EFFECT OF TECHNOLOGY ON PERFORMANCE OF MOBILE TELEPHONE INDUSTRY IN KENYA

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ABSTRACT

The purpose of this study was to investigate the effects of technology on performance. The study employed descriptive and explanatory design. The target population consisted of 381 respondents and the sample size was 170 respondents from the four mobile phone companies in Kenya. The research adopted stratified random sampling technique. The study used mainly primary data which was collected using self-administered questionnaires. Reliability of the instrument was tested using cronbach's alpha reliability coefficient of 0.7 which was considered acceptable, hence the instrument was reliable. Data was analyzed using inferential statistics. An inferential statistics simple linear regression was used to test the hypothesis. The analysis used stata statistical package version 11.0 to aid data analysis. The results were presented using tables. Technology was found to be significant in explaining the variation of performance of mobile phone companies. The study concluded that there is need for the companies to invest more in modern technology to cope with the changes that are necessary to enhance performance. Finally, the study recommended that further research be done by replicating the same study in other companies or industries like banks.

Key words: Technology, Resource Based View, Performance and Mobile Phone companies.

1.0 INTRODUCTION

1.1 Background of the study

Rouse and Daellebach (2009) argued that for a firm to advance its performance, it must comprehend and ascertain its main resources that will improve its competitiveness and sustainability. The study established that a firm's skills, strategic positioning and intangible technological resources results to superior performance and that they aid the firm in formulating and implementing strategies that can improve effectiveness and efficiency of the firm. Barney and Hesterly (2010) advanced that intangible technology resources are more sustainable than tangible resources which can be acquired and duplicated by competitors. In addition, Kenneth, Anderson and Eddy (2010) pointed out that a firm has an advanced performance when it has the capability of maintaining VRIN resources for a number of years.

According to Barney (2011), a firm's performance superiority is not from one source but from a package of resources both tangible and intangible. Tangible resources such as physical building and land would only result to a temporal competitive advantage which is inadequate in the long run since the competitors are in a position to obtain crucial resources through substitutes, hence eliminating above average profitability of a firm. Technology as an Intangible resource is able to produce superior performance since they are valuable, rare, inimitable and non-substitutable (Gamero, Patricinio, Enrique & Jose, 2011; Costa, Cool & Dierick, 2013).

Baker and Sinkula (2009) indicated that for a long time, technology has been identified as the key for commencing novel activities through risk-taking and firm proactively which results in a firm's higher performance than competitors. Firms that focus on technological advancement through innovation research and development generate above average performance (Paladino, 2009; Merlo and Auh, 2009 and Tajeddini, 2010). Firms that employ technology are known for superior performance because they believe in acquisition of new technologies for product innovation, research and development which enables the firm to produce unique products which are hard to copy (Altindag, Zehir and Acar, 2010). Basile (2012) noted that technology deserves consideration since it pursues opportunities and renewal of new market from the areas of operation that are existing to match with the changing needs of the customers in the market.

In the last six years (2008 to 2013), there was a noticeable sharp increase in mobile phones networks in developing countries, especially in Kenya where most people own mobile phones. This was caused mainly by the drop in the price of mobile handsets making them within the reach of low incomes people. Another contributing factor was the drop in mobile phone tariffs as a result of stiff competition between the four mobile phone service providers as well as the low cost of prepaid calling cards (Muturi, 2010). The industry has four network providers: Safaricom, Airtel, Yu and Orange.

There is stiff competition in the mobile phone industry, which calls for each provider to look for a strategy that will contribute to the firm performing better than its competitors (Akar and Mbiti, 2010). In the last six years, Safaricom remained the market leader with other network providers trying to outperform it by formulating all sorts of strategies like offering free calls and messages across the networks, offering cheaper services in mobile money transfer and other forms of advertisement but without much success (Ofwona, 2009 and Odhiambo, 2011).

1.2 Statement of the Problem

In industry characterized by competition and alternative service providers, consumers have freedom to choose from among the available alternative service providers. In such a case, the market leadership should shift from one service provider to another but in the case of mobile phone companies, the market leadership is constant for the last six years (2008 to 2013) (Akar and Mbiti, 2010). Empirical studies indicate that performance of the mobile phone companies have been dominated by one play for the six years.

Despite strategies and efforts made by other players in the mobile phone companies such as lower tariff, lower money transfer charges, attractive offers like free calls and free short messages services, these efforts did not translate into competitive advantage and there was constant market leadership dominance by the same company (Ofwona, 2009 and Odhiambo, 2011). In this case, homogeneity in performance for the companies operating in similar competitive conditions and industrial environment is not explained. This begs the question of what technology does the market leader applies to sustain the high performance that other companies are not able to apply?

2.0 LITERATURE REVIEW

2.1 Theoretical Literature

2.1.1 Resource Based View

How a firm controls its key resources will determine its performance (Wernerfelt, 1984). The focus of the RBV is on attributes of resources and capability from the source they are gained to clarify a firm's heterogeneity, performance and sustainability. Further, resources are substances of approach in that gaining dominance in an aggressive marketplace is dependent on firm capability to recognize, build up, position and safe guard meticulously resources that differentiate it from its competitors (Morheney and Pandian, 1992).

Barney, Wright and Ketchen (2001) noted that every firm owns a diverse outline of tangible and intangible resources. Barney is one of the late contributors of RBV who studied and established the existence of key firm resources for superior performance. The theory of RBV assumes that individuals are inspired to make maximum use of economic resources available and rational choices that a firm makes which are shaped by economic framework (Barney, 2007). Resource Based View theory in this study played a role of evaluating and explaining resources and capability of a firm that have the capability to create and maintain a firm's advantage and thus higher performance among the mobile phone industries in Kenya (Sheehan & Toss, 2007).

Complex packages of skills, obtained knowledge, ability and experience that facilitate the company to manage activities of the firm and make use of resources to create performance through coordinating and putting resources into proper production use is what defines capability (Amit and Shoemaker 1993; Barney, 2007 and Mckelvie and Davidsson, 2009). According to Lockett, Thompsons and Morgensrern (2009) on strategic management, RBV scrutinizes the resources and abilities that facilitate how the firm will produce above the ordinary rates of return and higher performance benefits.

The theory of RBV contributes in enabling the firm managers to check whether factors relevant to superior performance exist or not. This enables them to be in a position of exploiting market imperfection to advance their performance. That way, managers are put in a place where they can combine resources to sustain their performance advantage. Resource Based View theory provides the benefit to the firm specifically highlighting factors that create superior performance for a firm (Locket, Thompson and Morgenstern, 2009). Resource Based View allows executives of the organization to choose the most important strategic factors to invest in from a given range of probable strategic factors in the mobile telephone industry.

Barney and Hesterly (2010) advanced that resources in general include the following key constructs: resources, capabilities and competences. In strategic management literature, resources are defined as stocks of accessible things that are possessed by the firm. Competencies are the firm's strengths that enable it to better differentiate its products or service quality by building technological system to respond to customers' needs, hence allowing the firm to compete more efficiently and successfully than other firms (Defillippi, 1990; Arend and Levesque, 2010 and Anderson, 2011). Resource Based View has contributed in strategic management through its emphasis on firm-specific resources as bona fide source of CA and high performance (Mckelvie & Davidsson, 2009).

For a firm to have CA and superior performance, resources and capabilities have to qualify as exceedingly valuable, rare, inimitable, and non-substitutable. Resources that are valuable add to advancing the firm's performance. Rareness creates ideal competition in view of the fact that resources in that category are possessed by fewer firms. Inimitable resources are costly to duplicate and non-substitutable, meaning that there is no alternative to accomplishing an equal function instantly available to competitors (Barney 2007, Barney and Hesterly, 2010). Tangible resources are physical substances that an organization possesses such as facilities, raw materials and equipment. Intangible resources include corporate brand name, organizational values, networks and processes that are not included in normal managerial-accounting information. Intangible resources are more likely to generate competitive advantage and superior performance as compared to tangible resources (Rouse & Daellenbach, 2009 & Kenneth *at el.*, 2011).

2.2 Empirical Literature Review

2.2.1 Technology Competencies and performance

The disparity between technological progression and consumer demand means that technology does not have an impact on superior performance of a firm (Paladino, 2009). An investigation of performance in technology-based firms in Kenya by Kinot (2009) indicated that investment in research and development directly contributed to higher performance of a firm. However, Kinot (2009) only analyzed a direct relationship between technology and performance without taking into account any mediation, which is a gap that the current study attempted to fill by mediating the relationship with competitive advantage while maintaining technology as an independent variable.

Mu, Peny and Maclachian (2009) emphasized the spirit of creating novel business out of continuing practices for valuability of a product and reinvigorating sluggish companies which often accomplish their objectives through the introduction of breakthrough innovation to make it hard for competitors to copy, making a firm's performance greater than the contenders'. The

study used both descriptive statistics and regression analysis, which were adopted by the current study. An entrepreneur's ability to take risk has a stronger effect on decision-making in the firm and on performance. The pointer to risk-taking is the willingness to advance in hesitant returns and levels of research and development which give a firm an opportunity to discover complex product production processes, resulting to firm performance enhancement (Merlo and Auh, 2009). The findings of the study indicated that the environment is part of the orientation. Nonetheless, the study of Merlo and Auh (2009) adopted orientations as the dependent variable, which was moderated by environment factors, whereas the current study adopted the environment to moderate organizational resources in influencing performance.

According to Rhee *et al.,* (2010), to invest in research and development calls for evaluation of advantage and cost before making the decision whether to adopt or invest in technology. In a survey study by Rhee *et al., (*2010), technology is linked to greater firm innovativeness. This has to do with focusing the company's effort on developing and utilizing resource to produce unique products for sustainability of competitiveness and performance. The conclusion of the study was that there is a strong positive relationship between technology and performance in SMEs in Korea. However, the study used correlation analysis, which was considered weak for the current research.

From the WEB (2010) report, a firm will have a better competitive edge when it is in a position to convert the knowledge created into innovative production over the others who are not able to do the same. Lum (2011) upholds those values, such as being exceedingly proactive towards market opportunities, being tolerant of risk and open to innovation, will result to a firm's advantage in performance. A quantitative survey by Benedetto and Mu (2011) pointed out that innovation brings out new products, services and processes which are as a result of new ideas, experimentation and creativity. Anal *et al.,* (2011), concluded that innovativeness and performance have a positive relationship, due to the existence of uniqueness and inimitability of the products. The study of Anal *et al.,* (2011) analyzed a direct relationship between innovation and performance without either a mediator or a moderator; therefore, the current study mediates and moderates the relationship.

An interactive research by Hakala (2011) maintained that for a firm to have a better performance than its opponents, then it must make use of complicated technologies which cannot be duplicated by competitors for product development, use swiftness of combination of original technologies, and proactively expand new technologies in creating novel, valuable and distinctive product ideas. In addition, the firm's technical skills, research and development resources and technological stand appear to be critical in passing originality and better deliberated products into the market, hence the firm's superior performance (Hakala, 2011). Although the findings of the studies showed a strong and positive relationship between performance and technology, the studies used survey design only, which is not adequate for the current study, hence the current study used of descriptive and explanatory design as well. The study concluded that technology-oriented firms emerge to have the capability and will to obtain advanced technological setting, and such firms hold the idea that innovation is a strategy for superior performance. Nevertheless, the study employed structural equation method for data analysis, which was not appropriate for the current study.

A study by Spanjol *et al.*, (2011) states that for technology oriented firms to achieve superior performance, then they should apply technical ability to produce new products in the market to cope with competition, flexible products so as to change with changing needs of customers and be able to maintain them, and originality in developing original products, services and processes which are unique and difficult to imitate. Anal, Dionysis and Carmen (2011) found out that customers choose technologically superior products and services and that customers stick to a firm that has the capability to react to their choices in a successful way.

Technological competence is viewed as the principal means of a firm to create product differentiation which will end up being unique to a specific firm and promote product designs that are not beyond those of competitors. Firms which use technological -oriented strategy are in support of a strong research and development department, acquisition of new technologies and application of the most recent technologies which enhance superior turnovers and be difficult to be copied by competitors (Slater *et al.*, 2012). Cristima (2012) noted that for a firm that invest in technology to maintain its superior performance, it should focus on engaging in the search for new market opportunities and rebuilding of existing areas of operations to keep on producing unique products. The two studies used Organization Learning theory and Knowledge Management theory which were considered useful in the current study, hence the decision to adopt organization learning and RBV theories.

3.0 RESEARCH METHOLOGY

3.1 Research Design

The study adopted both descriptive and explanatory research design. According to Eriksson and Kovalainen (2008), descriptive research involves producing data that is holistic, contextual and with rich details to test hypotheses or answer questions concerning the current status of the subject of the study. Explanatory research attempts to clarify why and how there is a relationship between two or more aspects of a situation or phenomenon. The explanatory research design was the best to explain the characteristics of the variables and, at the same time, examine the cause-effect relationship between variables. Cross-sectional design allowed collection of quantitative data from a population in an economical way (Saunders, Lewis & Thornhill, 2009).

3.2 Empirical Model

The study adopted regression model. Linear regression was used to access the combined effects of independent variables technology on the dependent variable performance. The model was presented in a linear equation form. Using linear regression analysis, it was possible to calculate the values of the constant coefficient (β_0) and the slope coefficients (β) from data already collected.

The overall equation of the effect of independent variables on performance:

$$Y = \beta_0 + \beta_1 TC + \varepsilon \quad \text{..... 3.1}$$

Where,

β_0 = Constant

β_1 to β_2 = The slope

TC = Technology Competencies

3.3 Target Population
The accessible population was mobile phone companies in Nairobi County where the headquarters are located, with a total population of 381 managers which included top, middle and lower level managers.

3.4 Sampling design and procedure
The study used proportionate stratified random sampling technique to select the required sample from the target population of 381 managers, drawn from the three strata of top-, middle and lower-level managers of the mobile phone companies in Kenya. Based on the total population of 381 managers, a sample of 170 was determined using Saunders *et al.*, (2009) sample size determination table at 95% confidence level.

3.5 Data Collection Instruments
The study used mainly primary data, which were collected using a self-administered structured questionnaire. This study also made use of secondary data obtained through document review of company's reports. Structured questionnaires were used in this study since they enabled the researcher to collect quantitative data (Gall and Borg, 2003).

3.6 Data Analysis Methods
Quantitative data was analyzed using descriptive and inferential statistics. Descriptive statistics was used to describe and summarize the data. Descriptive statistics of mean and standard deviation was necessary to access data characteristics and thus make it possible to interpret the information. Inferential statistic was carried out using linear regression models. Linear regression was conducted to determine which variables influenced the dependent variable most and determine the nature of influence. The adjusted coefficient of determination (R-squared) was used to indicate the percentage of variability of the variables that was accounted for by the factor**s** under study**.** This was followed by determination of standardization beta (β) coefficient which indicated the direction (+ or -) and the magnitude of the influence as well as compare the relative contribution of independent variable in the firm's performance (Hair *et al.*, 2006).

4.0 RESEARCH FINDINGS AND DISCUSSION
4.1 Response Rate
A total of 170 questionnaires were administered to 57, 49, 38 and 26 managers in Safaricom, Airtel Orange and Yu respectively, Out of 170 questionnaires that were distributed, 143 were correctly filled and returned. This represented 84 percent. According to Mugenda and Mugenda (2003) and Saunders, *et al.,* (2007), a response rate of 50 percent is adequate, 60 percent is good, and 70 percent is very good. Therefore, the response rate of 84 percent is very good and hence acceptable for drawing conclusions on the current study.

4.2 Descriptive Analysis
4.2.1Technology
The responses were on the level of agreement or disagreement on statements based on technology. The results are given in Table 4.4.

Table 4.1 Technology and performance

Description	Response rate in scale of 1-5					Mean	Std. Deviation
Technology	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree		
We always ask our customers IT for feedback or evaluation of our services	0	15.8	3.3	45.4	35.5	4.007	1.013
Most of our new and innovated products are as a result of customer analysis	0	0	15.1	61.2	23.7	4.086	.619
Our customers innovation opinion matter	0	0	19.1	73.7	7.2	3.882	.501
We innovate a product when we are very sure that it will not fail	0	0	44.1	34.2	21.7	3.776	.782
Our methods of offering services do change easily due to technology changes	0	0	16.4	62.5	21.1	4.046	.613
We continuously generate new ideas			15.8	64.5	19.7	4.039	.597
We are always sensitive to our competitors research and development action	0	0	34.9	49.3	15.8	3.809	.688
We always involve our research and development department in most of our activities	0	0	15.1	82.9	2.0	3.868	.393
Our organization supports and invest in innovation	2.0	10.5	21.1	50.0	16.4	3.684	.938
We always keep our ICT department up to date	7.9	4.6	2.6	74.3	10.5	3.750	.985
We use most recent technology	0	0	28.3	48.0	23.7	3.954	.722
Aggregate						3.758	.726

Source: (Survey data, 2014)

The aggregate score in Table 4.4 shows that the M = 3.758; SD = 0.726. This is an indication that the respondents agree that technology influenced performance. The result is supported by the low standard deviation, showing that only a few employees vary in their opinions. However, a mean of 3.776 agree that a product is innovated when the company is very sure that it will not fail. In addition, the extent to which respondents were neutral that organizational support and investing in innovation, is with a mean of 3.684, while there was a mean of 4.086 when it came to those who agree that new and innovated products are as a result of customer analysis. A mean of 4.046 agree that methods of offering services do change easily in response to changes in technology.

4.3 Inferential results

Table 4.2: Influence of technology on performance

Goodness of fit	**Test Statistic**	**P-value**	
Adjusted R-squared	0.594		
F-statistic (2, 141)	62.35	0.000***	
Dependent Variable= Performance	**Linear Regression Results**		
	Coefficients	**t-statistic**	**P-value**
Technology	1.502	7.34	0.000***
Dummy: Airtel	-3.287	-5.73	0.000***
Orange	-1.1604	-1.60	0.089
Yu	-10.948	-14.64	0.000***
Constant	-18.935	-1.70	0.068
Key ** significant at 5 percent			
*** significant at 1 percent			

Source: *(Survey data, 2014)*

Table 4.10 shows that the adjusted R-squared is 59.4%, meaning that the independent variables jointly explain approximately 59.4 percent of variations in the dependent variable, while the rest are explained by other variables not included in the model. Therefore, the model can reliably be used to test the influence of technology on performance. The F statistic is 62.35, with a P-value of 0.000, which implies that the independent variables are jointly significant in explaining variations in mobile firms' performance. Technology competencies coefficient is positive and significant at 1.502 and P value = 0.000 < 0.05. The regression results indicated that increase of technological resource by one unit would increase performance by 1.502 units.

The results show that individual company differences and practices is a significant explanatory variable of performance, meaning Safaricom cannot ignore the presence of Airtel, YU and other companies in the market. In terms of performance, Airtel and Yu are significantly lower when compared with Safaricom; however, the coefficient comparison between Safaricom and Orange mobile company was inconclusive, as the coefficient was insignificant at 5 percent level. Other results are discussed thematically, based on the objectives.

4.4: There is no relationship between the firm's technology competencies and the firm's performance of mobile telephone companies in Kenya.

The objective sought to establish whether a firm's technological competencies affect its performance so far as the mobile telephone companies in Kenya are concerned. A null hypothesis was formulated with an assumption that there is no relationship between technological competencies and the firm's performance of mobile companies in Kenya. Table 4.10 shows that the coefficient of technological competencies was 1.502, with the t-statistic and corresponding p-value of 7.34 and 0.000 respectively. Thus, the study rejected the null hypothesis at 1% level of significance. Therefore, for the Kenyan mobile telephone industry, technology competencies have a significant effect on performance.

The findings are in line with Kinot's (2009) findings which indicated that investment in technology, specifically research and innovation and development, directly contributed to higher performance of a firm as also cited by Slater *et al.*, (2012). Benedetto and Mu's (2011) findings agree with the current findings that technology through innovation brings out new products which contribute to high performance. Furthermore, the findings of Anal *et al.*, (2011) support the current study's findings in concluding that technology and performance have a positive and significant relationship.

5.0: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The performance of the mobile phone companies in Kenya seems to have been stagnated for a period of time despite the availability of better and modern organizational resources. Previous studied done on performance globally and in Kenya did not focus on the mobile phone companies. The current study sought to determine the extent to which organizational resources affect performance of the mobile phone industry in Kenya and analyze the strengths of the factors of organizational resources on performance.

This was achieved by the use of explanatory and descriptive survey design which was cross-sectional by design. Primary and secondary data was collected using structured questionnaire. The data collected was analyzed using descriptive and inferential statistics. The descriptive analysis was used to describe and summarize the data. Simple regression was used to assess the effect of technology on organizations' performance.

The objective aimed at establishing how technological competencies affected the firm's performance of the mobile phone companies in Kenya. The null hypothesis was rejected, based on the fact that technological competencies had significant effect on performance of the mobile phone companies in Kenya. This would have resulted from technical ability to produce new products. As far as technology was concerned, research and development were found to be the main elements of new technology. Innovation was also found to be a key requirement as it led to new ideas, products and services, and it enabled complex production processes. The findings showed that if a company kept on changing the method they used in giving services, performance would improve, hence the reason why the recent technology had strongly influenced performance.

5.2 Conclusions

The study found out that technology was statistically significant in affecting the firm's performance; therefore, the research concludes that technology is an important resource in influencing companies' performance. Mobile phone companies should therefore keep updating their technological systems so as to cope with the changing customer needs for better performance.

5.3 Contributions of the Study to Knowledge

The study focused on the area of technology and performance, particularly in mobile phone companies in Kenya. This would be beneficial to the management in understanding key technological element that influences performance. The thesis variable may be of help to

researchers and practitioners in evaluating the most influential technological element to performance. It is important to note that previous studies on performance and organizational technology have been done in other countries, but this study is done on Kenya mobile phone companies.

The thesis enhances theoretical understanding of organizational technological influence on performance in Kenya mobile phone companies. Other studies look at performance in terms of market share or profit separately, whereas this study combines market share and profitability as indicators of performance.

5.4 Recommendations for policy implication

Concerning the shift in the customer needs, it is safe to recommend that the management of mobile phone companies ensure that they provide sufficient services to their customers since they directly influence performance. In other words, management ought to pay a lot of attention to technological changes. In addition, the management should put more emphasis and pay additional attention to innovations since they are essential instruments in giving competitive advantage, which leads to high organizational performance. Furthermore, research and development appears to be critical drivers for organizational performance. They act as a link of positive impact on organizational performance. For these reasons, information technology managers ought to focus and invest more on cutting edge systems to achieve best results.

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