EFFECT OF INFORMATION AND COMMUNICATION TECHNOLOGIES ON COMPETITIVENESS OF MANUFACTURING SMALL AND MEDIUM SCALE ENTERPRISES

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Abstract

The study was seeking to establish effect of information and communication technologies on competitiveness of manufacturing (SMEs) in Thika, Kiambu County: Kenya. This was achieved through the following objectives: examining how e-inventory management affects the competitiveness of SMEs traders at Thika; determining how e-marketing affects competitiveness of SMEs traders at Thika and identifying how e-customer relationship management affects the competitiveness of SMEs traders in Thika. A survey research design was employed on sample SMEs Traders through the use of questionnaires to collect primary data. The collected data was analyzed through descriptive statistics mainly to summarize the data. This will include percentages and frequencies. Tables and other graphs were used as appropriate to present the data collected for ease of understanding. The questionnaire technique was used to obtain information from the respondents through simple random methods of administering them. Kothari (2004) observes that a questionnaire is good for research studies as they enable a researcher to collect more information which is not directly observable. The questions in the questionnaire were both structured (closed ended questions) and open ended questions for the purposes of eliciting more in-depth qualitative information and quantitative information. The selection of these tools was informed by time available and the objectives of the study. Based on the empirical evidences and results of the analysis, the researcher arrived at logical conclusions. The researcher concludes that there is a positive relationship between all the independent variables under study and competitiveness. This position was clearly shown through the inference statistics which confirmed the existence of a significance level or the P values which were less than confidence level of confidence.

Keywords: e-inventory management, e-marketing, e-Customer Relationship Management
Background of the Study

Information Communication Technology has changed strategies and manner of doing things, in commerce, trade, agriculture, and manufacturing and government services. It is to be adopted by business as a matter of responding to world dynamics. Highlighting the impact of ICT in recent years, Oladejo and Adereti (2010) observed that the 1990s witness the proliferation and hyper growth of internet and internet technologies, which together are creating a global and cost-effective platform for business to communicate and conduct commerce. Despite the enormous investment in IT during recent years, demonstrating the effect on such on organizational performance has proven an enormous subject, (Mahmood & Mann, 2000). Due to the globalization of markets and competitive developments in the demand for new technologies and innovations have rapidly made it difficult to survive and prosper (Seyyed et al 2015). Today turbulent nature of global manufacturing sector industry is faced with numerous challenges. The solution in this unstable environment is to consolidate and achieve a situation of continuous improvement through application of ICT (Seyyed, 2015).

According to world development report (1999), for leading countries in the world economy, the balance between knowledge and resources has shifted so far towards the former that knowledge has become perhaps the most important factor determining the standard of living more than land, tools, and labor. Today’s most technologically advanced economies are truly knowledge based (Akande & Oluwaseun, 2013). Computers and the internet catalyzed the growth of the knowledge economy by enabling people to put knowledge into a digital form easily transmitted to anywhere around the world. IT has speed up the pace of globalization and increase the complexity of business practices because firms not only need to be familiar with their local context but also with global developments, (Olusola et. al, 2013. Thus, to compete in the knowledge economy, Manufacturing SME’s need a strong IT skills base that can innovate and adapt quickly to change.

ICT usage in business activities can be effective and efficiently and ensure business success as ICT is usually more accurate and fast than manually routines. ICT has the potential to support many business activities within a firm and could influence its performance; performance such as productivity, profitability, market value, and market share (Laudon and Laudon, 2016). ICT also affects intermediate performance measures such as process efficiency, service quality, cost savings, customer satisfactions, as well as organizational and process flexibility (Alberto and Fernando, 2016). Businesses adopting and using ICT can obtain benefits as it allows quick access and more accuracy to vital information in a competitive environment (Laudon and Laudon, 2016). There are many examples of benefits from ICT usage for SMEs in their daily business activities. Increased annual profit, more effective employees, improved accuracy, and quick customer satisfaction is some of the benefits SMEs can gain by adopting and using ICT. The ICT usage could be computer (web sites, email, database), and communication (telephone and internet) usage. Firms using ICT needs to have personnel that can use the ICT in order for
the firm to reap these benefits. If the SMEs manages to reap these benefits depends on their ability to recruit ICT skillful graduates (Vanita et al., 2016).

**Statement of the problem**

An inventory management program considers such things as purchasing goods commensurate with demand, seasonal variation, changing usage patterns, and monitoring for pilferage. Electronic marketing and marketing information remains a severe constraint to Manufacturing SMEs development and competitiveness in Kenya. To this view (Kiveu & Ofafa, 2015) further states that overall aggregate demand is low; markets are saturated due to dumping and overproduction, and in most cases markets do not function well due to lack market information and high transaction costs. This confines majority of Manufacturing SMEs to narrow local markets characterized by intense competition.

Although Kenya is the most industrially developed country in East Africa, GOK, (2011). Manufacturing still accounts for only 14 per cent of gross domestic product (GDP). This represents only a slight increase since independence. Expansion of manufacturing after independence, initially rapid, has stagnated since the 1980s because of scanty leverage on ICT and dumping of cheap imports (GOK, 2011). A recent study by the Bowen et al. (2009) shows SMI’s in Kenya suffer from constraints that lower their resilience to risk and over 50% of SME’S continue to have a deteriorating performance with every 3 in 5 SME’S introduced failing within few months of establishment and only a fraction develops to the core group of high performance firms.

This study was informed by the understanding that Kenyan people are faced with myriads of challenges with earning income due to high unemployment levels and thereby resorting to starting SME’S as a means of harnessing their livelihood. Therefore, given the importance of Manufacturing SME’S to the Kenyan people and the evidence that they are often exposed to risk of failures, there is need to conduct empirical enquiry on how ICT would foster their survival and growth overall.

**Objectives of the Study**

The main aim of the study is to establish the effect of information and communication technologies on competitiveness of manufacturing small and medium scale enterprises. The specific objectives were to:

1) Determine the effect of electronic inventory management on competitiveness of manufacturing SME’s in Thika

2) Examine the effect of electronic marketing on competitiveness of manufacturing SME’s in Thika

3) Establish the effect of electronic customer relationship management on competitiveness of manufacturing SME’s in Thika
Research Methodology

This research survey used both qualitative and quantitative methods to investigate and collect required data for analysis. The research problem was studied using a descriptive research design. Descriptive research design in which quantitative data was collected and analyzed so that to describe the specific phenomenon in its current events, current trends, and linkages between different factors at current time. The research targeted manufacturing SMEs operating in Thika, Kiambu County, Kenya. There are about 67 registered SMEs in Thika according to County Government of Kiambu. The sample size was computed using 30% of the target population which gave us a sample size of 20 respondents. The questionnaire technique was used to obtain information from the respondents through simple random methods of administering them. The questions in the questionnaire were both structured (closed ended questions) and open ended questions for the purposes of eliciting more in-depth qualitative information and quantitative information. The selection of these tools was informed by time available and the objectives of the study.

This statistical process for estimating the relationships among variables focused on the relationship between dependent variable i.e. competitiveness and independent variables or predictors. A written explanation was also provided to interpret data, draw conclusions, and make recommendations.

Research Findings and Discussion

ICT Strategies and Competitiveness

The respondents were classified on contribution of ICT on business competitiveness in the industry. The table below shows the frequencies and the respective percentages.

Table 1: ICT Strategies and Competitiveness

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Competitive</td>
<td>15</td>
</tr>
<tr>
<td>Moderate competitive</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
</tr>
</tbody>
</table>

From this study, 15 out of the 18 respondents reported that they were highly competitive while 3 respondents reported that they had moderate competitiveness through application of ICT. This implies that 83.3% of the respondents had high competitive only 16.7% of these respondents had moderate competitive. This agrees with (Furrer 2008) that the pursuit of competitiveness is arguably the central theme of all businesses, further according to (Powell 2015; the superior performance of a firm arises from sustainable completeness through adopting new technologies is of strategic importance in initiating the movement toward higher quality and completeness. |
Every SME have a desire of being competitive so that they can acquire a high level of market share compared to other competitors. Hence the management and the owners of an organization should work very hard to ensure that they are competitive. Moreover, Hazbo (2008) argues that ICT has become a major catalyst and enabler of organizational change that enable a firm to successfully formulate and implements a value-creating strategy. In this respect, Ashrafi and Murtaza (2010) assert that ICT enhance manufacturing SMEs competitiveness by helping them to enter new markets, supply new products and services increase their added value, change business processes increase performance and productivity of the SME’s, employ new business channels and provide a rapid response to competitors’ activities. Also, Gathogo, (2014) strongly advocate that they need access to appropriate technology if they are to have be competitive otherwise their inability to secure technology especially at start-up level impact negatively on the entrepreneurship development process in today’s world of globalization.

E-Inventory Strategy Management and Competitiveness

The respondents were required to give information on e-inventory management on competitiveness and whether they had adopted E-inventory management in their business. The table below shows the responses to this regard.

The researcher tried to relate E-inventory management and the competitiveness of the SMEs. This was summarized in the table below.

**Table 2: E-Inventory Strategy and Competitiveness**

<table>
<thead>
<tr>
<th>Contribution of E-inventory management</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High competitiveness</td>
<td>15</td>
</tr>
<tr>
<td>Moderate Competitiveness</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 2 above indicates that respondents who had high competitiveness based on the application if electronic inventory management were 15, translating to 83.3% while only 3 that is 16.7% of these respondents reported to have moderate competitiveness. As Graman and Magazine (2013) argue that companies must now provide good service by tapping to e-inventory management while maintaining minimal inventories in order to be competitive and avoid stock loses due to the cost of holding inventory, extensive product proliferation and the risk of obsolescence, especially in rapidly changing markets. Further Imeokparia (2013). argues that for an organisation to adopt the right e-inventory management strategy, this e-inventory management strategy is necessary in order to gain more customers through customer satisfaction, and in order for the third-party logistics provider organisation to operate effectively through the preferable strategy.
E-Marketing Strategy and Competitiveness

The researcher tried to evaluate contribution of e-marketing and competitiveness to competitiveness and whether the respondents were applying E-marketing in their businesses. The table below summarizes the responses given.

### Table 3: E-Marketing Strategy and Competitiveness

<table>
<thead>
<tr>
<th>Contribution of E-marketing</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Competitiveness</td>
<td>17</td>
</tr>
<tr>
<td>Moderate</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 3 above indicates that most of the respondents that is 17 (94.4%) reported to have high competitiveness which was courtesy to application of E-marketing while only 1 (5.6%) respondent who had moderate competitiveness through the use of E-marketing. As Kiveu (2013) proposed that E-marketing is important success function for Manufacturing SME’s that is facilitated by market access. Information plays a key role in market access and is the main core of any e-marketing system. Further to this view (Kiveu & Ofafa, 2013); E-marketing strategy spells a breakthrough to unlimited access to market. Strategies that enhance market access greatly impacts on the Competitiveness of small enterprises. He further said Potential benefits of ICT to Manufacturing SME’s include enhancing efficiency, reducing costs, and broadening the market both locally and globally. (Kiveu, 2013) continue to say: empowering Manufacturing SME’s to participate in the knowledge based economy by facilitating connectivity promote their competitiveness in the industry.

E-Customer Relationship Management Strategy and Competitiveness

The respondents were required to give information on e-customer relationship management and competitiveness. The table below shows the responses to this regard.

The researcher tried to find the relationship between the E-customer relationship management and competitiveness and produced the following results.

### Table 4: E-Customer Relationship Management Strategy and Competitiveness

<table>
<thead>
<tr>
<th>Contribution of E-CRM</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Competitiveness</td>
<td>16</td>
</tr>
<tr>
<td>Moderate Competitiveness</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 4 above shows that the application of E-CRM contribute to 88.9% of high level of competitiveness while only 11.1% are seen to have moderate competitiveness and they apply the E-CRM. This is true as supported by Fotouhi (2015); that 5% increase in preserving the
customer will lead to 95% increase in the value for organization. This means that instead of distinguishing products, organizations should identify their customers and shift toward emphasis on the increasing the share of customer. Thus, customer is one of the important resources for the development of enterprise: For the enterprises, efficient organization and planning of their own resources can help them to achieve competitiveness and long-term development goals.

**Mean and Standard Deviation**

The researcher obtained a low standard deviation which indicates that the data points tend to be close to the mean also called the expected value of the set, while a high standard deviation indicates that the data points are spread out over a wider range of values. The table below is the result of this study.

**Table 5: Mean and Standard Deviation**

**Descriptive Statistics**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Inventory mgnt</td>
<td>18</td>
<td>1</td>
<td>5</td>
<td>4.58</td>
<td>1.056</td>
</tr>
<tr>
<td>E-marketing</td>
<td>18</td>
<td>1</td>
<td>5</td>
<td>4.94</td>
<td>1.349</td>
</tr>
<tr>
<td>E-Cust mgnt</td>
<td>18</td>
<td>1</td>
<td>5</td>
<td>5.00</td>
<td>1.351</td>
</tr>
<tr>
<td>Comp indicator</td>
<td>18</td>
<td>1</td>
<td>5</td>
<td>4.79</td>
<td>0.901</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard deviation tries to show how well the data is represented by the mean. Since there is no much variations from the reported mean, it means that the data is well represented by the mean. From the table above competitiveness has the least deviation from the mean.

**Correlation**

Correlation is used to show the relationship between two variables. Unlike experimental studies, however, correlational studies can only show that two variables are related—they cannot determine causation which variable causes a change in the other. The researcher tested the correlation between the dependent and the independent variable. The correlation results are shown in the table below.

**Table 6: Correlation**

<table>
<thead>
<tr>
<th></th>
<th>E-INV</th>
<th>E-M</th>
<th>E-CRM</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-INV</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>.173</td>
<td>.045</td>
</tr>
<tr>
<td>E-MTK</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>.338</td>
<td>.310</td>
</tr>
<tr>
<td>E-CRM</td>
<td>Pearson Correlation</td>
<td>1</td>
<td></td>
<td>.448</td>
</tr>
<tr>
<td>Competitiveness</td>
<td>Pearson Correlation</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Correlation indicates the level of association between the variables under consideration. The results show that there is a positive correlation between the dependent variable and all the independent variables. The highest correlation was observed between e-inventory management and competitiveness with a relationship of 0.532. This was closely followed by e-customer relationship with a relationship of 0.448. The lowest e-marketing was which had a positive but mild correlation with competitiveness with a relationship of 0.310. However, it is noted that all variables had a positive correlation with competitiveness; when any of the variables increased, they increased competitiveness.

**Inferential Statistics**

This section explains the linear regression model results that was obtained from the SPSS model. The linear regression model is of the form;

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon \]

Where \( Y \) is the dependent variable

\( \beta_0 \) is the constant

\( \beta_0, \beta_2, \beta_3 \) is the slope of each independent variable

\( X_1 \) is the electronic inventory management

\( X_2 \) is the electronic marketing

\( X_3 \) is the electronic customer relationship management tools

The model is presented in the table below;

**Table 8: Linear Regression Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>.947</td>
<td>.436</td>
</tr>
<tr>
<td></td>
<td>E-IM</td>
<td>.372</td>
<td>.436</td>
</tr>
<tr>
<td></td>
<td>E-M</td>
<td>.271</td>
<td>.405</td>
</tr>
<tr>
<td></td>
<td>E-CRMT</td>
<td>.377</td>
<td>.565</td>
</tr>
</tbody>
</table>

\( R^2 \) 0.517

The table 8 above gives the statistical results of the study. At 95% confidence or 5% significant level, the study indicated that all the variables under consideration are significant to the study since they have a significant level of less than 0.05. The study results also show a positive relationship between the dependent variable and the independent variables.
From the model table, that is table 8 above the linear regression equation can be expressed as follows:

\[ Y = 0.947 + 0.372X_1 + 0.271X_2 + 0.377X_3 + e \]

**Analysis of B-Coefficient & significance level**

From the B-Coefficient we observe that E-customer relationship management had the largest contribution to the effect of competitiveness \((\beta \ 0.377)\) implying is more significant and at the lowest significant level of 0.007. E follows this- inventory management with a beta coefficient of \((\beta \ 0.372)\) at a significant level of 0.024. The last one is E-marketing with a \((\beta \ -0.271)\) with also the least significance level of 0.044 being the last of the three as we compare significance. This implies that when one has limited resources to invest in any of the three independent variables, he will concentrate most of the resources on E-customer relationship management which has the largest contribution on SME’s competitiveness, followed by E-inventory management and eventually on E-marketing. This model is translated to mean that if \(X_1, X_2, \text{and} \ X_3\) are zero, \(Y\) the dependent variable will be 0.947. This model shows that a unit increase in E-inventory will contribute positively towards SME’s competitiveness by 0.372. Likewise, a unit increase in E-marketing will contribute to increased competitiveness by 0.271 and a unit increase in E-customer relationship management will contribute to increased competitiveness by 0.377. The study showed an R square of 0.517 implying that the 51.7% of the variations in the dependent variable can be explained by the independent variables thus 48.3% of the variations in the dependent variable are explained by other factors other than those considered in this study.

**Conclusion and Recommendations**

**Conclusion**

The overall objective of the study was to investigate the effect of information and communication technologies on competitiveness of manufacturing small and medium scale enterprises. Several questions were given to the clients through questionnaires to assist derive facts and information on the variables. Based on the empirical evidences and results of the analysis, the researcher arrived at logical conclusions. The researcher concludes that there is a positive relationship between all the independent variables under study on competitiveness. This position was clearly shown through the inference statistics which confirmed the existence of a significance level or the p values which were less than confidence level of confidence.

**Recommendations**

Based on the investigations conducted and the findings of this study, the following recommendations are put forward by the researcher, for the effective application of information and communication technologies to improve on competitiveness. Based on the significant and positive relationship between electronic inventory management and competitiveness, I recommend that organizations should put more emphasis on installation of software’s that assists
them to trace the movement of inventories which in turn will assist in cost reduction due to minimization of stock out. This will also enhance effective customer satisfaction and quick customer service. From the studies, there was a significant and positive relationship between electronic marketing and competitiveness. From these findings, I would recommend that organizations should invest on electronic marketing to enable them to be competitive in the growing economy. From the significant and positive relationship between electronic customer relationship management tools and competitiveness I recommend that organizations should have an emphasis on the use of the different tools that would build up the customer relationship and hence competitiveness.

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