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INFORMATION COMMUNICATION TECHNOLOGY AND COMPETITIVENESS OF LARGE MANUFACTURING COMPANIES IN KENYA

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Abstract: *Economic growth and development of every country depends with its ability to integrate its labour forces and the resources available to be valuable inputs to the social and political welfare. Manufacturing sector has been termed as one of the major sectors that make great contribution to the economic growth of many countries across the globe- both in the developing world and the developed world. In Kenya particularly, manufacturing firms have been key contributors to the employment as well as availing of the required inputs to other sectors such as construction and service delivery. However, competitiveness of these firms has been sabotaged by a number of factors including technological changes, increased competition as well as changing economic world. This study seeks to establish the influence of the strategic management drivers on the competitiveness of large manufacturing firms in Kenya with a specific objective to analyze the influence of information technology on competitiveness of large manufacturing companies. Descriptive survey research design was employed in the study and the population consisted of large manufacturing firms in Nairobi, Kenya (454) which was sampled using stratified random sampling to obtain a sample of 384 respondents. Questionnaires were used as the research instruments where the data was collected through drop-and-pick method. The study results revealed that most of the respondents were of the opinion that their respective firms had incorporated automation of tasks and services in their operations and that the continued automation processes enhanced accuracy and cost-saving. Automating operations has been regarded as one of the major strategies towards enhancing the efficiency and effectiveness of operations which at the end of the day steers competitiveness. Information technology is therefore, known to be the best driver for automation of operations and services.*

Keywords: *Automating operations, large manufacturing firms, strategic management drivers*

INTRODUCTION

Background of the study

A strategy is the assurance of long-run objectives and targets of an organization, assimilation of course and distribution of fundamental resources for executing these objectives (Ebersberger *et al.*, 2016). The strategy is viewed as a field of request created from a viable need to explain the reason behind the progress and drawback among organizations. T enhance the effectiveness of a strategy, there ought to be some key enablers. These are the strategic management drivers. One of these drivers is the adoption and embrace of information technology. In the modern business sector, technology stands best as the key determinant of success of any strategy that the organization puts forward. In this regard, enhancing technology is the basic step in any organization that seeks to have its strategies enhances its competitiveness. Angst, Agarwal, Sambamurthy and Kelley (2010) define information technology as the evolvement of the production and communication lecterns to more

efficient and convenient systems that ease the contributions of the humans to their competitiveness and operations.

Developing a sustainable competitiveness in the current competitive market setting is the main challenge that most firms face. Porter as cited by Dyllick and Muff (2016) defines competitiveness as the leverage that a business has over its competitors. Porter argues that an organization can achieve competitiveness over its peers in two ways which include; cost advantage and differentiation advantage. The cost competitiveness strategy, when a business provides the same products and services as its competitors, albeit at a lesser cost. Differentiation competitiveness strategy an institution provides better products and services than its competitors. In Porter's view, strategic management should be concerned with building and sustaining firm competitiveness.

Anderson (2014) posited that competitiveness tries to address a portion of the reactions of near favourable position. Upper hand lays on the idea that shoddy work is universal and normal assets are a bit much for a decent economy. The other hypothesis on relative favourable position, can lead nations to represent considerable authority in sending out essential products and crude materials that trap nations in low-wage economies because of terms of exchange (Strickland, 2012). The Upper hand endeavours to address this issue by worrying on boosting scale economies in merchandise and ventures that accumulate premium costs (Kitua, 2014). Considering previous studies, it is evident that for a firm to gain competitiveness that is sustainable, it must be ahead of competition in terms of formulating and implementing its own strategies, even if the competitors are concurrently implementing the same strategies.

In the modern business sector, technology stands best as the key determinant of success of any strategy that the organization puts forward. In this regard, enhancing technology is the basic step in any organization that seeks to have its strategies enhances its competitiveness. Angst, Agarwal, Sambamurthy and Kelley (2010) define information technology as the evolvement of the production and communication lecterns to more efficient and convenient systems that ease the contributions of the humans to their competitiveness and operations. Through enhanced information technology, the production of goods and services has become more efficient has gone global. Organizations need to embrace technology in the modern businesses environment so as to gain competitiveness and enhance competitiveness. Strategic management also requires extensive information technology for effectiveness. Through emergence of technology, management has turn to be more diverse and competitiveness oriented (Cooper & Molla, 2014; Acemoglu & Cao, 2010). Manufacturing companies need to embrace information technology in a bid to make their production efficient. However, they should consider incorporating several systems that keep the flow of information and operations keenly monitored and thus reduce management loopholes.

Information Technology and Firm Competitiveness

Balogun (2016) in his study on the effects of information technology on organizational performance in Nigerian Banking Industries. The study targeted 15 banks. 450 employees were sampled. Primary data was collected using questionnaires. The findings revealed that technological innovation influenced banks employee's performance, customer's satisfaction and improvement in banks' profitability. It was recommended that banks should effectively manage technology innovation hence, improve employee's performance, customer's satisfaction, sustainable profit, increased return on investment, returns on equity and achieve a competitive advantage in the banking industry.

Revenio (2017) conducted a research on evaluating the impacts of ICT usage on organizational performance in International College of Engineering and Management. Simple random sampling was used to select 60

participants. The findings revealed that there is positive relationship between ICT use and organizational performance. Girma (2016) conducted a research on the impact of information and communication technology on performance of commercial banks in Ethiopia. It was recommended that banks should invest more on information and communication technology so as to enhance their performance, educate the public on how to use some of the information technology such as ATM and POS.

Macharia *et al.* (2015) examined the impact of information technology on performance of logistics firms in Nairobi County. The study targeted logistic firms within Nairobi County. Data was collected from 10 firms. It was revealed that (50%) of logistic firms are not using ICT in their departments thus leading to low service delivery. Findings also revealed that use of ICT infrastructure reduces transaction costs by replacing paper work with electronic processes, improve the level of coordination between members of the supply chain network, reducing transaction costs and eliminating avoidable errors. Adekunle, and Rafiu, (2014) researched on the impact of information and communication technology (ICT) on commercial bank performance in South Africa. The study used data from 1990-2012 published by Bankscope–World banking information source. Findings revealed that use of ICT has increased return on capital and return on assets at South African banking industry. It was recommended that banks should develop policies that they can use to increase the application of information technology.

Mukangu and Ndungu (2016) assert that use of information and communication technology (ICT) has enabled organizations increase productivity, operational efficiency, reduce cost, improve in design process and inventory management. Based on his study on role of computer based information system on organizational performance. The findings revealed that there was a positive correlation between computers based information system and organizational performance. Aduda and Kingoo (2012) investigated the relationship between electronic banking and financing performance among Commercial Banks in Kenya. It was revealed that there exist a positive relationship between e-banking and bank performance. It was concluded that the use of electronic banking has made it easy for customers and employees to conduct bank transactions thus, increase performance.

Muthuri (2014) did a study on the role of information technology in enhancing competitiveness of star rated hotels in Nairobi. The study aimed at finding out the effects of technology on buyer-supplier relationship, electronic tendering and enterprise resource planning and their merit on competitiveness of procurement in star-rated hotels in Nairobi. Muthuri (2014) used a descriptive research design and had a sample of 100 star hotels in Nairobi. Muthuri (2014) found that the star rated hotels in Nairobi adopted ICT in various phases of the procurement cycle including ICT in announcement of the notice – publication, contract administration, preparation of tender dossier and procurement planning to great extents and that the hotels adopted ICT in calculating the value and classification of the contract, opening and evaluation of tenders, determination of the procurement procedure and giving and signing of contract. However, Muthuri (2014) concluded that application of information technology in procurement enhanced efficiency and time saving thus enhancing the competitiveness and competitiveness of the hotels.

Mardia and Namusonge (2016) did a study on influence of information technology practices in procurement on organization competitiveness in public institutions in Kenya. The study focused on Jomo Kenyatta University of Agriculture and Technology. In their study, Mardia and Namusonge (2016) found that information technology positively influenced procurement efficiency in JKUAT through enhancement of continuous quality improvement as well as enhancing transparency and service delivery. Mardia and

Namusonge (2016) recommended that the institution should embrace use of IT in procurement to promote competitiveness and growth.

Statement of the Problem

Despite the merit that surrounds large manufacturing firms and their colossal contribution to the manufacturing sector, competitiveness of the firms has been undergoing tremendous challenges from unfavourable operating environment, globalization, and technological changes to increased cost of raw materials (Mukwenia, 2017). These challenges have seen many of large manufacturing firms in Kenya drop in their profit margin and some even close down or relocate to other countries (Were, 2016). On a global perspective, decline in competitiveness of the manufacturing has been argued to be caused by the decreasing demand for the products due to increase in production (overproduction) and changes in technology (Hajiha & Ghilavi, 2012; and Karitoh, 2016).

Based on the above reviews, it is not clear what exactly causes the declining competitiveness of large manufacturing firms or manufacturing firms at large. It is on this merit that the current study sought to fill this gap and answer the question; does strategic management drivers have any influence on the competitiveness of manufacturing firms in Kenya?

Research Objectives

The main aim of this study was to investigate the influence of strategic management drivers on competitiveness of large manufacturing firms with a specific objective to establish the influence of information technology on competitiveness of large manufacturing companies in Kenya.

Research Hypothesis

The study will adopt the following null hypothesis;

i. **H_{01}:** There is no significant influence of information technology on competitiveness of large manufacturing companies in Kenya

RESEARCH METHODOLOGY

Descriptive survey research design was employed in the study and the population consisted of large manufacturing firms in Nairobi, Kenya (454) which was sampled using stratified random sampling to obtain a sample of 384 respondents. Questionnaires were used as the research instruments where the data was collected through drop-and-pick method. The collected data was analysed through both qualitative and quantitative methods where quantitative data was coded and interpreted in form of mean, standard deviations and percentages and presented through frequency tables, pie-charts and bar-graphs. The qualitative data on the other hand was analysed through content analysis where the data were compared and presented based on the research objectives. Inferential statistics were carried out to determine the relationship between independent and dependent variables.

FINDINGS AND DISCUSSIONS

This part covers the research findings and discussions on the influence of strategic drivers on the competitiveness of large manufacturing companies in Nairobi County, Kenya. The section has various subsections which are systematically outlined to clearly point out what was observed in the study. The first subsection covers the descriptive analysis of the research findings which comprises of mean, standard deviation

and percentages. The tests for assumptions of the regression model, correlation analysis as well as inferential statistics are also covered in this chapter.

Descriptive Analysis of the Research Findings

The objective of the study was to establish the influence of information technology on the competitiveness of large manufacturing firms in Nairobi County, Kenya. The main indicators for the variables included work automation, real-time reporting and sales automation. These aspects stand to be critical attributes of Information Technology in a manufacturing set-up. The respondents were asked to indicate their levels of agreement or disagreement with specific statements drawn from these parameters based on a five-point Likert's scale. The findings are as shown in Table 1.

As the findings reveal, 50.8% of the respondents agreed that integrated machineries and systems had been adopted in their respective organizations to ensure automation of given tasks while 50.3% of the respondents disagreed that payment and invoicing channels in their respective manufacturing firms had been automated to save the processing and waiting time. The respondents however, agreed that through continued automation of processes in their respective organizations, there was cost saving and enhanced accuracy as evidenced by a mean of 3.52 and standard deviation of 1.12. The findings imply that the surveyed large manufacturing firms have partially embraced automation of their process despite this being a key aspect towards enhancing effectiveness, efficiency and cost-saving.

The findings further showed that majority of the respondents were of the opinion that their respective firms did not frequently train their employees on the use of ICT to enhance its integration in the operations as shown by a mean of 2.66 and a standard deviation of 1.27. The respondents however agreed that there were manuals and user-support mechanisms to ensure usability of the ICT systems in their respective organizations as shown by a mean of 3.55 and a standard deviation of 1.14. The respondents further agreed that their respective manufacturing organizations embraced several ICT platforms to enhance service delivery and product quality as shown by a mean of 3.69. The findings imply that while most of the large manufacturing firms through their management are aware of the need for ICT in their operations, their yet to effectively embrace the latter and this could have derailed their competitiveness.

The findings are in agreement with those by Venkatesh, Thong and Xu (2012) who found out that through information technology, the customers are brought closer to the organization and it becomes easier for the management to understand their needs and become innovative to ouster the competitors and gain competitiveness. The Technology Acceptance Model by Davis (1989) upholds the need for the organizations through management to ensure training and involvement of the users of ICT who in this case are the employees, as a way of enhancing their acceptance of new technology.

Table 1: Descriptive Results on Information Technology

Statement	SD (%)	D (%)	N (%)	A ()%	SA (%)	Mean	Std. Dev.
Integrated machineries and systems have been adopted to ensure automation of given tasks in our organization	13.4%	15.4%	20.3%	43.6%	7.2%	3.15	1.18
Payment and invoicing channels have been automated to save the processing and waiting time	20.0%	20.3%	26.6%	28.9%	4.3%	2.77	1.18

Through continued automation there have been cost saving and enhanced accuracy in our organization	9.2%	7.2%	22.3%	44.9%	16.4%	3.52	1.12
Employees are frequently trained on the use of ICT to enhance its integration in the organization	25.2%	21.6%	20.3%	26.6%	6.2%	2.66	1.27
ICT competencies and skills are highly recommended among the employees in our organization	12.5%	18.0%	16.7%	43.3%	9.5%	3.19	1.20
There are manuals and user-support mechanisms to ensure usability of the ICT systems in our organization	9.5%	7.9%	16.4%	49.8%	16.4%	3.55	1.14
Our organization sets aside a budget for ICT tools and training to enhance effective use of information technology	7.5%	9.5%	15.4%	56.1%	11.5%	3.54	1.06
Computers and other ICT tools are provided adequately to ensure effective use	16.1%	23.6%	30.5%	25.6%	4.3%	2.78	1.12
Our organization has embraced several ICT platforms to enhance service delivery and product quality	4.6%	7.5%	17.0%	55.1%	15.7%	3.69	.97

Competitiveness of Large Manufacturing Firms

The study sought to establish the competitiveness of large manufacturing firms in Kenya. The main parameters of competitiveness adopted in the study included number of branches, number of employees, sales volume and profit margin. The findings are as shown in Table 2 and Figure 1.

The respondents were asked to indicate the net profit, the average increase in customer flow the return on investments and the average number of distribution channels for the year 2014 to 2018. The figures were computed and ratios generated as shown herein. The findings revealed that the ratios for the net profit increased between the year 2014 and 2015 from 6.2 to 9.8 but declined in the year 2016, 2017 and 2018 to 4.9. The increase in the customer flow took a similar trend where the ratio was 7.9 in 2014, increased to 14.8 in 2015 and to 17.0 in 2016 and declined to 8.9 in the year 2017. This was the case for ROI which increased from 13.9% in 2014 to 14.7% in 2015 but declined to 9.2% in the year 2016. The findings revel that most of the large manufacturing firms were losing their competitiveness and this could indicate an alarming trend based on the role played by these firms in the country's economy.

Table 2: Descriptive Results on Firm Competitiveness

Measurement Aspect	**2014**	**2015**	**2016**	**2017**	**2018**
Average Increase in Net Profit Margin (%)	6.2	9.8	7.4	5.8	4.9
Average Increase in Customer Flow (%)	7.9	14.8	17.0	8.9	11.5
Return on Investments (%)	13.9%	14.7%	9.2%	7.0%	8.4%
Average Increase in Distribution Channels/Branches (%)	3.6	4.3	3.9	2.1	3.0

The respondents were further asked to rate the influence of competitiveness by each of the four strategic drivers. The findings as shown in Figure 1 revealed that customer focus had the highest score with 71.8%,

followed by human resources with a score of 62%, Information Technology with 52.1% and lastly corporate culture with a score of 42%.

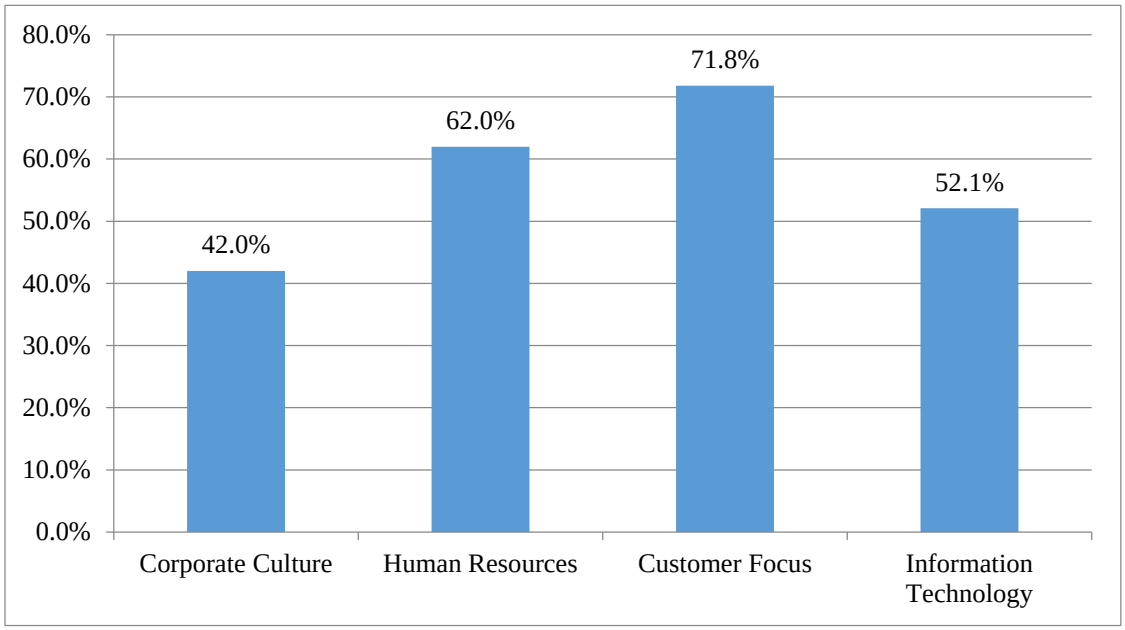

Figure 1: Rating the Influence of Strategic Drivers on Competitiveness

Factor Analysis

Factor analysis is the process of obtaining the actual coefficients of every question in a questionnaire from the obtained data to identify the level at which each of the question contributes to the overall impact of the variable. This enables the researcher to identify the items that were most useful in answering the research questions as well as identifying the items that may reduce the effectiveness of the research model. This study carried out factor analysis and the findings are as herein presented.

On the objective to determine the influence of information technology on the competitiveness of large manufacturing firms in Nairobi County, the variable had 9 items. The factor loadings for each of these items as shown in Table 3 were between 0.524 and 0.855. These fell within the threshold hence all the nine items were used in the final analysis of the study model.

Table 3: Factor Loadings for Information Technology

Factors	Loadings
Integrated machineries and systems have been adopted to ensure automation of given tasks in our organization	.724
Payment and invoicing channels have been automated to save the processing and waiting time	.524
Through continued automation there have been cost saving and enhanced accuracy in our organization	.618
Employees are frequently trained on the use of ICT to enhance its integration in the organization	.850
ICT competencies and skills are highly recommended among the employees in our organization	.800
There are manuals and user-support mechanisms to ensure usability of the ICT systems in our organization	.551

Our organization sets aside a budget for ICT tools and training to enhance effective use of information technology	.855
Computers and other ICT tools are provided adequately to ensure effective use	.744
Our organization has embraced several ICT platforms to enhance service delivery and product quality	.829

The total variance explained for the information technology was established. As the findings on Table 4 portray, 3 components explained a total variance of 70.08%. The three components were found to most represent the factors under the information technology.

Table 4: Total Variance Explained for Information Technology

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.471	49.682	49.682	4.471	49.682	49.682
2	1.060	11.774	61.456	1.060	11.774	61.456
3	.776	8.626	70.082	.776	8.626	70.082
4	.648	7.199	77.281			
5	.555	6.165	83.446			
6	.463	5.141	88.587			
7	.419	4.652	93.239			
8	.320	3.552	96.792			
9	.289	3.208	100.000			

Extraction Method: Principal Component Analysis.

The factor loadings for the components identified were sought. As the findings on Table 5 reveal, the first component had four factors with factor loadings above 0.40, the second and third components had 2 and 3 components respectively with factor loadings exceeding 0.40. These factors were computed to represent the three sub-constructs under information technology.

Table 5: Rotated Component Matrix for Information Technology

-	Component		
	1	2	3
Integrated machineries and systems have been adopted to ensure automation of given tasks in our organization	.745		
Payment and invoicing channels have been automated to save the processing and waiting time	.825		
Through continued automation there have been cost saving and enhanced accuracy in our organization	.607		
Employees are frequently trained on the use of ICT to enhance its integration in the organization.	.793		
ICT competencies and skills are highly recommended among the employees in our organization		.651	
There are manuals and user-support mechanisms to ensure usability of the ICT systems in our organization		.834	
Our organization sets aside a budget for ICT tools and training to enhance effective use of information technology			.846
Computers and other ICT tools are provided adequately to ensure effective use			.620
Our organization has embraced several ICT platforms to enhance service delivery and product quality			.531

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

Correlation between Information Technology and Firm Competitiveness

The study sought to establish the correlation between information technology and competitiveness of large manufacturing firms in Kenya. The results as shown in Table 6 revealed that the Pearson Correlation coefficient was 0.722 at a significance level of 0.000<0.05. This is an implication that there is a strong and positive correlation between information technology and competitiveness of large manufacturing companies in Kenya.

Table 6: Correlation Results on Information Technology

		Firm Competitiveness	Information Technology
Firm Competitiveness	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	305	
Information Technology	Pearson Correlation	.722**	1
	Sig. (2-tailed)	.000	
	N	305	305

Hypothesis Testing

H_{01}: *There is no significant influence of information technology on competitiveness of large manufacturing companies in Kenya*

$$Y = \beta_0 + \beta_1 X_1 + \mathcal{E}$$

Simple regression analysis was carried out to find out the statistical relationship between information technology and competitiveness of large manufacturing companies. Model summary (R^2), Analysis of Variance (ANOVA) and regression coefficients (β) were used to explain the relationship. The model summary results as shown in table 7 revealed that the R^2 for the model was 0.535. This implies that the information technology explained up to 53.5% variation of competitiveness of large manufacturing firms.

Table 7: Model Summary (Information Technology)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.731[a]	.535	.533	.51018

a. Predictors: (Constant), Information Technology

The ANOVA results on the other hand as shown in table 8 revealed that at the F-statistic of 348.435 the model was significant at a p-value of 0.000 which is less than the standard p-value of 0.05. This implies that the model can significantly explain the relationship between Information Technology and competitiveness of large manufacturing companies.

Table 8: ANOVA Results for Information Technology

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	90.690	1	90.690	348.435	.000[b]
	Residual	78.865	303	.260		
	Total	169.555	304			

a. Dependent Variable: Firm Competitiveness
b. Predictors: (Constant), Information Technology

The regression coefficients on the other hand revealed the beta coefficient for was 0.641 at a significant level of 0.000. The model now changes from $\mathbf{Y=\alpha_0+\beta_1X_1 + e}$ to $\mathbf{Y=1.284+0.641X_1 + e}$ which implies that a unit change in Information Technology can explain up to 64.1% of competitiveness of large manufacturing firms. This on the other hand means that the study rejects the null hypothesis that information technology has no significant influence on the competitiveness of large manufacturing firms.

Table 9: Regression Coefficients for Information Technology

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.284	.112		11.496	.000
	Information Technology	.641	.034	.731	18.666	.000

a. Dependent Variable: Firm Competitiveness

Summary of the Findings

The descriptive analysis results revealed that most of the respondents were of the opinion that their respective firms had incorporated automation of tasks and services in their operations and that the continued automation processes enhanced accuracy and cost-saving. Automating operations has been regarded as one of the major strategies towards enhancing the efficiency and effectiveness of operations which at the end of the day steers competitiveness. Information technology is therefore, known to be the best driver for automation of operations and services. Most of the respondents indicated that the employees in their respective organizations were not frequently and adequately trained on the use and integration of ICT in their duties whereas the organizations upheld ICT competencies and skills among the employees. This reflects what happens in most of the modern businesses where as much as the organizations uphold ICT skills and competencies among the employees, they are not ready to offer these skills through training hence limiting their ability to adopt and integrate ICT. Most of the surveyed firms had embraced several ICT platforms to steer their service delivery capability but this would remain ineffective with unqualified staff. The inferential analysis results on the other hand confirmed that indeed Information Technology had a significant and positive influence on the competitiveness of large manufacturing firms.

Conclusion of the Study

The purpose of this study was to examine the influence of strategic management drivers on the competitiveness of large manufacturing firms in Nairobi County, Kenya. The study concluded that strategic management driver (information technology) has a significant influence on the competitiveness of large manufacturing firms in Nairobi County, Kenya. Strategic management plays a critical role in the overall firm competitiveness by ensuring proper alignment of both internal and external environment aspects towards the success of the company's objectives and goals. The pillar (driver) supporting and enhancing the effectiveness of strategic management is, therefore, equally important.

The study concluded that information sharing significantly influenced the competitiveness of large manufacturing firms. In the modern World, Information Technology stands to steer the ability of the firm to embrace new ways of doing things as well as scaling-up its operational capability and efficiency. The study

concluded that while most the firm embraced information technology through automation of processes and provision of ICT infrastructure, training of the employees on the use of the technology was not effectively done which in turn affects the integration of ICT.

Recommendations

Information Technology is a major strategic driver especially in the modern business World that links the organization to the global market. It is therefore recommended that the large manufacturing firms through the management embraces information technology by adopting modern technology platforms, promoting automation and ensuring effective integration of ICT in the workforce through policing and training.

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