Process Innovation As A Factor In Improving Performance In Software Start-Ups In Nairobi City County, Kenya

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Abstract

Kenya and its capital in Nairobi City County, has taken a lead in innovation hubs and software start-ups in the financial technology (fintech), health-tech, and agri-tech sectors. But performance of these start-ups has been unstable due to lack of external financial support, managers lacking experience and inability of accessing money in the initial phase of development. These obstacles have caused closure of many start-ups for failing to remain competitive, retain customers and employees, increase market presence and profitability. To solve these challenges, this paper considered process innovation as a means of improving performance of software start-ups in Nairobi City County. The Schumpeter's Theory of Innovation provided the theoretical perspective. Primary data was collected from 149 respondents who filled the structured questionnaires. The quantitative data was analyzed using descriptive and regression approaches and found an aggregate mean of 3.97 for process innovation and 3.95 for performance of the software start-ups. The regression model at R square of 0.552 indicating that process innovation accounting for 55.2% performance changes and beta findings of β =0.167, implying a positive and significant relationship between the variables. It was concluded that process innovation was an important component in determining performance of start-ups. The paper recommended a need to keep improving and adjusting work schedule **and processes for optimization of resources, quickly completing tasks and maintaining high standards of products.**

Keywords: Operational Efficiency, Cost Reduction, Quality Improvement, Cycle Time Reduction, Revenue, Growth, Customer Retention, Profitability

INTRODUCTION

Performance as concept covers productivity and the attainment of the purposes by the organization as well as providing value to stakeholders. It is a key determinant of success, sustainability and competitiveness of organizations and businesses. In the views of Taouab and Issor (2019) performance includes dimensions such as profitability, market positioning and size, consumer satisfaction and process management. There is increased demand for better performance speed, and reduced cost and the reverse is wastes, negative returns, market share erosion, and poor stakeholder satisfaction (Wheelen, *et al.,* 2018). Prolonged decline in performance, makes the organization unattractive to investors and threatens its survival (Tuan, 2020). Therefore, for continued successes, organizations must invest in innovation as a means of developing and launching new concepts, fresh approaches, goods or service.

Innovation provides organizations with a competitive edge, particularly in industries characterized by rapid technological advancements. Tidd and Bessant (2018) highlighting that the firms which engaged into research and development are future-oriented and geared to remain relevant. These firms consistently develop their programs resulting in better performance in the long run. Risk of not adopting innovation strategies is that the organization gets left behind to struggle with outdated practices inability to deliver on new demands, new technologies or changing customer needs (Kerzner, 2022). Innovation strategy is difficult to implement in emerging markets that are common in Africa and its start-ups. Another factor is that performance of the start-ups is still a great challenge due to restricted capital base, high operation risks and inadequate legal protection (Mkpojiogu, *et al.,* 2019). This has left start-ups suffered and hampered with impossibilities leading to high failure rates (Odufuwa & Mureithi, 2023).

In Kenya, there are over 200 software start-ups as per the 2019 records, and these firms provide solutions in different industries (Ajuang', 2019). However, these start-ups suffer from resource constraints, minimal governmental support, and a lack of skilled human resource. These hurdles prevent the start-ups from expanding and operating with optimum efficiency, thereby reducing the chances of sustainability (Chirchietti, 2017). Rising competitiveness demand innovation in the production processes, and hence the interplay between process innovation and performance as a core component for survival and growth of these start-ups.

Process innovation where the focus on the use of better or new methods of operation to confirm efficiency and cut costs while enhancing product quality (Kahn, 2018). It makes it possible for organizations to reduce internal processes, which is structure for start-ups that have limited capital to take on many processes. Organizational innovation as per the perspective of Paais and Pattiruhu (2020) on the modification of organizational arrangements and leadership systems to enhance adaptability and decision making; for instance; organizational redesign or implementation of new human resource policies that will enhance the company's innovative capacity. Supply chain innovation is another sub category of innovation strategies and is concerned with improving the activities that surround product or service distribution, such as the management of the physical flows and the introduction of newer forms of technologies like blockchain for greater levels of openness (Hong, *et al.,* 2019).

Process innovation works to streamline organizational functions for better performance. This performance takes different dimensions and measurement indicators because the organizations are dissimilar. Taouab and Issor (2019) gives a broad description of organizational performance as a general wellbeing of an organization in terms of financial sustainability, strategic positioning, employees' satisfaction and organizational flexibility. Performance for profit-making organizations is done using financial measures, that Amir et al. (2023) noted include ratios, the generation of cash and analyses of profitability in a statement of profit and loss. For Alshehhi *et al.* (2018) noted the employment of financial data such as organization revenue, profit margin, and return on investment as indicators of economic performance and financial health of the organization. In this paper, performance of the start-ups is measured as revenues, customer acquisition, customer retention rates, growth rate and profitability margins. These indicators were also used in researches conducted by Skala and Skala's (2019), Tidd and Bessant (2018) and Taouab and Issor (2019).

Statement of the Problem

Start-ups face barriers as they are limited in access to resources and lack operational history; but software start-ups have an added challenge of continuous technological advancement and changes in the industry. Therefore, according Kahn (2018) and Opazo-Basáez *et al.* (2022) these software start-ups are vulnerable to unpredictable markets and dealing with costs of acquiring state-of-the-art technologies. Although, the Kenyan start-up ecosystem is the most established in Africa, but its average growth rate of 22.7% cannot compared to Silicon Valley's average growth rate of 50%. In their research Muathe *et al.* (2022) noting that all the start-ups indicated that their greatest challenge was raising capital and finding a suitable investor, which negatively impacts on functionality and performance outcomes. For Giardino *et al.* (2014) start-ups face the challenge of limited resources and hence tend to be highly reactive to the market trends.

Most software start-ups struggle in their growth phase especially in running their daily operations, managing the business and improving efficiency. Although these start-ups have really good solutions, they lack standard operations which also includes no constant pricing structure for their services and no defined market niche. Korir (2018) observes that for most companies, applying business strategies is expensive and requires changes that require considerable time due to cultural and structural factors. Most of the entrepreneurs in these start-ups hence overlook the need for having solid business strategies, which can result in poor performance. With the highly unpredictable and ever-changing environment in which software start-ups operate, there is a need to correctly map out innovation strategies to help these start-ups survive (Eisenmann, 2021). Therefore, the study sought to explore how process innovation influences performance outcomes in start-ups.

The study objective was to establish the effect of process innovation on performance of software start-ups in Nairobi City County, Kenya

Research hypothesis:

$H0_1$: There is no significant effect of process innovation on performance of software start-ups in Nairobi City County, Kenya.

LITERATURE REVIEW

Theoretical Framework

Schumpeter's Theory of Innovation

The theory is associated with Schumpeter (1934), stating that any entrepreneur that wishes to grow and remain relevant in the industry they operate should continuously innovate. The failure to innovate renders the company irrelevant in the long run. Schumpeter coined the term "creative destruction" to describe the process in which the introduction of new innovations disrupts and replaces established industries, technologies, and ways of doing business. Further stressing that this process of destruction and renewal is required for lasting expansion in the sense of economy. Technology was deemed an important vehicle in the promotion of innovation and development. The appropriate conceptions of radical innovations were considered as revolutionary breakthroughs, which involves ground-break inventions in producing disruption and fueling the transformation of economics.

Tidd and Bessant (2020) observed that organizations might have some competitive advantage, better and more profits, and potentially monopolistic or oligopolistic position in the first stage. But it takes some time before creative destruction occurs and other firms may come up with new innovations that will eventually displace the current leaders. According to Schumpeter, innovation is not merely an option for businesses but a necessity for survival and success in the modern economy. This theory was suitable for software start-ups in Nairobi City County because of the dynamic operating environment, which requires frequent change to ward off competition and improve performance.

Other than technological innovation as a component of the theory, Usai *et al.,* (2021) noted that process innovation is another crucial element rooted in Schumpeter's theory of innovation. This is a signal to the software start-ups to reflect and better their operation in order to increase productivity, decrease spending, and increase on the quality of the services they delivery (Murenga & Njuguna, 2020). Schumpeter's idea of creative destruction applies here as well, as outdated processes are replaced with more efficient and scalable ones, enabling the software start-ups to operate more effectively in a competitive environment. Inefficient structures are cast off and replaced with more efficient and economies of scale where the software start-ups themselves are able to operate more efficiently in a competitive environment.

Empirical Literature

In a study carried out by Majimbo and Namusonge (2020) on strategic innovation and performance of oil marketing firms in Nairobi city county, the results revealed that implementation of new workflow management systems by the companies resulted in increased sales and improved operational efficiency within the oil marketing sector. Although these companies did not provide incentives to employees for making improvements in their work nor did they lead to any noticeable improvements, the firms supported ongoing enhancements in their activities. Introduction of new systems in these firms lead to high efficiency in the oil marketing firms.

Mung'ora and Kiiru (2019) investigated how innovation strategies influenced the performance of savings and credit cooperatives in Nyeri County. The study collected data through census as the population was small. Unstructured questionnaires were used to gather data and respondents were allowed complete freedom in their responses. The research results revealed that process innovation improved the performance of the SACCOS which led to shorter waiting hours, reduced operational costs and overall efficiency improvement. It was seen that process innovation was an important indicator of a SACCO's performance.

According to the recent work done by Hong *et al.* (2019) on over 150 manufacturing firms they realized that there were enhancements in efficiency of production by 20 % and a decrease in cost of production by 15 % among companies which had incorporated process innovations. Further, product quality was enhancing by 18% and research/development expenses by 12%, and in other aspects, an average of 25% by financial returns were seen. This is a reflection of latest dynamics and innovation strategies unique to manufacturing sector in China

In another study, Yang and Lee (2020) examined an influential association between process innovation and organizational performance in the scope of the South Korean service industry. In the study, 200 service organizations were studied. The findings showed that process

innovations resulted in the enhancement of organizational performance by 22% in terms of operational effectiveness, 30% of the boost in the scores of customers, and 17% in general organizational performance.

Conceptual Framework

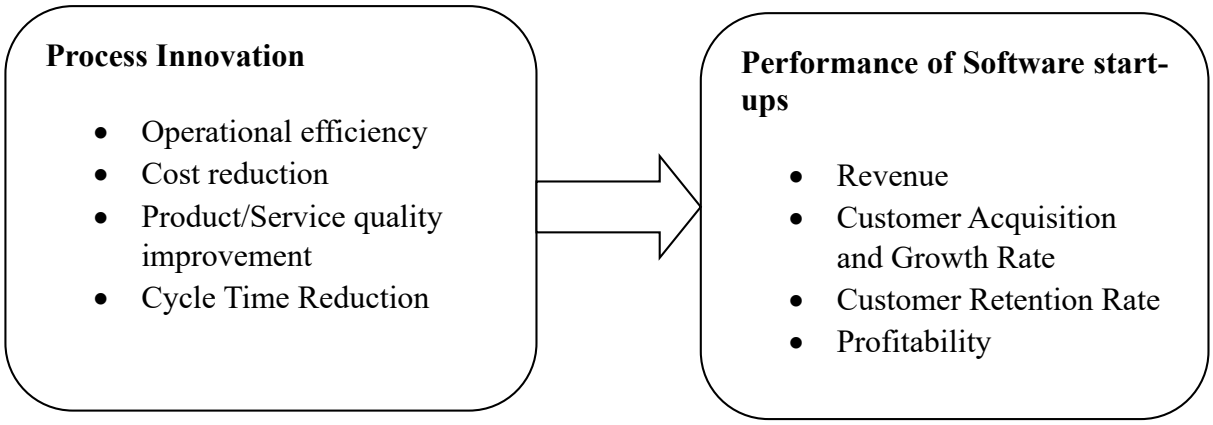

Figure 1: Conceptual Framework

METHODOLOGY

Research design, is the systematic plan or blueprint for conducting a study (Asenahabi, 2019). The goal is to provide a comprehensive and well-structured framework for conducting rigorous and systematic case study investigations. To investigate the study problem, descriptive research design was used in this study. The design helps describe events and conditions they naturally are without manipulating the variables (Indu & Vidhukumar, 2019). In this study, a mix of quantitative and qualitative data was gathered from the targeted respondents.

The targeted population consisted of 93 software start-ups in Nairobi City County and the respondents included 348 individuals who hold the positions of founder/co-founder, Chief Technology Officer, Head of Customer Support, and marketing manager. Using the Yamane formula Yamane (1973) a sample size of 186 respondents was selected to take part in the research.

These respondents filled a semi-structured questionnaire, which was the data collection instrument. A pilot study was conducted and with Cronbach alpha scores of 0.843 for process innovation and dependent variable -performance at 0.801; confirming the instrument was reliable. The questionnaire was also reviewed by the supervisor and research experts, showing the questionnaire as valid. The questionnaire was converted into an online document and distributed via a Google Forms link. The respondents had two weeks to fill the questionnaire before commencement of data analysis. The analysis consisted of inferential and descriptive statistical procedures, with findings presented in tables, charts and discussions.

FINDINGS

The results are based on conducted descriptive and linear regression analysis, as shown in subsequent sections.

Descriptive Analysis Results

Table 1: Process Innovation

	Mean	Std Dev.
The systems and processes we've introduced have helped us work more efficiently, completing tasks faster with fewer resources.	3.98	.948
New processes or technologies we've implemented have helped us cut costs without sacrificing quality.	3.87	.917
Our internal process improvements have led to noticeable enhancements in the quality of our products or services (e.g., fewer bugs, better user experience).	3.92	.874
We've managed to shorten the time it takes to go from concept to the final product or service delivery because of process changes.	3.90	.950
We have automated key processes in our operations (e.g., customer management, invoicing) to improve efficiency.	4.03	.944
Changes in how we work have resulted in our employees being able to achieve more in the same amount of time.	3.96	.929
Our operational changes have improved customer service, leading to higher satisfaction levels.	4.11	.909
Aggregate Mean and Std. Dev.	**3.97**	**.924**

The seven items received mean scores between 3.87 and 4.11 which accumulated to a general average of 3.93. The overall standard deviation measure equaled 0.924 which demonstrated that most participants agreed within an average range of responses to the questions on process innovation within their star-ups.

Table 2: Performance of Software Start-ups in Nairobi City County

	Mean	Std Dev.
Over the past year, our company has consistently increased its overall revenue.	4.07	.886
We have successfully attracted a growing number of new customers or users over the past 12 months.	3.87	.946
Most of our customers continue to use our product or service for a long time after their first purchase or signup.	3.98	.990
After covering all operating costs, our company has consistently generated profits over the last year.	3.85	.982
We have been able to expand our market share and reach new customer segments or regions.	3.99	.874
Our product or service can scale easily without needing proportional increases in costs.	3.97	.986
Our company is financially stable, and we can sustain operations even during periods of slow revenue growth.	3.92	.912
Aggregate Mean and Std. Dev.	**3.95**	**.939**

Study results revealed that fintech start-ups in Nairobi achieved positive performance according to different metrics including growth potential and market penetration capabilities and the ability to expand their operations. The performance-based items received uniform approval from the respondents as their combined mean was 3.95 while the standard deviation reached 0.939 though some variance appeared when rating profitability and customer retention capacity. Research shows innovation-based start-ups demonstrate strong initial growth potential but encounter performance instability in their initial operational phases as per Eshima & Anderson (2017).

Regression Analysis Results

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.743	0.552	0.540	0.18902

a Predictors: (Constant), Process Innovation

Process innovation was found to explain about 55.2% of the differences observed between the manner in which the software start-ups performed. This shows in the R-square value of 0.552 as shown

Table 4: Analysis of Variance

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	7.775	1	7.775	181.24	.000
Residual	6.306	147	0.042		
Total	**14.081**	**148**			

a Dependent Variable: Performance of software start-ups
b Predictors: (Constant), Process Innovation

Results in table 4 indicated that the model was statistically significant, with F (1, 147) of 182.24 and a p-value below 0.001. To support this, the actual F-value computed (182.24) was checked to see if it was greater than or equal to the critical F-value for a 0.05 significance level. With reference to the F-distribution tables, the critical F-value for these parameters was close to 2.39. Since F-value (182.24) exceeded the critical value (2.39), the model was accepted as statistically meaningful. Implying that process innovation impact start-up performance and helped the prediction process more than what might be achieved randomly.

Table 5: Regression Coefficients

Predictor	Unstandardized		Standardized	t	Sig.
	B	Std. Error	Beta (β)		
(Constant)	2.781	0.428	—	6.5	0
Process Innovation	0.167	0.049	0.261	3.409	0.001

a Dependent Variable: Performance of software start-ups

The analysis found that process innovation was significantly associated with better software start-up performance. Because the coefficients are unstandardized, the equation produced from the model is as follows:

$Y= \beta_0 + \beta 1X_1 + \varepsilon$, as per the SPSS generated table above.

This equation therefore becomes:

$Y= 2.781 + 0.167X_2 + \varepsilon$

To examine the effect of process innovation on performance, the following hypotheses were tested:

$H0_2$: There is no significant effect of process innovation on performance of software start-ups in Nairobi City County, Kenya.

$H1_2$: There is a significant effect of process innovation on performance of software start-ups in Nairobi City County, Kenya.

As shown in table 5, Process Innovation was the second most important from the results (B = 0.167, p = 0.001). According to the findings, making internal processes more efficient by automating them, enhancing efficiency and updating procedures mattered for firm success. Most Nairobi fintech start-ups need to be very agile, quick to market and efficient with resources because the industry moves rapidly. For every one-unit rise in process innovation, performance improved by 0.167 units, indicating how key innovation is to smooth operations. As a result, the study rejected the null hypothesis ($H0_2$), which stated there is no significant effect of process innovation on performance of software start-ups in Nairobi City County, Kenya. The data provide strong evidence that efficient internal systems are a vital contributor to success in this context. The results match those found in study by Mikalef *et al.* (2020) which connect simpler processes with better scalability and quality of services.

CONCLUSION AND RECOMMENDATIONS

The study was to establish the effect of process innovation on performance of software start-ups in Nairobi City County, Kenya. In line with this objective, the study sought learn whether software start-ups were redesigning key operations to boost their productivity. From the results, many firms had updated their processes, made administrative and customer care tasks automated and chose agile approaches to build software applications. The new developments saved time as well as lowered expenses for each transaction, resolved customer problems faster and made it easier for departments to cooperate. Moreover, doing these things with few resources suggested that start-ups at the event had strong strategies. It was now recognized that strong performance depended both on what a company offered to customers and on how smoothly internal functions allowed for promptness, adaptability and reliability.

The study concluded that process innovation was seen to be very important as well. Streamlined workflows, automation tools and agile techniques were proven by the study to lift the efficiency of any organization's operations. Companies that worked on their internal structures could reduce costs, complete products faster and create more output, all without sacrificing quality. Broken down avenues made certain that resources were utilized efficiently and processes were flexible to changes in the firm's and market's environment.

Since, process innovation helps to make the company more efficient and effective within start-ups operating within Nairobi City County, the study recommends these organizations should keep improving and adjusting how they work. There processes needed to be automated and follow agile development as it helps improve performance. Improvements within departments will help companies optimize resources, complete tasks quicker and keep service standards as they scale up. Applying strong project and performance management methods will help these goals by making it easier to watch, measure and adjust to new market trends.

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