values (Jurevicius, 2013). The key point of the model is not to look at the company to find the great strategy, structure, systems etc., but to look if it is aligned with other elements. If it is aligned with other 6 elements (Structure, Skills, Staff, Style, Systems, and Shared values), then it may provide strong results (Peters & Waterman, 1982).

The most common uses of the framework are to facilitate organizational change, to help implement new strategy and to identify how each area may change in the future. In this regard, the model can help guide Kenya Railways on how they can effectively and successfully implement the ICT strategy effectively in the company. That is, by aligning the strategy with the other elements of the company.

Unified Theory of Acceptance and Use of Technology

The unified theory of acceptance and use of technology (UTAUT) was formulated by Venkatesh *et al.* (2003). UTAUT explains the extent of acceptance of the use of information technology. These theories assess if the user will accept the new technologies and also the user's ability to deal with it. The Technology Acceptance Model helps managers and decision makers to assess the success of the introduction of technology to the organization, and motivate users to accept the systems (Venkatesh, Morris, Davis & Davis, 2003). UTAUT has been used and applied by many educational institutions and research to answer one of the most critical questions:

What are the user's attitudes towards accepting ICT solution? Regardless of the level of available infrastructures and support administrations, there is a concern as to whether teachers are prepared to integrate available technology into effective lessons for their students.

UTAUT consists of four main concepts, Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC). These four main concepts are independent variables which influence dependent variables, behaviorals and usage. Gender, age, experience, and volunteers of system use have indirectly influenced the dependent variables via the four main concepts. Behavioral intention is seen as a critical predictor of technology use (Venkatesh *et al.,* 2003). This theory helps understand individual factors that influence acceptance and use of information technology. The theory has distilled the critical factors and contingencies related to the prediction of behavioral intention to use a technology and technology use primarily in organizational context. This is critical in guiding Kenya Railways on how to deal with the organizational aspects that can affect user's attitudes towards accepting ICT in the organization and hence improve its performance.

Empirical review

Use of ICT systems to automate and computerize business processes reduces lead-time which helps gain improved performance and competitive advantage. The immediate advantage that computerization and automation of processes brings is the enhanced ability to handle large amounts of information (Frey & Osborne, 2013). There is empirical evidence showing that computerization and automation of processes or utilization of IT applications can effectively reduce cost of businesses processes. For instance, Cakmak and Tas (2012), conducted a study on use of information and technology applications on gaining competitive advantage in Turkish contractor firms. The study noted that Automation System for Architectural Practices (ASAP) and Multi-phase Integrated Automation System (MITOS) are being used in the construction companies in Turkey to gain and sustain a competitive advantage. These systems are used for quick access of correct and up-to-date information, data storage, sharing of information, ease of communication, reducing costs and less use of paper. Hence, changes in technology have resulted in quality improvement, new revenues and adding value as well as less resource consumption for the company. These systems drastically reduce associated costs, giving them a competitive advantage.

Adjei (2013) also conducted a study on the effects of computerized accounting system on Ghanaian Banks. The empirical findings showed that banks using manual banking systems have not been apt in delivering quick and efficient services to their customers. On the other hand, banks operating with computerized accounting/banking systems offer much improved, efficient and fast services to their customers, thereby making them much more competitive. This therefore implies that computerization enhances efficient service delivery thus influencing the competitive advantage.

Information and Communication Technology (ICT) Infrastructure have been found to enhance effective deployment of ICT services, providing relevant and high quality data from IT systems. A review of the existing empirical literature shows that Karungani and Ochiri (2017) conducted a study to find out the impact of ICT infrastructure support on organizational performance. The research employed purposive sampling to select 87 employees in Nairobi County Government to participate in the research. Data was collected using simple structured questionnaires and analyzed using descriptive and regression analysis. The findings showed that a robust ICT infrastructure improves communication, enhances efficiency, enhances monitoring and control, makes work easier as well as improving service delivery. ICT

infrastructure also plays an important role in improving the level of coordination between stakeholders. These findings are in agreement with those of Namusonge (2016) examined the impact of ICT infrastructure on organizational performance revealing the ICT infrastructure plays a very important role in enhancing organizational performance. The findings of the research revealed that the use of ICT infrastructure reduces administrative overheads, enhances efficiency in the processes in addition to improve the speed of delivery of services. Therefore, ICT infrastructure enhances the performance of business functions.

The processes and practices employed by an organisation are also key in ensuring consistent delivery of reliable, cost effective, and of consistent high quality service to business users (Makatiani, 2012). Mogoi (2015) conducted a study on the effect of technology on strategy implementation at the Nairobi county Government. The study established that there must be well and organized structures in the organization with people who have equal skills and knowhow. This would help define roles and responsibilities. The study also revealed that there were challenges in communications which were affecting strategy implementation and hence needed to be addressed through a well-defined organization structure. The study concludes that in order to enhance competitiveness in strategy implementation and management process, there was need to align technology with strategy.

In addition, Hagsten and Sabadash (2014) conducted a study on the impact of highly-skilled ICT labour on firm performance. This was an empirical evidence study from six European countries (UK, France, Sweden, Norway, Denmark and Finland) for the period 2001-2009. The findings reveal that increasing the share of highly skilled ICT employees has positive effects on firm productivity. A one unit rise in the share of highly skilled ICT employees has a positive effect on productivity in all countries, ranging from approximately 0.5% in Denmark and the United Kingdom to close to 1.0% in Sweden and Norway. When manufacturing and services firms are studied separately, the country differences remain but the results also indicate that the right type of human capital may be more important in the manufacturing industries, since there is a larger spread of the results in this sector than for the services firms. The productivity effect in manufacturing spans from 0.17% in the United Kingdom to 1.1% in Norway; in services it varies between 0.46% in the United Kingdom and 0.9% in Norway. The findings establish that increases in the proportion of ICT-intensive human capital boosts productivity.

Wachira, Muturi and Sirma (2014) evaluated the ICT strategy on the performance of Sacco's in Kenya. The study revealed that ICT skills and knowledge can crucially increase ICT adoption and implementation hence eventually influencing performance. The study recommended that there is need for more training to be offered to the staff to support ICT in the organization. Kenya's ministry of planning and National development (2005) recognized the need to make education a platform for equipping the nation with ICT skills in order to support sustainable economic growth. This study concentrated on ICT strategy and performance of Sacco's in Kenya. The operations of Sacco's are different from those of KRC, and therefore the results cannot be this study.

METHODOLOGY

The study adopted a descriptive research design. The descriptive design was therefore appropriate for this study since it helped describe the current status on the research problem. The target population consisted of 250 staff in KRC who consisted of both the management staff and support staff. The population was divided in these two strata and from each stratum a 30% sample was taken. This was guided by Mugenda (2008), who says that when the population is 1000 and over, 10% of the population

should be sampled, while when the population is less than 1000, a 30% sample should be taken. The sample size was therefore 75 respondents. Stratified random sampling technique was used to select the sample. Stratified random sample is adopted since it reduces the potential for human bias in the selection of cases to be included in the sample (Latham, 2007). The study collected primary data through a questionnaire which had both closed and open ended questions. A pilot study of the questionnaire was conducted prior to the actual data collection to test for validity and reliability to detect weakness in design and instrumentation. Validity of the research instrument was established by the researcher seeking opinions of experts in the field of study especially from the supervisors, quality experts and lecturers. These experts went through the instruments to establish whether the tools were adequate and valid enough to collect data/ information to answer the objectives of the study. Feedback from these experts facilitated the necessary revision and modification of the research instrument thereby enhancing validity. Reliability of the questionnaire was tested by Cronbach's alpha test with the help of Statistical Package for Social Sciences (SPSS). Reliability testing was conducted on the likert scale questions under each variable. Reliability coefficient for the questionnaire was above 0.7 which is acceptable and is taken as the rule of thumb for an instrument to be said it's reliable (Tavakol & Dennick, 2011). The collected data was analyzed using descriptive and inferential statistics with the aid of Statistical Package for Social Sciences (SPSS) Version 21. Descriptive statistics enabled the researcher to summarize and organize data in an effective and meaningful way using percentage and frequency distribution tables, mean scores and standard deviation. In inferential statistics, the study conducted a regression analysis to establish the relationship between variables. The analysed data was presented in tables and bar graphs, charts.

RESULTS AND DISCUSSION

ICT Systems and Performance of KRC

This study sought to assess the influence of ICT Systems on performance of Kenya Railways Corporation. The respondents were first asked to indicate whether KRC had put in place any ICT Systems to support and help the organization manage its operations. The study findings showed that all the respondents 100% (n=58) indicated that the company had adopted ICT systems to help manage its operations. The respondents stated that the organization had adopted systems such as Navision ERP, which captures most of the current processes in KR and integrates other systems that support the operations of the corporation. The company also had a mailing system - Lotus which is used for all email communication. The company has also adopted a digital ticketing system, and a records digitization system. All these systems support the operations of the organisation.

Table 1: ICT Systems in KRC

Statements on ICT Systems in KRC	N	Mean	Std. Deviation
KRC has put in place Information management systems which facilitate the storage, organization and retrieval of information in the company.	58	4.14	0.576
The organization has adopted transaction processing systems (e.g. E-ticketing) to enhance efficiency in passenger train operations.	58	4.28	0.523
KRC has deployed ICT management systems (such as ERP systems) to support the management of operations of the organization.	58	4.36	0.667
Automation of business processes in KRC has reduce lead-time to perform a particular task	58	4.02	0.761

Source: Survey Data (2019)

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The study findings in Table 1 showed that the respondents agreed that KRC had deployed ICT management systems, (such as ERP systems) to support the management of operations of the organization (mean score = 4.36). The respondents also agreed that the organization had adopted transaction processing systems (for example E-ticketing) to enhance efficiency in passenger train operations; as well as information management systems to facilitate the storage, organization and retrieval of information in the company; this was shown by the mean scores 4.28 and 4.14 respectively.

In addition, 48.3% of the respondents revealed that ICT Systems influence the performance of KRC to a great extent while 49.6% indicated that the ICT Systems influenced the performance of the company to a very great extent. Only 12.1% of the respondents indicated that the ICT Systems influenced performance to a moderate extent.

Organization Performance

In this section the study sought to establish the extent to which ICT Strategy improved the performance of Kenya Railways Corporation. A five point likert scale was adopted to interpret the results whereby a mean score of 1- 2.5 implied that there was agreement to a small extent, a mean score of 2.6-3.5 implied to a moderate extent, while a mean score of 3.6-5.0 implied that there was agreement to a great extent. The results were presented in Table 2.

Table 2: Performance in KRC

Performance in KRC	N	Mean	Std. Deviation
ICT strategy in has increased revenues in KRC.	58	3.40	0.699
ICT strategy has enhanced effective delivery of services in the organization.	58	4.10	0.742
The ICT strategy has reduced the costs of operations in the organization.	58	3.41	0.750
There is increased customer satisfaction due to efficient delivery of services through ICT solutions.	58	4.28	0.586
ICT has improved the efficiency in operations in the organization.	58	4.33	0.758

Source: Survey Data (2019)

As shown in Table 2, the respondents indicated that ICT had improved the efficiency in operations of KRC (mean score = 4.33), and as a result there was increased customer satisfaction due to efficient delivery of services through ICT solutions (mean score = 4.28). The respondents further agreed that ICT strategy had enhanced effective delivery of services in the company (mean score = 4.10). However, the respondents revealed that the ICT strategy had reduced the costs of operations to a moderate extent (mean score = 3.41); and also increased revenues to a moderate extent (mean score = 3.40).

CONCLUSIONS

The study concluded that ICT systems at KRC influence the performance of the corporation. The company had put in place systems such as ERP, mailing system, records digitization and digital ticketing system which helped the company manage its operations effectively. The ICT systems had also facilitated the storage, organization and retrieval of information in the company as well as enhancing efficiency in passenger train operations. As a result this improved the performance of the company.

RECOMMENDATIONS

There is need for increased training of the staff on the use of ICT tools in the organization. ICT knowledge has been identified as a key determinant of ICT adoption and effective implementation. Training would therefore increase adoption of more ICT tools and their integration to business strategies and

subsequently enhance usage ICT in organisation. Training would also enhance change management which would make it easier for the staff to accept the changes that come along with the integration of ICT into business strategies.

The study also recommended that the company's top management should be committed to ICT strategy implementation as they should commit more financial resources to support the strategy in the organization. This would facilitate adoption of more technologies, training and hiring skilled staff who can efficiently and effectively use the technologies to help manage the operations of the company and also deliver services to customers so as to enhance the performance of the company.

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