

Influence of Product Innovation on Public Sector Performance in Nairobi City County Government, Kenya

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Abstract: The significance of innovation in public sector performance cannot be overstated. Competition triggers creativity and innovation. To be competitive in the global marketplace, organizations need to be driving more innovation in their products and services and also establish their corporate identity together with realizing real time customer interactions. Innovation can be a key differentiator between market leaders and their rivals. Innovative Technology can help a company capture a competitive edge through making more competitive products and services. Due to increasing innovation costs, decreasing innovation cycles and increasing technology complexity, the achievement of a company's innovation success has received renewed attention. This paper sought to bring light on the influence of product innovation on public sector performance. The study used a descriptive survey design. The study aimed at identifying the influence of product innovation on public sector performance in Nairobi City County Government. The study was based on public sector organizations within the county government of Nairobi, Kenya. A total of 100 usable survey responses were received from questionnaires distributed in different public-sector organizations. The study used the inferential statistics: Multiple linear regression and bivariate correlation to determine how product innovation influences public sector performance in Nairobi City County. Quantitative data was analyzed using SPSS version 21. The study results indicated that product innovation had a statistically significant positive influence on public sector performance in Nairobi City County. The study recommended that organizations needed to prioritize on managing technology transfer problems. The study also recommended that organizations develop ways of adopting and absorbing product innovations in Nairobi City County. This would enhance innovation activities implemented in public sector organizations.

Keywords: Competitive advantage, Performance, Process, Process innovation, Product, Product Innovation, public sector.

I. INTRODUCTION

Innovation is an outcome of a collision between technological opportunities and user needs. The focus is upon the interaction between producers and the users of innovation. One outcome of the analysis is a more realistic understanding of markets and vertical integration than the ones offered by neoclassical economics and transaction economics. Another outcome is the conceptualization of national innovation systems as an aggregate framework for processes of interactive learning at the micro-level. Together these concepts go beyond the neoclassical actors of firms and consumers and point to the need to take into account economic structure, institutions and policies for learning. Innovation refers to changing processes or creating more effective processes, products and ideas (Nielsen, 2016). For businesses, this could mean implementing new ideas, creating dynamic products or improving your existing services. Innovation can be a catalyst for the growth and success of an organization, and can help organizations to increase market share (Kumar, 2016). Innovations

International Journal of Novel Research in Engineering and Science

Vol. 4, Issue 2, pp: (69-82), Month: September 2017 - February 2018, Available at: www.noveltyjournals.com

take time, investment and effort. Some organizations are more adept at probing possibilities and reaping benefits from the process of idea generation, selection, implementation and diffusion. Each of the stages of idea generation has been drawn from different values, processes and resources. Companies live or die by implementing innovation. Innovation does not only mean inventing. Innovation can mean changing your business model and adapting to changes in your environment to deliver better products or services (Nielsen, 2016). Successful innovation should be an in-built part of business strategy, where one creates a culture of innovation and leads the way in innovative thinking and creative problem solving. Innovations can increase the likelihood of the business succeeding. Businesses that innovate create more efficient work processes and have better productivity and performance (Hall, 2011).

Public sector innovations involve creating, developing and implementing practical ideas to achieve a public benefit. Innovation in the public-sector organizations induce better understanding of opportunities and problems, thus generating more useful ideas by scaling things up and improving adoption. Government policies have had an impact on the innovation strategy and its efforts towards development and advancement. Government policies are critical for innovation within the public sector because it decides resource allocation in accordance with comparative advantages (O'Donnell, 2006). There are organizational factors that create a learning environment which promotes innovation. Transition to new ideas within the organization faces not only financial barriers but a lot of cultural and political barriers too in both public and private sector organizations. Reguia (2014) opines that through innovation, new forms of competition and new markets have been realized for the creation and delivery of innovative products and services. This has been reinforced by globalization and rapid advances in new technologies, more so information and communication technology (ICT). Globalization has increased the pressure of countries to engage in a continuous process of adjustment and innovation which in turn increases creation and commercialization of innovative products, processes and services (OECD, 2007). Innovations have led to the emergence of new markets for innovative products and access to a new supply of highly skilled workers (Schwab, 2017).

Innovation versatility has resulted to increased adoption rate among the banks and their customers with the uptake further accelerated by the fact that the adoption is from both the banks and their customers. Banks are able to manage their costs better in continuing to invest in product innovation as opposed to continued investment in bricks and motor branches (Njenga, Kiragu & Opiyo, 2015). The internet and mobile channels can process a higher volume of transactions compared to the use of the conventional manual processes, thus leading to better management of costs within the banking sector (Ndunga *et al*, 2016). Commercial banks have explored management innovation which is the management of the innovation processes. This has allowed the management to cooperate with a mutual apprehension of goals and processes. Innovation management has allowed the banks to respond to internal and external opportunities, and use its creativity to introduce unique concepts, processes and products. Innovation strategies such as product repositioning, product replacement and process innovation strategies like conformance to regulations and the reduction of costs contributed to banks increased profitability (Ngugi, 2013). The Government of Kenya launched the innovative Kenya National Agricultural Insurance Program, which is designed to address the challenges that agricultural producers face when there are large production shocks, such as droughts and floods. The program aims at improving farmers' financial resilience to these shocks and will enable them to adopt improved production processes to help break the poverty cycle of low investment and low returns.

Organizations that innovate create more efficient work processes and have better productivity and performance. This is also true for the public sector. In the private sector, innovation is an established field of study that tries to explain why and how innovation takes place (De Vries *et al*, 2015). General literature reviews and systematic reviews have been carried out to assess the state-of-the-art in this field as well as to generate new avenues for theory building and research (Perks & Roberts, 2013). However, what is known about product innovation in the public sector? What topics have been addressed in the innovation studies to date, and what are the possible avenues for future research? Moreover, what can be added to the current methodological state-of-the-art when it comes to public innovation research? Many studies have been conducted to identify the challenges and barriers to the adoption of product innovations in the public-sector organizations but a comprehensive systematic overview of public sector innovation of products and services, which are replicable and transparent is still lacking. So this research study will sought to explore how implementation of product innovation benefits the public sector in Kenya empirically. The study attempted to overcome the loopholes of the review of literature on this stated topic.

International Journal of Novel Research in Engineering and Science

Vol. 4, Issue 2, pp: (69-82), Month: September 2017 - February 2018, Available at: www.noveltyjournals.com

Most of the literature reviews were mostly grasping the meaning and importance of public sector innovation conceptually rather than empirically. This research explored the empirical grounding of the knowledge that has been put forward in the scholarly articles related to innovation in the public sector and in so doing will sought to improve the quality and efficiency of internal and external processes; Creation of new organizational forms that support product innovation, the introduction of new management methods and techniques and new working methods; Creation or use of new technologies, introduced in an organization to render quality services to users and citizens; Creation of innovative public services and products; Introduction of new concepts, frames of reference or new paradigms that could help to reframe the nature of specific problems as well as their possible solutions. Innovation has shown a statistically significant change mainly in Nairobi City County through imposing technological techniques in revenue collection and use of new ideas and knowledge in industries.

Through Product innovation, the margin of good production and revenue collection has drastically increased in the County compared to the past when innovation was not mainly practiced. This study focused on determining the influence of Product innovation on public sector performance in Nairobi City County. The public sectors assessed included Physical Planning, Public Health, Social Services and Housing, Primary Education Infrastructure, Inspectorate Services, Public Works and Environment Management. Environment Management included the following sectors: Agriculture, Livestock Development and Fisheries, Trade, Industrialization, Corporate Development, Tourism and Wildlife, Public Service Management in Nairobi City County, Kenya.

II. METHODOLOGY

A descriptive study was used to obtain information about the status of the influence of product innovation on public sector performance in Nairobi City County Government. The objective of the research study was to investigate the influence of product innovation on public sector performance. The study used both qualitative and quantitative research designs. Qualitative data was used to triangulate quantitative data. This study in part, adopted descriptive research design. Product innovative organizations and existing product innovation knowledge base was used as reference points so that the findings were measured against best practices in product innovation. The population of the study was the public sectors including Physical Planning, Public Health, Social Services and Housing, Primary Education Infrastructure, Inspectorate Services, Public Works, Environment Management while the latter include Agriculture, Livestock Development and Fisheries, Trade, Industrialization, Corporate Development, Tourism and Wildlife, Public Service Management in Nairobi County, Kenya. The study targeted the 32,099 civil servants operating in respective public sectors. A list of all the 32,099 civil servants employed within the Nairobi City County under the public sectors formed the sampling frame. The study used a probability sampling technique in form of simple random sampling to draw a sample of 100 respondents from the target population of 32,099 civil servants. The study adopted a descriptive study to collect data from all the 100 respondents sampled using structured questionnaires. The study investigated Product Innovation to ascertain its influence on Public Sector Performance. Data collected from the respondents formed the primary data while secondary data was retrieved from the library through journals, books and reports. Questionnaires were served to the respondents and later collected after their response. The study conducted a pilot study to test the structuring of the questions in the questionnaires to ascertain whether the questionnaire was reliable.

38 subjects were issued with questionnaires to test the reliability of the data collection instrument (Mugenda & Mugenda, 2003). The 38 subjects participating in the pilot study were not included in the final study to avoid fatigue. The data obtained was subjected to data analysis and the instruments were reviewed appropriately. Reliability is the consistency of a set of measurement items (Cronbach, 1951). This study used the Cronbach's Alpha for the five point Likert scale items. This helps the researcher to assess the interval consistency reliability achieved, the threshold being 0.7. The closer Cronbach's alpha coefficient is to 1, the higher the internal consistency reliability (Sekaran, 2006). Mugenda and Mugenda (2003) define validity as the accuracy and meaningfulness of inferences based on the research results. Validity was determined by the use of face validity and content validity. Face validity tested whether the questions appeared to be measuring the intended constructs, while content validity tested content to determine whether the questions covered a representative sample of the behavior area to be measured and covered.

This study adopted the technique of content analysis to analyze the qualitative data to be obtained from interviews. This was done by coding the individual transcript data into sentences and themes, categorizing data based on these themes and summarizing all individual data to present a case study. Data collected from the respondents was tabulated, coded and

analyzed to deduce relationships between the variables using the statistical program for social sciences (SPSS) software version 21. Analyzed data was presented using tables, graphs and charts (Mugenda & Mugenda, 2003). Frequency distribution tables and percentages were used in the study to capture the characteristics of the variables. Inferential statistics mainly involved simple linear regression and bivariate correlation analysis. For ordinal data Spearman’s Rank correlation coefficient was used using SPSS version 21. This study proposed use of a simple linear regression model. The general purpose of simple linear regression was to establish the relationship between the independent or predictor variable (Product Innovation) and the dependent or criterion variable (Public sector Performance). Every value of the independent variable x was associated with a value of the dependent variable y .

The simple linear regression equation that was used in the model was:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where:

Y= Public Sector Performance

β_0 = Constant Term,

X_1 = Product Innovation

In the model, β_0 = was the constant term while the coefficients $\beta_i = 1$ was used to measure the sensitivity of the dependent variable (Y) to unit change in the predictor variable X_1 . ε was the error term which was used to capture the unexplainable variations in the model.

The Classical Linear Regression Models (CLRM) assumed that the error term was homoscedastic, that is, it had constant variance. If the error variance was not constant, then there was heteroscedasticity in the data. Running a regression model without accounting for heteroscedasticity would lead to biased parameter estimates. To test for heteroscedasticity, the Breusch-Pagan/Godfrey test (1979) was used. The null hypothesis of this study was that the error variance was homoscedastic. If the null hypothesis was rejected and a conclusion made that heteroscedasticity was present in the panel data, then this would be accounted for by running a Feasible Generalized Least Squares (FGLS) model. Hypothesis testing was tested using the simple regression model to show how well it fits the data. The significance of the independent variable was also tested. The Hosmer-Lemeshow's (H-L), goodness of fit was applied. To evaluate the goodness of fit of the logistic regression model, the Nagelkerke's R squared was used. The test divided a subject into deciles based on predicted probabilities then computes a chi-square from observed and expected frequencies. Then a probability (p) value was computed from the chi-square distribution to test the fit of the logistic model. The hypothesis was tested on the basis of p value. The rule of thumb was that the research hypothesis was accepted if the p value was 0.05 or less. The research hypothesis was rejected if the p value was greater than 0.05. In other words, if the p-value was less than 0.05 then it was concluded that the model was significant and had a good predictor of the dependent variable and that the results could not be based on chance. If the p-value was greater than 0.05 then the model was not significant and was not used to explain the variations in the dependent variable.

III. FINDINGS

The researcher issued 100 questionnaires to the respondent who filled and returned them. The table 1 below shows how the response rate to the questionnaires. This response rate was achieved after the researcher made effort to constantly remind the respondents to fill in and return. According to Mugenda and Mugenda (2003), a response rate of 50% or more is adequate. Babbie (2004) also asserted that return rates of 50% are acceptable to analyze and publish, 60% is good, and 70% is very good. Thus, the respond rate was considered very well.

Table 1: Response rate

Response rate	Frequency	Percentage
Response	100	100%
Non-response	0	0%
Combined	100	100%

A pilot study was conducted to determine the reliability and the validity of the instruments used for data collection. It was calculated as the average inter-correlations among the items measuring the construct. A Cronbach’s coefficient value of 0.7 was adopted as a threshold minimum value which defined satisfactory reliability (Sekaran, 2008). Table 2 shows that all the items included in the variables were consistent they all have the values of Apha above 0.7, which is the recommended value of Alpha.

Table 2: Reliability Analysis

Item	Cronbach's Alpha	Number of items	Remark
Product innovation	0.734	6	Accepted
Public sector performance	0.814	5	Accepted

75.9% of the respondents agreed that the organization introduced new or significantly improved goods. 77.2% agreed that organization introduced new or significantly improved service while 68.2% agreed that the new or significantly improved products introduced in the organization were new to their market. 81.5% of the respondents agreed that the new or significantly improved products introduced in the organization were only new to their firm.

73.1% of the respondents agreed that the research and development activities undertaken by the organization created new knowledge to solve scientific and technical problems, 75.1% of the respondents further agreed that the organization engaged in in-house or contracted out activities to design or alter the shape or appearance of goods or services, 73.7% of the respondents agreed that acquisition of existing know-how, copyrighted works, patented and no patented inventions by their organization from other enterprises or organizations for the development of new or significantly improved products. The findings are in line with those of Chigona and Licker (2008) contended that innovation holds the key to the continuity and growth of companies. Skaalsvik & Olsen (2014) argues that strong brands could lead to strong companies, customer loyalty and even strong industries and that a powerful brand can dictate high brand equity. Davis (2007) opines that the most valuable resource a business has is the reputation of its brands. Thus, a strong brand as an intangible asset is beneficial and useful because it enables a firm to strategically position itself with regard to competitors (Skaalsvik & Olsen, 2014). Nevertheless, the development of a competitive, sustainable and successful brand becomes the responsibility of everyone working in an organization (Skaalsvik & Olsen, 2014).

Innovative packaging and branding also enables the consumer to identify genuine products from counterfeit ones thus ensuring the safety (Wilson, 2015). 77.2% of the respondents agreed that public sector performance in Nairobi had been effective, 68.2% agreed that transparency influenced public sector management, 81.5% agreed that public sector performance was heavily reliant on accountability of public servants, 73.1% agreed that efficiency influenced public sector performance, 75.1% agreed that both human and non-human resource influenced public performance while 73.7% of the respondents agreed that skills had direct relationship on public sector performance. Zhonghua (2012) explains that, in light of traditional enterprise performance measurement, public sectors performance measurement shows two significant characteristics in the process of implementation and improvement: First, the multidimensional nature of measuring objectives. Public sectors not only have the economic attributes, but also bear on non-economic obligations of environmental benefits and social benefits, which needs to set performance targets to balance multiple objectives, multi-agent interests. Ulrike Mandl, Adriaan Dierx and Fabienne Ilzkovitz (2008) suggested that effectiveness was harder to achieve than efficiency, since the latter was not influenced by outside factors. The effectiveness has as influence factors the outputs, the outcomes and the environmental factors. Normality test was carried out since many of the statistical procedures used in the study including correlation, regression and t- test that assumed that the data followed a normal distribution. This assumes that the population from which the sample was drawn was normally distributed (Ghasemi & Zahedias, 2012).

Correlation between variables is a measure of how well the variables are related. This is represented by r. The most common measure of correlation in statistics is the Pearson Correlation (technically called the Pearson Product Moment Correlation or PPMC), which shows the linear relationship between two variables. Results are between -1 and 1. A result of an r value of -1 means that there exist a perfect negative correlation between the two values at all, while a result of r =1 means that there is a perfect positive correlation between the two variables. Result of 0 means that there is no correlation between the two variables (Gujarat, 2004). The Pearson correlation results of this study are shown in Table 3 and reveals that there exists a strong positive correlation between product innovation and public-sector performance supported by an r value of 0.786. Therefore, an increase in the product innovation influence public-sector performance positively.

Table 3: Pearson Correlation Coefficient Matrix

		Public-sector performance	Product innovations
Public-sector performance	Pearson Correlation	1	
	Sig. (2-tailed)		
Product innovations	Pearson Correlation	0.786**	1
	Sig. (2-tailed)	0	

** Correlation is significant at the 0.01 level (2-tailed).

Beta coefficients results in table 4 showed that Product innovation had a positively and significant influence on the Public-Sector Performance ($\beta=0.250$, $p=0.007$). This implies that one unit increase in product innovation would lead to a 0.250 increase in Public Sector Performance in Nairobi City County.

Table 4: Regression coefficient

	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	1.828	0.290	6.305	0.000
Product innovations	0.250	0.043	5.814	0.007

The simple regression optimal model was as shown below:

$$Y = 1.828 + 0.250X_1 + 0.290$$

Where;

Y= Public-Sector Performance

X_1 = Product Innovation

Simple linear regression was used to test the hypothesis. The criteria used in hypothesis testing was that research hypothesis was to be accepted if the p value is 0.05 or less. The research hypothesis was to be rejected if the p value is greater than 0.05. In other words, if the p-value is less than 0.05 then it was concluded that the model was significant and had good predictors of the dependent variable and that the results was based on chance. If the p-value was greater than 0.05 then the model was not significant and was used to explain the variations in the dependent variable.

IV. DISCUSSIONS

The main objective of the study was to assess the impact of product innovation on public sector performance in Nairobi City County. The results indicated that the impact of product innovation on public sector performance was satisfactory. This is due to introduction of a good or service that is new or has significantly improved characteristics or intended uses. These include technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics. Moreover, Customers of innovative products gained benefits in terms of more choices, better services, lower prices and improved productivity. This finding is supported by the coefficient of determination which shows that unit increase in product innovation will lead to an increase of 0.165 in the public-sector performance in Nairobi County. Since the P-value is 0.000 which is less than 0.05, the impact of product innovation on public sector performance is statistically significant and hence we accept alternate hypothesis. The second objective of the study sought to determine how process innovation influences public sector performance in Nairobi County Government.

V. CONCLUSIONS

Based on the findings of the study, it can be concluded that product innovation influences public-sector performance in Nairobi County. Improved quality of goods and services in any organization will highly influence performance of public sector as seen in Nairobi County. Well utilization of product innovation by any business/organization entices customers to buy their products and customers become much attracted towards that business. The study also established that the innovative products required organizations to succeed in market innovations such as environmental analysis, response to change and aggressive anti-competitors needs to influence public sector performance in Nairobi City county. The study

concludes that product innovations such as product replacement and product repositioning contribute to public sector performance. Product development was important in both the supply of the core product as well as in the support part of any offer. The study concluded that innovations ensured that the goods and services given to customers were of high quality. The study also concluded that Process innovation generated significant gains in product quality and service levels. Generally, from the findings, the innovational influence on public sector performance could be said to be satisfactory.

VI. RECOMMENDATION AND SUGGESTIONS

The study demonstrated that product innovation design is the main way to improve the core competitiveness of enterprises and tacit knowledge is the source of product innovation design. A business that is capable of differentiating their product from other business in the same industry to large extent will be able to reap profits. This can be applied to how smaller businesses can use product innovation to better differentiate their products from others. Business that once again are able to successfully utilize product innovation will thus entice customers from rival brands to buy its product instead as it becomes more attractive to the customers.

For better performance of any public-sector incorporation of product innovation is highly recommended. Innovation in all human areas is applicable from product development, methods of management and ways of doing works. This study considered the influence of product innovation in public sector performance only in Nairobi City County hence further study is recommended to perform the same study in other counties. A comparative study on influence of innovation practices in public sector performance can be done per counties.

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