TECHNOLOGICAL INNOVATION STRATEGY AND PERFORMANCE OF DATA SERVICE PROVIDERS IN KENYA

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ABSTRACT

The study sought to assess the influence of technological innovation strategy on the performance of data service providers in Kenya. This study was anchored on diffusion of innovation theory. The study employed a descriptive research design and was guided by positivism philosophy. Simple random sampling was used to select 177 managers from the sample size out of a target population of 316 managers of data service provider companies in Kenya. Primary data was collected using questionnaires while secondary data was collected through reviews of both theoretical and empirical literatures. The collected data was analyzed using the statistical package for social sciences (SPSS) version 23.0. The software was used to produce frequencies, descriptive and inferential statistics which was used to derive generalizations and conclusions regarding the population. The study revealed that technological innovation strategy and entrepreneurial orientation influenced the performance of data service providers in Kenya. The study concludes that, innovative entrepreneurs need to be technology literate to match technology potential with market changes, new customer needs, emerging problems, and other possible opportunities. The study recommends adoption of technological innovation as an innovation strategy in the context of listening to customers’ opinion as helping tool in customizing value innovation which can be furthered by altering service products, process and personnel structure to meet customers special needs in specific use situations.

Key Words: Technological innovation, Entrepreneurial orientation, Firm performance, Data service providers
1.0 INTRODUCTION

1.1 Background of the Study
In the modern business world, innovation remains a key aspect that plays a critical role in promoting firm performance and competitiveness. In strategic management, technological innovation stands to play a key role in steering the strategic visions of the organization into success. In this view therefore, technological innovation strategies adopted by firms should help identify and explore new revenue opportunities and improve customer satisfaction, (Becheikh et al, 2006). Its agreeable then that technological innovation is driven by new ideas and advances in technology to create new value for the business. This may involve identifying and exploring emerging and existing technology with the business and working together to create new business opportunities. Modern businesses have started to grasp the importance of innovation (Dess & Picken, 2010), since swiftly changing technologies and severe global competition rapidly erode the value-add of existing products and services, (Nybakk & Jenssen, 2012). The overwhelming response from scholars and practitioners in the overarching fields of innovations strategy, testifies to the apex position of innovations as a sure pathway to competitive advantage. To this end, Ganter and Hecker, (2013) postulate that innovations constitute an indispensable component of the corporate strategies for reasons such as to apply more productive processes, to perform better in the market, to seek positive reputation in customers’ perception and as a result to gain sustainable competitive advantage. In line with this observation, Roberts & Amit, (2013) agree that innovation has great commercial importance due to its potential for increasing profitability and therefore, innovation plays a significant role in creating differences of performance and competition.

Valacich & Schneider, (2012) avers that, technological innovation may involve integration of specific technologies, including gaming, mobile technology, social media, and robotics. Technological innovation strategies involve the adoption of systems such as ERP systems that provide capabilities that support and enhance processes associated with producing. Technological innovation is a key factor in a firm’s competitiveness and therefore innovation is unavoidable for firms which want to develop and maintain a competitive advantage and gain entry into new markets, (Becheikh et al, 2006). Further to this view, technological innovation activities may also include the inter-organizational processes of market-based sell-buy relationships, collaboration and consumer-oriented activities (business-to-consumer and consumer-to-consumer), as well as
the intra-organizational processes that supports them, (Zwass, 2013). Therefore, as observed by Turban et al. (2010), organizations are embracing e-commerce as a means of expanding markets, improving customer service, reducing costs, and enhancing productivity.

Locally, the 2010 African Innovation Outlook (NEPAD, 2010) shows that Kenya’s gross expenditure on research and innovation exceeded KES 7.6 billion during 2007/2008. If converted into comparable Purchasing Power Parity, the expenditure levels translate into approx. US$90 Million, which means that Kenya spent 0.48% of its GDP on Research and Development. However, the most significant indicator of the Kenya Government’s commitment to the mainstreaming of Science Technology and Innovation (STI) and knowledge in its development policy management is embodied in the establishment of the fully-fledged flagship, Research Innovation and Technology (RIT) Sector during 2008/09, (Republic of Kenya, 2010).

Along the pathway of Research Innovation and Technology initiated by the government, Kenya has been home to several major technological innovations hitherto. These innovations are characterized by for instance: An agile mobile banking system that has created new market opportunities for digital entrepreneurs, 4G internet connections that have become more and more affordable. Locally developed but globally recognized technological innovations like mobile phone-based money transfer, ‘M-Pesa’ incorporating, financing and micro financing services, launched in 2007, (CCK, 2012). To this end, technological innovations have birthed strong investment players in data service industry. Prolific data service providers have become impeccably more visible than ever before in enabling technology-based enterprises in Kenya.

Data service providers are enterprises that provide access to the Internet. A data service provider (DSP) is an organization that provides a user with internet access via some sort of connection. Traditionally, this connection was always a telephone line, although faster digital technologies such as cable and DSL (A digital subscriber line or modem) have appeared in recent years. DSPs sell bandwidth to internet users and assist organizations and individuals to get connected to the internet.

1.2 Statement of the Problem

Despite the great potential of the data service market in Kenya, observable performance gaps conspicuously exist among individual firms. For illustration, Communications Authority of Kenya report for the end of financial year 2015/16 showed that Safaricom Limited recorded the highest
market share for mobile data subscriptions standing at 63.8 per cent. Airtel Networks Limited and Orange Kenya Limited (now Telkom) market shares stood at 18.7 per cent and 10.0 per cent respectively while that of Finserve Limited was recorded at 7.5 per cent, (Communication Authority of Kenya, 2016). Looking ahead, in 2017/2018 review, the market share for Safaricom Kenya Limited in mobile data/Internet subscriptions stood at 76.0 per cent. Airtel Networks Limited recorded a market share of 15.7 per cent while Telkom Kenya Limited posted a market share of 7.3 per cent. Finserve Africa Limited and Mobile pay Limited market share stood at 0.7 per cent and 0.3 per cent respectively. The market share for Sema Mobile Services remained unchanged at 0.0 per cent, (Communication Authority of Kenya, 2018). Agreeably, this trend raises pertinent questions on the individual performance of majority of the firms pointing to lack of innovation strategies.

In addition to performance paradox, revenue and investment in the Data market excluding data revenues from the mobile sector for year 2016, (Communication Authority of Kenya, 2016), showed that there was a continued drop in investment and revenues from this market. The revenues declined from KES 10,158 Million in 2014 to KES 8,498 million in 2015 while investments recorded declined from KES 3,440 Million in 2014 to KES 2,233 million in 2015 and this downward trend had been observed since 2012. The 2016-2017 quarter data market experienced a decline in the number of subscriptions. The number of Internet subscriptions declined to 25.6 million down from 26.8 million subscriptions in the last quarter, representing a 4.5 per cent drop. Moreover, Fixed DSL subscriptions declined by 15.7 per cent to stand at 2,583 subscriptions down from 3,063 subscriptions recorded in the previous quarter, (Communication Authority of Kenya, 2017). This shows a performance concern for data service providers.

construction industry in Malaysia. None of the studies have used entrepreneurial orientation as a moderator. Therefore, the study sought to assess the effect of technological innovation strategy on the performance of data service providers in Kenya and the moderating role of entrepreneurial orientation.

1.3 Objectives of the Study

1) To assess the effect of technological innovation strategy on the performance of data service providers in Kenya
2) To determine moderating effect of entrepreneurial orientation on the relationship between technological innovation strategy and performance of data service providers in Kenya.

1.4 Research Hypotheses

1) $H_{01}$: Technological innovation does not have a significant effect on the performance of data service providers in Kenya
2) $H_{02}$: There is no moderating effect of entrepreneurial orientation on the relationship between technological innovation strategy and the performance of data service providers in Kenya.

2.0 LITERATURE REVIEW

2.1 Theoretical Framework

A theory is defined as set of interrelated concepts, definitions, and propositions that present a systematic view of phenomena by specifying relations among variable with the purpose of explaining or predicting the phenomena, (Bull, 2006). This study was based on the following theories.

2.1.1 Diffusion of Innovation Theory

The theory of Diffusion of Innovations as described by Rogers (1995) is well known. Rogers describes diffusion of innovations as: “the process by which an innovation is communicated through certain channels over time among the members of social systems. It is a special type of communication, in that the messages are concerned with new ideas” (Rogers, 1995). A decision not to adopt an innovation relates to the rejection of the available new idea. However, in order to explain the rate of adoption of innovations, Rogers suggests measurement of perceived
characteristics of innovations such as: relative advantage, compatibility, complexity, trialability, and observability. Rogers, (1995) postulated that the adoption of innovations is influenced by these five characteristics, and that they can explain the rate of technology adoption.

Technology diffusion is an indispensable process through which technological potential of innovative activities can be actually turned into productivity. Various characteristics of the economic environment in which diffusion takes place may affect the pace of diffusion, while the diffusion itself may also have feedbacks on the environment, (Gongera, 2013).

If data service providers in Kenya observe the benefits of technological innovations, they will adopt these innovations given other factors such as the availability of the required tools. It is an open secret then that adoption of such innovations might be faster in organizations that have internet access and information technology departments than in organizations without. This therefore, advances the role of technological innovations in improving firm performance.

2.2 Conceptual Framework

![Conceptual Framework Diagram]

**Figure 2.1: Conceptual Framework**

2.3 Empirical Review

Tajuddin, Iberahim and Ismail (2015) explored the relationship between innovation and organizational performance in the construction industry in Malaysia. The instruments in measuring innovation and organizational performance specific to the construction industry were developed.
by adapting measures introduced by several scholars in these fields. Innovation was represented by innovative design solutions, innovative project practices and advanced technology utilization. The results revealed that principally innovation is significantly positive in influencing organizational performance. Nevertheless, innovative design solution and advanced technology dimensions were insignificant in influencing project performance and business performance respectively (Tajuddin et al., 2015).

Malhotra and Singh (2009), in their study on the impact of internet banking on bank performance and risks, found out that on average internet technology-savvy banks are larger, more profitable and are more operationally efficient. Additionally, it was found that internet savvy banks have higher asset quality and are better managed in lowering expenses. They further found out that smaller banks that adopt internet banking have been negatively impacted on profitability.

Muita (2013) conducted a study on innovation strategies and competitive advantage in the telecommunication industry. In order to satisfy the objective of the study, a descriptive survey research design was adopted and data was collected from top management and senior managers of four major telecommunication companies in Kenya. The findings revealed that technological innovation strategies were formulated more in meeting customer needs than to attain competitive advantage. External environment was monitored to determine the innovation strategies to be formulated. This study established that understanding customer needs was the major reason for success levels of products in telecommunication market and superior competitive advantage. The study recommended that top management in the telecommunication industry should realign their innovation strategies to understand customer needs in order to acquire competitive advantage, (Muita, 2013).

Covin, et al, (2006), examined the effect of three strategic process variables, strategic decision-making participation, strategy formation mode, and strategic learning from failure on the entrepreneurial orientation of firm sales growth-rate relationship. Results based on a sample of 110 manufacturing firms indicated a positive effect of entrepreneurial orientation on sales growth rate. Moreover, the relationship between entrepreneurial orientation and sales growth rate was more positive among firms that employ autocratic decision making and that exhibit an emergent strategy formation process. Perceptions of proficiency at learning from strategic mistakes
differentially affected the growth rates of firms at different ends of the entrepreneurial orientation continuum, but in manners inconsistent with the hypothesized relationship.

Claudine and William (2017) examined how the relationship between entrepreneurial orientation and firm growth is shaped by learning orientation in technologically sophisticated environments. The study drew upon an information processing perspective that emphasized alignment between information processing demands and support mechanisms. Using data from 116 small to medium-sized enterprises in the Netherlands, the study observed that the ability of entrepreneurial orientation to drive firm growth greatly depends on the joint consideration of technological sophistication and learning orientation.

3.0 RESEARCH METHODOLOGY

3.1 Research Design

The study adopted descriptive research design which is a method of collecting data by interviewing or administering a questionnaire to a sample of individuals which can be used when collecting information about peoples’ attitudes, opinions, habits or any other social issues. The design is useful in describing the features of a population that has been earmarked for study and to provide answers to research questions.

3.2 Target Population

The target population comprised of 316 managers of all data service providers in Kenya (Communication Authority of Kenya, 2018). The managers were selected since they had a clear and comprehensive understanding of their firms’ innovation strategies.

3.3 Sampling

The sampling frame for the study comprised all the managers from all the 35 Data service providers. The choice of managers was justified as the sampling units because they had a clear and comprehensive understanding of their firms’ innovation strategies.

Sloven's formula was used to calculate the sample size (n) given the population size (N) and a margin of error (e). It’s a random sampling technique formula to estimate sampling size (n).
According to Yamane (1967) where \( n \) is the sample size, \( N \) is the population size and \( e \) is the level of precision at 95% confidence level \( n \) is computed as follows:

\[
n = \frac{N}{1 + N(e)^2}
\]

\( N = \) Target population, (316)
\( e = \) the level of precision, 5%

Where \( n \) is the sample size,

\[
n = \frac{316}{1 + 316 \times (0.05^2)}
\]

\[
n = \frac{316}{1.79}
\]

\( n = 177 \)

Therefore, the sample size was 177

### 3.4 Data Collection Instruments

The study used both primary and secondary data. The choice of the instrument used was influenced by the nature of the problem in Data Service Providers and dictated by the availability of time and budget just as observed by Cooper and Schindler, (2011). This study collected primary data through use of questionnaires. Kothari, (2008) observes that collecting data through the questionnaires saves time since it is possible to collect huge amount of information especially when the population of interest is large.

### 3.5 Data Collection Procedures

Data collection procedure that was chosen by the study was determined by the objectives of the study. The questions addressed by questionnaires sought to identify the effect of innovation
strategies on Data Service Providers in Kenya. Questionnaires were distributed to the target population. Prior to conducting questionnaire interviews on the selected respondents, letters requesting for permission were distributed to respondents. Through the help of the research assistants, a total of 177 questionnaires were administered to the selected respondents. Questionnaires were self-completion questionnaire administered by researcher with the help of research assistants. Respondents were asked to anonymously complete the questionnaire for immediate collection.

3.6 Data Analysis and Presentation

A multiple linear regression model was used to measure the relationship between independent variables and the dependent variable. Multi-linear regression model is a statistical tool which allows for the prediction of response variables based on a set of independent variables. In this study, data collected using questionnaires was coded, verified for completeness and accuracy and then analyzed using quantitative approaches to derive descriptive statistics/outputs. This study used the Statistical Package for Social Scientists (SPSS version 23) to process the data. The software was used to produce frequencies, descriptive and inferential statistics which were used to derive generalizations and conclusions regarding the population. Quantitative data analysis allowed the study to make inferences by objectively and systematically identifying specified characteristics of data flow.

The following regression equation model was used to test the statistical significance of the study hypotheses:

Régression Model

\[ Y = \beta_0 + \beta_4 X_4 + \varepsilon \]  

Equation (i)

Where:

\( Y = \) Performance
\( X_4 = \) Technological Innovation
\( \beta_0, \beta_4, = \) Regression coefficients of changes included in \( Y \) by each \( X \) value
\( \varepsilon = \) Error term which is normally distributed with a mean and variance of zero.
The moderating variable in this study was entrepreneurial orientation. To determine the presence of moderating effect, the OLS model was compared with the MMR model. Equation (ii) shows the Ordinary Least Squares (OLS) regression equation model predicting Y scores from the first-order effects of X and Z observed scores.

\[ FP = \beta_0 + \beta_4 Z + \epsilon \]  

Equation (ii)

4.0 RESEARCH FINDINGS AND DISCUSSION

4.1 Response Rate

The sample size for the study consisted of 177 respondents from 316 managers of Data Service Providers in Kenya. Out of 177 respondents that formed the sample size, 120 questionnaires were returned correctly filled representing a response rate of 68%. This response rate was appropriate representation of respondents in providing information for analysis and conclusions.

4.2 Descriptive Analysis

4.2.1 Technological Innovation Strategy

The study sought to investigate how technological innovation strategies influence performance of Data Service Providers. The respondents were asked to indicate whether technological innovation strategies influenced performance of Data Service Providers. From the findings as shown in table 4.1, majority of the respondents who participated in the study (96.7%) agreed that technological innovation strategies influence performance of Data Service Providers while only 3.3% of the respondents said that technological innovation strategies does not influence performance of Data Service Providers.

Table 4.1: Technological Innovation Strategies

<table>
<thead>
<tr>
<th>Influence on Performance</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>116</td>
<td>96.7</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100.0</td>
</tr>
</tbody>
</table>
The study sought to understand to what extent technological innovation strategies influence firm performance. The findings are presented in figure 4.8 below. From the findings, majority of the respondents (59.2%) indicated that technological innovation strategies influence firm performance to a great extent, 39.2% said that technological innovation strategies influence firm performance to a moderate extent while 1.7% of the respondents said that technological innovation strategies influence firm performance to a small extent.

![Technological Innovation Strategies](image)

**Figure 4.1: Influence of Technological Innovation Strategies**

The study sought to determine the influence of technological innovation strategies on performance of Data Service Providers. The response was rated on a scale of 1-5 on which: 1= strongly disagree, 2= disagree, 3= neither agree or disagree, 4= agree and 5= strongly agree. Table 4.2 below shows the descriptive statistics describing the data in details. From the findings, majority of the respondents in the study agreed with the statement that technological innovation strategy involves adoption of new technology as shown by a mean score of 4.02. Further, respondents in the study agreed that process innovation is key in achieving technology innovation as shown by a mean score of 4.33. A majority of the respondents agreed that technological innovation strategy involves adoption of new systems such as ERP by the firm as shown by a mean score of 4.35. The level of agreement was also extended to other statements as follows: Technological innovation strategy is achieved by increasing investments in innovation technology as shown by a mean score of 4.37.
Technological innovation strategy is realized through automation of routine tasks produced a higher value as shown by a mean score of 4.23. Technological innovation strategy promotes inter-organization processes and collaboration as shown by a mean score of 4.35 and technological innovation strategies promotes intra-organization processes and collaboration as shown by a mean score of 4.53.

Table 4.2: Technological Innovation Strategies and Performance

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technological innovation strategy involves adoption of new technology</td>
<td>4.02</td>
<td>.745</td>
</tr>
<tr>
<td>Process innovation is key in achieving technology innovation</td>
<td>4.33</td>
<td>.760</td>
</tr>
<tr>
<td>Adoption of new system such as ERP</td>
<td>4.35</td>
<td>.669</td>
</tr>
<tr>
<td>Technological innovation strategy is achieved by increasing investments in innovation technology</td>
<td>4.37</td>
<td>.673</td>
</tr>
<tr>
<td>Technological innovation strategy is realized through automation of routine tasks</td>
<td>4.23</td>
<td>.825</td>
</tr>
<tr>
<td>Technological innovation strategy promotes inter-organization processes and collaboration</td>
<td>4.35</td>
<td>.729</td>
</tr>
<tr>
<td>Technological innovation strategies promote intra-organization processes and collaboration</td>
<td>4.53</td>
<td>.661</td>
</tr>
</tbody>
</table>

4.2.2 Entrepreneurial Orientation

The study sought to investigate how entrepreneurial orientation influence performance of Data Service Providers. The respondents were asked to indicate whether entrepreneurial orientation influence performance Data Service Providers. From the findings as indicated in table 4.3, majority of the respondents (93.3%) agreed that entrepreneurial orientation influence performance of Data Service firms while only 6.7% of the respondents said that entrepreneurial orientation does not influence performance.
The study sought to determine the influence of entrepreneurial orientation on the performance of Data Service Providers. The response was rated on a scale of 1-5 on which: 1= strongly disagree, 2= disagree, 3= neither agree or disagree, 4= agree and 5= strongly agree. Table 4.4 below shows the descriptive statistics describing the data in details. Through entrepreneurial orientation, the firm is able to influence market environment as shown by a mean score of 4.12. Further, majority of the respondents in the study agreed with the following statements: Entrepreneurial orientation facilitates the firm to penetrate into new ventures as shown by a mean score of 4.11. Through entrepreneurial orientation, the firm is able to adopt new technologies as shown by a mean score of 4.27 and moreover, through entrepreneurial orientation, the firm is able to introduce new processes as shown by a mean score of 4.33.

### Table 4.4: Entrepreneurial Orientation and Performance

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduce new product/service through orientation</td>
<td>3.95</td>
<td>.829</td>
</tr>
<tr>
<td>Anticipate the future through orientation</td>
<td>4.12</td>
<td>.852</td>
</tr>
<tr>
<td>Influence market environment</td>
<td>4.12</td>
<td>.871</td>
</tr>
<tr>
<td>Penetration into new ventures</td>
<td>4.11</td>
<td>.838</td>
</tr>
<tr>
<td>Source for external finances</td>
<td>4.10</td>
<td>.929</td>
</tr>
<tr>
<td>Adopt new technologies</td>
<td>4.27</td>
<td>.857</td>
</tr>
<tr>
<td>Introduce new processes</td>
<td>4.33</td>
<td>.909</td>
</tr>
</tbody>
</table>
4.2.3 Relationship between Entrepreneurial Orientation and Performance of Data Service Providers

The study carried out a regression analysis of Entrepreneurial Orientation and Performance of Data Service Providers. The Model Summary (Table 4.38) presents an R² result of 0.501 or 50.10%, meaning that the independent variable (performance of data service providers) alone can explain up to 50.10% of the total variability in Entrepreneurial Orientation. The remaining 49.90% of the variation can be explained by other factors not included in the model. The findings provide qualitative empirical support for theoretical claims of the importance of moderating effect of entrepreneurial orientation as building blocks of innovation strategies and organization performance. The findings underscore the significance of moderating effect of entrepreneurial orientation by tangling continuous entrepreneurship, innovation strategies and performance.

Table 4.5: Model Fitness

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.708</td>
<td>.501</td>
<td>.488</td>
<td>.36601</td>
</tr>
</tbody>
</table>

An ANOVA test was performed on the variable, Entrepreneurial Orientation and the results obtained are presented in Table 4.39. From the ANOVA Table, the model is statistically significant as the p-value is less than 0.05. The values of F (1, 119) = 3.039, P < 0.05, shows that Entrepreneurial Orientation statistically and significantly predicts the performance of Data Service Providers (i.e., the regression model is a good fit of the data) and that Entrepreneurial Orientation significantly moderates the performance of data service providers in Kenya.

Table 4.6: Analysis of Variance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>df</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Regression</td>
<td>37.005</td>
<td>1</td>
<td>3.039</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>15.808</td>
<td>118</td>
<td>.134</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15.813</td>
<td>119</td>
<td></td>
</tr>
</tbody>
</table>
To complement the ANOVA findings presented in Table 4.39, Pearson’s correlation coefficients were also generated. Regression of coefficients results in table 4.40 shows that there is a positive significant relationship between entrepreneurial orientation and the performance of data service providers as shown by a p value of 0.000 which is less than the critical p value of 0.05. This was supported by the t values whereby t cal=2.197 > t critical =1.96 at a 95 percent confidence. The findings show that Entrepreneurial Orientation significantly influence the performance of Data Service Providers, that is an increase in mean index of entrepreneurial orientation increases the performance of Data Service Providers by a positive unit mean index value of 0.012.

The findings reinforce Kropp, Lindsay & Shoham, (2006) view that entrepreneurial orientation is the process and decision-making activities used by firms that leads to entry and support of business activities. Findings also connect to De Clercq et al., (2014) who affirm that entrepreneurial orientation, reflects the reliance of the entrepreneur, on the skills and efforts of other enterprise participants in the exercise of strategic innovations and control thus providing direction to the company’s entire performance. Further the findings resonate with Frank, (2010) who emphasize that an entrepreneurial firm as ‘one that engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with ‘proactive’ innovations, beating competitors to the punch”.
Table 4.7: Regression Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>3.462</td>
<td>.226</td>
</tr>
<tr>
<td>Entrepreneurial</td>
<td>.012</td>
<td>.062</td>
</tr>
<tr>
<td>Orientation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2.4 Performance of Data Service Providers

The researcher sought to assess the performance of the Data Service Providers. The respondents were asked to indicate the effectiveness of the process innovation, product innovation, market innovation and technological innovation strategies in influencing performance of the Data Service Providers. From the findings as shown in table 4.5, 45.8% of the respondents indicated that process innovation strategies were most effective in influencing performance, 42.5% of the respondents said that product innovation strategies were most effective in influencing performance, 35.8% of the respondents said that market innovation strategies were most effective in influencing performance and 46.7% of the respondents said that technological innovation strategies were most effective in influencing performance.

Table 4.8: Effectiveness of Innovation Strategies

<table>
<thead>
<tr>
<th></th>
<th>Most effective</th>
<th>Effective</th>
<th>Neutral</th>
<th>Least effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process innovation</td>
<td>45.8%</td>
<td>27.5%</td>
<td>11.7%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Product innovation</td>
<td>42.5%</td>
<td>20.8%</td>
<td>17.5%</td>
<td>19.2%</td>
</tr>
<tr>
<td>Market innovation</td>
<td>35.8%</td>
<td>18.3%</td>
<td>15.8%</td>
<td>30.0%</td>
</tr>
<tr>
<td>Technological innovation</td>
<td>46.7%</td>
<td>12.5%</td>
<td>14.2%</td>
<td>26.7%</td>
</tr>
</tbody>
</table>

Table 4.9: Performance of Data Service Providers
<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product innovation Improve profitability</td>
<td>4.07</td>
<td>.742</td>
</tr>
<tr>
<td>Process innovation Improve profitability</td>
<td>4.23</td>
<td>.775</td>
</tr>
<tr>
<td>Improvement in innovation increase sales</td>
<td>4.09</td>
<td>.789</td>
</tr>
<tr>
<td>Modern technology service delivery</td>
<td>4.23</td>
<td>.772</td>
</tr>
<tr>
<td>Customer satisfaction goal adoption of innovation</td>
<td>4.31</td>
<td>.731</td>
</tr>
<tr>
<td>Efficiency in service delivery</td>
<td>4.55</td>
<td>.708</td>
</tr>
</tbody>
</table>

### 4.3 Inferential Analysis

#### 4.3.1 Correlation between Technological Innovation Strategies and Performance

This study sought to establish whether there was any form of correlation between technological innovation strategies and performance of Data Service Providers in Kenya. The findings are summarized in Table 4.7. From the table, a positive correlation coefficient of .716 (or 71.60%) existed between technological innovation strategies and performance of Data Service Providers. The existence of a positive correlation expounds the role of technology as a key driver in influencing performance of Data Service Providers.

**Table 4.10: Correlation between Technological Innovation Strategies and Performance**

<table>
<thead>
<tr>
<th>Technological Innovation Strategies</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson</td>
<td>0.716</td>
<td>.000</td>
<td>120</td>
</tr>
<tr>
<td>Correlation</td>
<td></td>
<td></td>
<td>120</td>
</tr>
</tbody>
</table>

**Table 4.10**

<table>
<thead>
<tr>
<th>Technological Innovation Strategies</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Pearson</td>
<td>0.716</td>
<td>.000</td>
<td>120</td>
</tr>
<tr>
<td>Correlation</td>
<td></td>
<td></td>
<td>120</td>
</tr>
</tbody>
</table>
4.4 Regression Analysis and Hypothesis Testing

Hₐ₁: There is significant relationship between technological innovation strategies and performance of Data Service providers in Kenya.

The results presented in table 4.8 present the fitness of model used of the regression model in explaining the study phenomena. Technological innovation strategies explained 73.1% of the performance of Data Service Providers in Kenya.

Table 4.11: Model Fitness

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.855</td>
<td>.731</td>
<td>.712</td>
<td>.34736</td>
</tr>
</tbody>
</table>

Table 4.9 provides the results on the analysis of the variance (ANOVA). The results indicate that the overall model was statistically significant as supported by a p value of 0.000 which is less than the critical p value of 0.05. This implying that technological innovation strategies is a good predictor of the performance of Data Service Providers.

Table 4.12: Analysis of Variance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>1.575</td>
<td>1</td>
<td>1.575</td>
<td>13.057</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>14.238</td>
<td>118</td>
<td>.121</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15.813</td>
<td>119</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regression of coefficients results in table 4.10 shows that there is a positive significant relationship between technological innovation strategies and the performance of Data Service Providers as shown by a p value of 0.000 which is less than the critical p value of 0.05. This was supported by the t values whereby tₜₐₜ=3.613 > t critical =1.96 at a 95 percent confidence level which depicts that we reject the null hypothesis and accept the alternative hypothesis. This implies that technological innovation strategies influence performance of Data Service Providers.
The model outcome embraces Malhotra and Singh, (2009), who studied the impact of internet banking on bank performance and risks, and found out that on average, internet technology-savvy banks are larger, more profitable and are more operationally efficient, while internet savvy banks were found to have higher asset quality and are better managed in lowering expenses. The findings further connect to Muita, (2013) study on innovation strategies and competitive advantage in the telecommunication industry. The study established that understanding customer needs in relation to technology was the major reason for success levels of products in telecommunication market and superior competitive advantage.

**Table 4.13: Regression Coefficients**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>2.270</td>
<td>.319</td>
</tr>
<tr>
<td>Technological Innovation Strategies</td>
<td>.306</td>
<td>.085</td>
</tr>
</tbody>
</table>

**Table 4.14: Optimal Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>t</td>
<td>P-value</td>
</tr>
<tr>
<td></td>
<td>Beta</td>
<td>T</td>
<td>P-value</td>
</tr>
<tr>
<td></td>
<td>Beta</td>
<td>t</td>
<td>P-value</td>
</tr>
</tbody>
</table>

**Interaction Effect**
- Tech. innovation strategy and Entrepreneurial Orientation: .458, 6.056, .009

Model fitness
- R: 0.750
- R Square: 0.563
- Adjusted R Square: 0.554
- ANOVA F: 67.242, 0.000
- R Square Change: 0.563, 0.002
- Change in F: 67.242, 0.000
CONCLUSION

The study concluded that the less performing firms have to begin to embrace innovation and entrepreneurial orientation in order to survive and succeed in increasingly competitive data-service environments. By extension, managers of such firms have to encourage entrepreneurial and innovation behavior through recognition and subsequent exploitation of such potential in all employees. Potential of innovation recognition can be put into practice by selective screening for entrepreneurial behavior during the recruitment of new staff and subsequently through focused training programs which can use real world case studies. Such training approaches would stimulate innovation and entrepreneurial appetite as well as alertness in employees and ultimately translate to improved performance. Entrepreneurial alertness and innovation can further be built through rewarding policies, as well as cultural and structural orientations.

RECOMMENDATIONS

The study recommends adoption of new systems such as ERP, E-business, e-commerce, new production methods, new services that could result in the generation, integration, development, and enhancement of key resources over time. To spur innovation, Data Service Providers should increase their investments in innovation technology especially in E-business and e-commerce. The study recommends technological collaboration to promote inter-organization processes as well as creating clients-customer interface that can enhance innovations based on the interactions with the consumer. Technological collaboration, however will require technology literate managers to match technology potential with market changes, new customer needs, emerging problems, and other possible opportunities.
REFERENCES


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He, Dong, and Wenlang Zhang, 2008. “How Dependent is the Chinese Economy on Exports and in What Sense has its Growth been Export-Led?” Working Paper 0814, Hong Kong Monetary Authority.


