THE EFFECTS OF INNOVATION AND SUSTAINABLE DEVELOPMENT AMONG SMALL AND MEDIUM ENTERPRISES IN NAIROBI COUNTY

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Abstract

This study was designed to investigate the relationship between Innovation and sustainable development among SMEs in Nairobi County. A sample representation of 246 from three levels of management of all SMEs was taken from the study using simple random sampling. In the process of answering the basic questions, a questionnaire for this study consisted of two sections: the profile of the respondents and their business, and the main questionnaire, which contained questions on innovation. After the data, had been collected, it was analyzed for both parametric and non-parametric tests. Most of the data collected using the Likert scale was ordinal. Open-ended questions were analyzed using descriptive content analysis. There was error checking before data analysis to check for correctness of data input to the system cleared out transcription errors. Descriptive statistics such as the mean, the range, the standard deviation and variance gave a good idea of how the respondents reacted to the items of the questionnaire and how good the items measured were. Exploratory data analysis included reliability tests for constructs at both individual and composite level and measurement of both convergent and construct validity were carried out using regression analysis to determine the relationship between the environmental entrepreneurship and sustainable development. The findings established the effect of innovation and sustainable development as having a good fit since all were above or below the recommended levels. The effect of innovation was indicated by regression model results (R^2 0.526, $P < 0.000$). The independent variables had significant effects on sustainable development. Innovation had a significant effect on sustainable development ($p > 0.019$), The study recommends that SMEs' transition to sustainable practices can also favor the greening of supply chains; indeed, responding to green requirements for SMEs' participation in global value chains. Green-related changes in transnational supply chains can be particularly challenging for SMEs, as they are requested to fulfill highly demanding green quality standards, while facing growing pressures to reduce costs, in particular, among other recommendations.

Keywords: *innovation, sustainable development, SMEs*

Introduction

Eco-innovation is closely related to the development and use of environmental technologies, but it also embraces several non-technological dimensions. Based on the conventional understanding of innovation, as outlined in the Oslo Manual, the OECD defines eco-innovation as the implementation of new, or significantly improved, products (goods or services), processes, marketing methods,

organizational structures and institutional arrangements which, with or without intent, lead to environmental improvements compared to relevant alternatives (OECD, 2009a).

According to this definition, eco-innovation is distinguished from other types of innovation solely by its environmental effects, whether intended or not. However, eco-innovation can also be defined more broadly than in the conventional sense covered by the Oslo Manual, as it also includes changes in 'institutional arrangements', together with innovation in products, processes, marketing methods and organizational practices. The view that changes in social norms, cultural values, and institutional structures should be considered, and promoted, as eco-innovations is gaining ground from a policy perspective. This reflects the idea that the greatest potential for system-wide environmental improvements is associated with changes in value patterns, behavioral models, social structures and interactions (OECD, 2009a).

Small medium enterprises (SMEs) are often called 'the backbone of the economy'; these dynamic enterprises contribute to economic development in several ways: they have the ability to create economic opportunities through innovation, enhance productivity and social and productive networks; indeed "research has shown that countries which have high start-up rates of such enterprises benefit from higher economic growth" Creech H, et al (2012). Globally, the SME sector generates substantial employment and economic output (Nichter S, Goldmark L. (2009), Abor J, Quartey P. (2010), de Kok J, et al C. (2013)

Sustainable entrepreneurship is a crucial component of the global market as well. According to one study conducted by Schaltegger & Wagner, (2011), it reported that there is a link between sustainable entrepreneurship and sustainable innovations. A second study conducted by Meek et al. (2010) shows that there is an "integral role that social norms play in influencing the creation of new firms and by illustrating the potential effect social norms have the effect of a policy that seeks to encourage environmentally responsible economic activity".

To date, the majority of the corporate sustainability has been focused on how established firms can reduce their environmental impacts and how sustainable development affects competitive advantage (Hall et al., 2010). But recently the concept of sustainable entrepreneurship came into focus when comprehensively discussing the contribution entrepreneurial activities make to sustainable development. Sustainable entrepreneurship is, in essence, the realization of sustainability innovations aimed at the mass market and providing benefit to the larger part of society. By realizing such (radical) sustainability innovations sustainable entrepreneurs often address the unmet demand of a larger group of stakeholders. Stakeholders are groups or individuals that materially affect or are affected by a firm's activities (Schaltegger et al., 2011). As a consequence, the subject of sustainable entrepreneurship – defined in a narrow sense is a very innovative company start-up supplying environmentally and/or

socially beneficial products and services with the potential to conquer a large part of the market. Defined more widely, sustainable entrepreneurship can thus be described as an innovative, market-oriented and personality-driven form of creating economic and or social value by means of break-through environmentally or socially beneficial market or institutional innovations.

Literature review

Eco-Innovation has become one of the important strategic tools to obtain sustainable developments in manufacturing industries because of the increasing environmental pressure. In the past, investing in environmental activities was considered as unnecessary. However, strict environmental regulations and popular environmentalists have changed the competitive rules and patterns for companies. With the emerging importance of eco-innovation since the late 1990s, researchers have addressed eco-innovation from different perspectives. First, are the studies that identify factors that drive eco-innovation and the performance outcomes arising from eco-innovation, with Kammerer (2009) and Dangelico and Pujari (2010) being the most recent examples of this category. Second are those that identify the dimensions of eco-innovation, with Hermosilla et al. (2010) as one recent article in this category. The third group of studies is related to the measurement of eco-innovation (Arundel and Kemp, 2009).

According to a study conducted by Stuart and Kacou (2011) on business strategies, it was found that in Kenya, women are becoming role models. The women identified within the study were able to inspire and motivate people to be creative, helping themselves and others through the implementation of sustainable development solutions. These women were not imprisoned by the lack of opportunities, employment, or stereotyping, but instead have worked to start their own ventures, applying their full capacities and capabilities (Stuart & Kacou, 2011). As a result, innovation has become mainstream within Kenya, as individuals therein have made it a societal norm to use the opportunities available to its citizens that enable them to participate in innovation activities. Using Kenya as an example, it is plain to see that innovation can occur in numerous ways, even though the motivation of others is to participate in activities that work to improve the economy. This relates to sustainable development because of motivation, for example, allows entrepreneurs to continuously find new innovations that can enhance their businesses.

The innovation environment has changed significantly over the last decades. The increasing role of small businesses in innovation dynamics is related to profound and multi-dimensional transformations in market economies, which have led to a reduced importance of economies of scale in production, management, finance, and R&D. A major driver of this has been the reduction in the product standardization that was, on the other hand, the strength of large firms in the middle of the 20th

century. As incomes, have risen and the taste for variety increased, multiple market niches have appeared, which new and small firms are quick to fill (OECD, 2010).

Africa and Kenya, in particular, has become a center for innovation and entrepreneurship. Kenya is a world leader in mobile money, driven in part by the market leader, M-PESA. The second-generation mobile money has driven innovations in Kenya such as the mobile microfinance service M-SHWARI and "pay-as-you-go" home solar systems from M-KOPA show the potential of mobile money to break down barriers to development. Kenya is on the frontlines of innovation more broadly, with creative entrepreneurship incubation spaces such as "iHub," and companies like Google, IBM, and Intel strengthening operations in Nairobi County. In July 2015, the Kenyan and the United States governments co-sponsored the sixth annual Global Entrepreneurship Summit in Nairobi County. The 2015 summit focused on generating new investments in entrepreneurs, particularly women and young entrepreneurs.

Innovation can be subdivided into products (new good) or processes new method of production (Del Rio, Carrillo-Hermossilla, & Könnöla, 2010). System innovation refers to the changes in various systems such as industrial societal, behavioral, and market changes that may be present and may affect the organization itself. System innovations have the potential to alter the conditions of old systems, such as those of markets, by creating new frameworks and have the ability to create entirely new systems. Keywords in this area include the concepts of life-cycle analysis, dematerialization, closed-loop-material cycles, decoupling, sustainable production and consumption, eco-sufficiency, user-oriented systems and sustainable lifestyles.

Much of the existing literature on innovation is concerned with the process of diffusion of new products and techniques. An aspect of this process, which is discussed by a number of existing models, is the effect of uncertainty reduction on diffusion. As firms innovate, they release information about their novel product or technology. This reduces the uncertainty surrounding the value of the innovation, and hence will tend to promote or discourage further \innovators", depending on the nature of the information released.

Rogers offered the following description of an innovation: An innovation is an idea, practice, or project that is perceived as new by an individual or other units of adoption Rogers's theory (2003,). An innovation may have been invented a long time ago, but if individuals perceive it as new, then it may still be an innovation for them. The newness characteristic of an adoption is more related to the three steps (knowledge, persuasion, and decision) of the innovation-decision process that will be discussed later. In addition, Rogers claimed there is a lack of diffusion research on technology

clusters. For Rogers's theory (2003), a technology cluster consists of one or more distinguishable elements of technology that are perceived as being closely interrelated.

Uncertainty is a critical obstacle to the adoption of innovations. An innovation's consequences may create uncertainty. Consequences are the changes that occur in an individual or a social system as a result of the adoption or rejection of an innovation (Roger, 2003). To reduce the uncertainty of adopting an innovation, individuals should be informed about its advantages and disadvantages to making them aware of all its consequences. Moreover, Rogers claims that consequences can be classified as desirable versus undesirable (functional or dysfunctional), direct versus indirect (immediate result or result of the immediate result), and anticipated versus unanticipated (recognized and intended or not).

Rogers's theory (2003) describes the innovation-decision process as an information-seeking and information-processing activity, where an individual is motivated to reduce uncertainty about the advantages and disadvantages of an innovation. For Rogers (2003), the innovation-decision process involves five steps: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. These stages typically follow each other in a time-ordered manner

Despite the Kenyan people's talent, drive, and willingness to quickly adopt new innovations, significant difficulties remain for entrepreneurs. The Government of Kenya has recently taken steps to remove obstacles by using technology to streamline and simplify bureaucratic procedures, and reducing or eliminating minimum capital requirements.

Therefore, in the light of the above discussion, the following hypothesis was postulated: *Innovation in SMEs has an effect on the sustainable development of SMEs that the more they get innovative, the more the sustainable development*

Research methods

The study used a descriptive research design to investigate the effects of innovation and sustainable development among SMEs in Nairobi County, Kenya. A descriptive research design provided for a standardized collection and interpretation of data through surveys and statistical software SPSS. The study was conducted in Nairobi County. The population of the study comprised of the management of the SMEs. The research targeted 246 respondents, however, the study received a total of 236 respondents who completed the questionnaires and this was considered sufficient. This being a descriptive survey, the questionnaire was an appropriate tool for data collection. Respondents selected their answers guided by a seven Likert scale. The Likert scale is psychometric response scale primarily used in questionnaires to obtain participant's preferences or degree of agreement with a statement or

set of statements. This study applied various statistical techniques to compute the analysis. These included Analysis of Variance (ANOVA) and regression analysis.

Reliability was ensured through the use of standard survey questionnaires which was administered to all SMEs who formed the sample selected (Sunders, Lewis, & Thornhill, 2012). The consistency of the variables is checked with Cronbach's alpha statistics. Cronbach's Alpha test was also used to test internal reliability assuring the ability of data collected techniques and analytic procedure to produce consistent findings if they are replicated by a deferent inquirer (Sunders et al., 2012). The Cronbach's (ɑ) alpha as a coefficient of reliability score was 0.900 for this study. Cronbach's Alpha's can only be measured for variables which have more than one measurement question.

Analysis/study

The study assumed a linear model based on the knowledge from reviewed literature and relationship between Innovation (independent) and sustainable development (dependent) where Innovation assumes to be a function of sustainable development. Innovation (INN) = (Sustainable development);

$y = f(X^i)$

Where X_i is the independent variable

Y = is the dependent variable

Thus, the regression model is $y = \beta_0 + \beta_1 I_i + \varepsilon_i$

It is assumed that the error $\boldsymbol{\varepsilon_i}$ is independent with constant variance (homoscedastic)

Where:

Y = is the dependent variable and it represents sustainable development

B $_0$ is the autonomous components which are the level of sustainable development that is not influenced by the independent variables considered in the study. It also gives the Y intercept of the model. From the table 2 on multiple linear regression, $\beta_0 = 0.964$

B $_1$ is the coefficient of proportionality which tells the variation to which innovation causes on sustainable development in SMEs in Kenya. The coefficient is positive and has a magnitude of 0.242. Therefore, where changes in the score of SME innovations reflects changes in the score of sustainable development in SMEs in Kenya.

€ is a random error term and takes care of other factors that affect sustainable development which is not defined in the model. The model generated can then be as follows: -

Y = 0.964 + 0.242 INN

Response Rate

Out of 246 questionnaires distributed to SMEs in Nairobi County, 236 (95.9%) of the questionnaires were filled out and collected, all of which were analyzed. This was a high response rate that was enhanced using various ways. First, an introductory letter that briefly explained the purpose of the study accompanied the questionnaires assuring anonymity of the responses provided, secondly, the drop and pick late method used to administer the questionnaires enhanced the responses rate. In addition, phone calls were used so as to get enough responses for statistical analysis and validity. Respondent's gender, age, company and their Job positions in the organization are relevant personal data. In addition, in all the indicators from the five-study contrast are relevant to the SMEs characteristics.

Background information

Background information was summarized using frequencies and percentages. From the study findings majority 47.9% are from the age group of 21-30 followed by slightly old generation group of 31-40 years of age 36%, 2.5% of the respondents were the old generation 41-50 years of age and .8% of the respondents were above 50 years of age. The study further sought to ascertain the gender balance of the respondents, the study findings majority 107 (45.3%), were female while 99 (41.9%) were male. 12.7% (n = 30) did not disclose their gender, indicating that there were more female environmental entrepreneurs than male in the surveyed SMEs.

The study discusses the means and standard deviations of the results as per the variable of the study. This was applied for the variables whose data was collected through a Likert scale. The investigation of innovation and sustainable development.

Table 1: Innovation

Effects of innovation on Sustainable development among SMEs	Mean	Std. Deviation
The company is equipped with the most recent environmental technology	5.06	1.35
The company follows current environmental technological trends in the industry	5.48	1.29
The company uses environmental technology to increase the production process	5.30	1.51
The company considers the effect of that technology has on the environment	5.87	1.41

The mean score on this item was 5.06 and a standard deviation of 1.35. This means that the majority believed that the company is equipped with the most recent environmental technology. The second item sought to establish if the company follows current environmental technological trends in the industry. The mean obtained for this item was 5.48 with a standard deviation of 1.29. This showed that the majority of the respondents believe that company follows current environmental technological trends in the industry. The third item sought to establish if the company uses environmental technology to increase the production process.

Model Testing

A linear regression model was applied to investigate the effects of environmental entrepreneurship and sustainable development among the SMEs

Based on the findings as presented in Table 2, the overall model was statistically significant (R^2 = 0.525, F= 48.18, p > 0.000). The R- squarecoefficient of determination informs the proportion of change in sustainable development that is caused by the variation of the explanatory variables; R^2 0.526, means that the model is able to explain 5.25% of the variation of dependent variable (Sustainable development). The model summary is presented in Table 1 shown below

Table 2: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.725[a]	.525	.515	.635	.526	48.18	5	217	.000

a. Predictor: (Constant), Innovation,

Table 3: Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	97.06	5	19.41	48.18	.000[b]
1	Residual	87.43	217	.403		
	Total	184.49	222			

a. Dependent Variable: Sustainable Development

b. Predictors: (Constant), Innovation

Regression Coefficients

Table 4 presents the regression coefficients that show the effects of environmental entrepreneurship and sustainable development among SMEs in Nairobi County. The table also presents the t-statistics and the p-values measuring the significance of the relationship between the dependent and independent variables.

Table 4:Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.964	.321		3.00	.003
Innovation	.242	.056	.247	.746	.019

a. Dependent Variable: Sustainable Development

Table 4 shows the coefficients of the multiple regressions for the explanatory variables. At 5% significance level and 95% confidence level, innovation, significantly influencing the growth of medium enterprises. The independent variable had a significant influence on innovation and sustainable development among SMEs in Nairobi County as indicated by the regression results of (β 0.964, p>0.003). Table 4 shows that innovation had a significant influence on the sustainable development at (β 0.242, p>0.019)

Discussion

The discussion about the key findings of the study was based on the objectives. This study sought to establish the effects of innovation and sustainable development among the SMEs in Nairobi County. The research objective under this variable was to examine the effects of innovation on sustainable development among the SMEs in Nairobi County. This was addressed using a number of indicators in running the SMEs. Findings of the study are that after examining how successful innovation is received the correlation analysis established that there was no strong correlation between environmental entrepreneurship and sustainable development, in that innovation explained 24.2% of the variation in the sustainable development of SMEs in Kenya (t= 0.746,β =0.242, P > 0.019). Thus, the t-calculated (0.746) value is less than t-critical (2.069) and the P-value of 0.019 is statistically significant. The findings seem to agree with other studies from Gerstlberger, Knudsen & Stampe

(2014) who reported in their findings   that innovation was considered and utilized in order to combat environmental challenges, efficiency challenges, and product development challenges. This information suggests that innovation has a greater role in sustainable development than previously thought. This is because both of these studies emphasize the fact that innovation drives efficiency, which increases sustainable development.

These findings as well agreed with the findings of Stuart& Kacou, (2011) who reported that in Kenya, even women are becoming role models. They are able to inspire and motivate people to be creative, helping themselves and others through sustainable development solutions, not to be imprisoned by lack of opportunities, employment and stereotyping but to start a venture with their full capacity and also findings from Zeng, S. X. et al (2010) who reported significant positive relationships between inter-firm cooperation with intermediary institutions, cooperation with research organizations and innovation performance of SMEs, of which inter-firm cooperation has the most significant positive impact on the innovation performance of SMEs.

Conclusion

The general objective of the study to investigate the effects of innovation and sustainable development among SMEs in Nairobi County, Kenya. The explanatory variables used in the study to influence innovation and sustainable development explains 52.6% of the dependent variable (R^2=0.526, p>0.000). It was established that innovators are more committed to sustainable development. An analysis also established that a strong and significant positive relationship correlation exists between innovation and sustainable development. Based on linear regression analysis, there is a relationship between the dependent variable 'innovation' and 'sustainable development'

This study tested hypothesis developed out of the existing literature on the relationship between innovation and sustainable development. On the basis of the empirical results obtained from the analysis of the quantitative and descriptive data, the study concludes that innovation relationship affects sustainable development among small and medium enterprises in Nairobi County, Kenya. Following the study findings and discussion presented in this research, the following conclusion was made;

The effects of innovation on sustainable development among the SMEs, this research finding revealed that the linkage and cooperation with government agencies demonstrate significant effects on the innovation performance of SMEs. These findings as well resonates with the findings of Stuart& Kacou, (2011) who reported that in Kenya, even women are becoming role models. They are able to inspire and motivate people to be creative, helping themselves and others through sustainable

development solutions, not to be imprisoned by lack of opportunities, employment and stereotyping but to start a venture with their full capacity

Recommendation

The findings of this research add significant information on the body of knowledge, specifically on innovation and sustainable development in Nairobi County. Analysis and synthesis provide descriptions of and recommendations on how to integrate innovative aspects into sustainable development have been made that would address the experiences of the innovators in their endeavor to achieve sustainable development goals.

The study recognises the commitment and concerted efforts offered by the National government and Nairobi County government in supporting SMEs growth in the county. SMEs' transition to sustainable practices can also favour the greening of supply chains; indeed, responding to green requirements for SMEs' participation in global value chains. Green-related changes in transnational supply chains can be particularly challenging for SMEs, as they are requested to fulfil highly demanding green quality standards while facing growing pressures to reduce costs. At the same time, however, these changes offer SMEs opportunities for a low-carbon transition, by enhancing their access to environmentally conscious large firms, knowledge flows and global markets. In line with global development and response to the environmental degradation, governments should focus on ecopreneurs as the key stakeholders of the environment and the country itself. The private sector should also be seen as a supplier of innovative green products and services. There is a clear need to meet the adaptation priorities of developing countries with expertise in technology and service delivery.Future research should continue on this path and seek to understand the drivers of innovators and the underlying economic incentives and implication on Sustainable development

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