THE EFFECTS OF PRODUCT DEVELOPMENT ON SUSTAINABLE DEVELOPMENT AMONG SMES IN NAIROBI COUNTY, KENYA

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ABSTRACT

This study was designed to investigate product development 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 product development. 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 venture product and sustainable development. The findings established the effect of product development and sustainable development as having a good fit since all were above or below the recommended levels. The effect of product development was indicated by regression model results (R^2 0.526, P < 0.000). Product development had a significant effect on sustainable (P > 0.011).

The study recommends that SME's experts and product developers need close interaction, which means that experts should be both physically close and organizationally proximal (in terms of authority) with regard to product development issues.

Keywords: *Environmental entrepreneurship, sustainable development, SMEs*

Introduction

New product development is defined in many ways. For our research, however, the definition of Robin Simon (2009) will be used. We consider this definition as the most comprehensive and appropriate for the purposes of our research. He argues that product development is the introduction of a new product to an already established market; or in a more general way, new product development is a method by which companies create new products in order to enter or main markets. In addition, Mayo (2010) divides the history of new product innovation into three phases. The first historical phase takes place before War World II; during this period companies were more product orientated and did

not pay much attention to customers‟ needs and requirements. The second phase, according to Mayo, started in the middle of 60‟s and it is characterized by the emergence of competition and development of the markets. During this period, knowledge about the markets was very important in the new product development process: what needs and wants customers to have and how companies can satisfy them. The third, and the last, phase has revealed contemporary concepts of the new product development process. Modern new product development requires investments in innovations and R&D process together with the focus on diverse customer's needs (Mayo, 2010).

Product development has been beneficial especially for young entrepreneurs in terms of innovation. In fact, product development requires a certain amount of research and development, which can be beneficial in creating new ways of doing things that may improve production processes, thus, enhancing product development. In 2015, a study was conducted that analyzed the life cycle of product development and its relationship with product development.

In this particular study, the empirical approach was utilized. It is considered to be "a reflection process in relation to the epistemological and methodological requirements. This way, a thorough scientific research and a presentation of the options can be conducted on scientific criteria" (Corăbieru, Corăbieru, & Vasilescu, 2015; Rakic & Rakic, 2015). The study findings showed that product life cycle can relate to the environment, product development is part of this relationship as well; thus, affecting sustainable development.

SMEs utilize local raw materials and technologies thereby aiding the realization of the goal of self-reliance. Also, governments at various levels (local, state and federal) have in one way or the other facilitated the performance of SMEs. While some have, formulated policies aimed at facilitating and empowering the growth and development and performance of the SMEs, others had focused on assisting the SMEs to grow through soft loans and other fiscal incentives in order to enhance the socio-economic development of the economy like alleviating poverty, employment generation, enhance human development, and improve social welfare of the people (Oreoluwa, 2011).

There are various other financial challenges that face Small and Medium Enterprises in Kenya. They include the high cost of credit, high bank charges, and fees. The scenario witnessed in Kenya particularly during the climaxing period of the year 2008 testifies the need for credit among the common and low earning entrepreneurs. Numerous money lenders in the name of Pyramid schemes came up, promising hope among the 'little investors,' which they can make it to the financial freedom through soft borrowing. The rationale behind turning to these schemes among a good number of entrepreneurs is mainly to seek alternatives and soft credit with low-interest rates while making

profits. Financial constraint remains a major challenge facing SME's in Kenya (Wanjohi & Mugure, 2008).

Literature Review

Products claiming to be environmentally friendly or green are on the rise as consumer's environmental conscience perceivably increases over the last decade. According to the recently published GfK Roper Yale Survey on Environmental Issues, the majority of the US-American and Canadian citizens argue that product purchases should be ecofriendly GfK (2008). Although the market share of green products and related services in the United States remains small in the past (1%-2% in 2007) US Department of Commerce (2010), according to a recent analysis conducted by the US Department of Commerce impressively reveals that this sector is steadily growing in all green product segments (US Department of Commerce (2010)). For instance, in 2008, US organic food sales grew by approximately 16% and reached a volume of 22.9 billion US dollar Organic Trade Association (2009). A qualitatively similar pattern can be obtained for Canada by contrasting US and Canadian food sales data Bowles (2011).

By reflecting recently published European Commission surveys for the years 2008 and 2009, nearly 75% (2005: 31%) of all Europeans would buy environmentally-friendly European Commission (2008) and European Commission (2009) and reading the afore mentioned surveys carefully, consumers seem to be even prepared to pay a price premium for environmentally-friendly products Bowles (2011), European Commission (2008) and European Commission (2009)). The soaring importance of green growth can be also observed in China: the 12th Five Year Plan particularly emphasizes the increasing importance of going green for China's economic growth Casey and Koleski (2011).

The global relevance of the green sector can be also fleshed out in the context of the recent financial and economic crisis. Although the priorities investing in environmentally friendly products or services are not new, it seems that particularly in the aftermath of the recent economic and financial crisis, there seems to be a forum for a revitalized and more thorough discussion of identifying drivers for sustainable economic growth. As pointed out by the OECD (2011), in particular fostering green entrepreneurship Isaak (2005) seems to be one of the promising key boosting economic activities as nearly 99% of all OECD countries' firms OECD-WPSMEE (2010) belong to the small and medium-sized (SME) sector Audretsch (2007) and it is expected that green innovations can be particularly traced back to young firms OECD-WPSMEE (2010).

According to a study conducted by Prakash Saha (2013), it was found that developing new green products would be the first attempt for banks to move concerning green banking aspects. Now if banks show a favorable attention to their stakeholders to participate in the process of improvement for developing new green products it would be possible for banks to perform as learning organization approach which will help them making profitable business along with maintaining the value of key environmental stakeholders. Banks have to ensure all types of stakeholder's participation in developing new green banking products to address and broaden their perspective to evaluate every environmental issue. Banks can ensure maximum benefits for their environmental stakeholders through bank stakeholders interaction which will lead banks to become not only a profitable but also an environmentally responsible organization. At present, this interaction process could be the most prior asset for the banks to formally incorporate environment stakeholder's influences in developing new green banking products.

There are few banks that have attempted some green banking initiatives, although they have not established themselves as learning organization till today. However, now banks are realizing the importance of introducing new green banking products and the involvement of stakeholders in the development process. This article is trying to present the position of environmental responsible banking practices in Bangladesh and how and which stakeholders (Internal & External) can significantly influence the process of development new green banking products.

As De Ko (2010) believes traditionally, a product is designed based on the designer's experience and inspiration of artistic work and the final decision is made based on the manager's intuitive judgment of and subjective feeling. Further, he outlines the following disadvantages. In intuitive approach; Right idea rarely comes at the right moment since it cannot be elicited at will; The results depend strongly on individual talent and experience; There is a danger that solutions will be circumscribed by one's special training and experience. For an effective product development process, which identified the need of the customer, transferring the need to a product and making it producible, complex decisions are involved identifying reliable alternatives.

According to the study conducted by Bullough, et al. (2014), it was found that young entrepreneurs do not necessarily have better advantages than those who are older, as even if they are physically more capable, this characteristic still pales in comparison to the greater dearth of experience held by older businesspersons. Due to the presence of technology and the possibility afforded by the ability of a new business to start fresh, so to speak, in the innovation and provision of a green product, the new, rather than the established, business person holds the advantage as they do not have to modify their existing products and or services to be interrelated to sustainability initiatives, something that can be difficult for already established organizations. It is the option of the new entrepreneur that

they can use a new structure, as opposed to modifying a pre-existing one; to answer the challenge of the environment in their product design and address how the product or service can contribute to the safety of the environment, the price, the value, and the effectiveness of the product or service being introduced. As such, product development is sometimes taken in greater strides by young entrepreneurs, particularly toward the application of environmental sustainability.

Furthermore, product development has likewise benefited in terms of innovation, especially for young entrepreneurs. In fact, product development requires a certain amount of research and development, which benefits from the application of innovation in the creation of new ways of doing things that may improve the production process, thus, enhancing overall product development. This leads to the following hypothesis

Ho: Product development does not have significant effects on sustainable development among SMEs

Research methods

The study used a descriptive research design to investigate the effects of environmental entrepreneurship and sustainable development among SMEs in Nairobi County, Kenya. The study aimed to objectively examine the effect of product development on sustainable development. A descriptive research design provided for a standardized collection and interpretation of data through surveys and statistical software. The study used a descriptive research design to investigate the effects of product development 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 (α) 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 product development (independent) and sustainable development (dependent) where product development assumes to be a function of sustainable development. Product development (PD) = (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 ε_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_{13} is the coefficient of proportionality which tells the variation to which Product development causes on sustainable development. The coefficient is positive and has a magnitude of the coefficient is 0.258. Therefore, where changes in the score of SME product development 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: -

$Y = 0.964 + 0.258$ PD

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 product development and sustainable development.

The study applied five line items to measure on product development , From figure 1, the first item was to establish if respondents were asked to state their perceptions on whether: The company is considering the potential destruction of the environment, if product development companies consider the source of supply, if the   company has a policy that ensures the quality of products are environment-friendly, if companies products have a strict environmentally quality production process and whether products are labelled with international standards and customers are protected
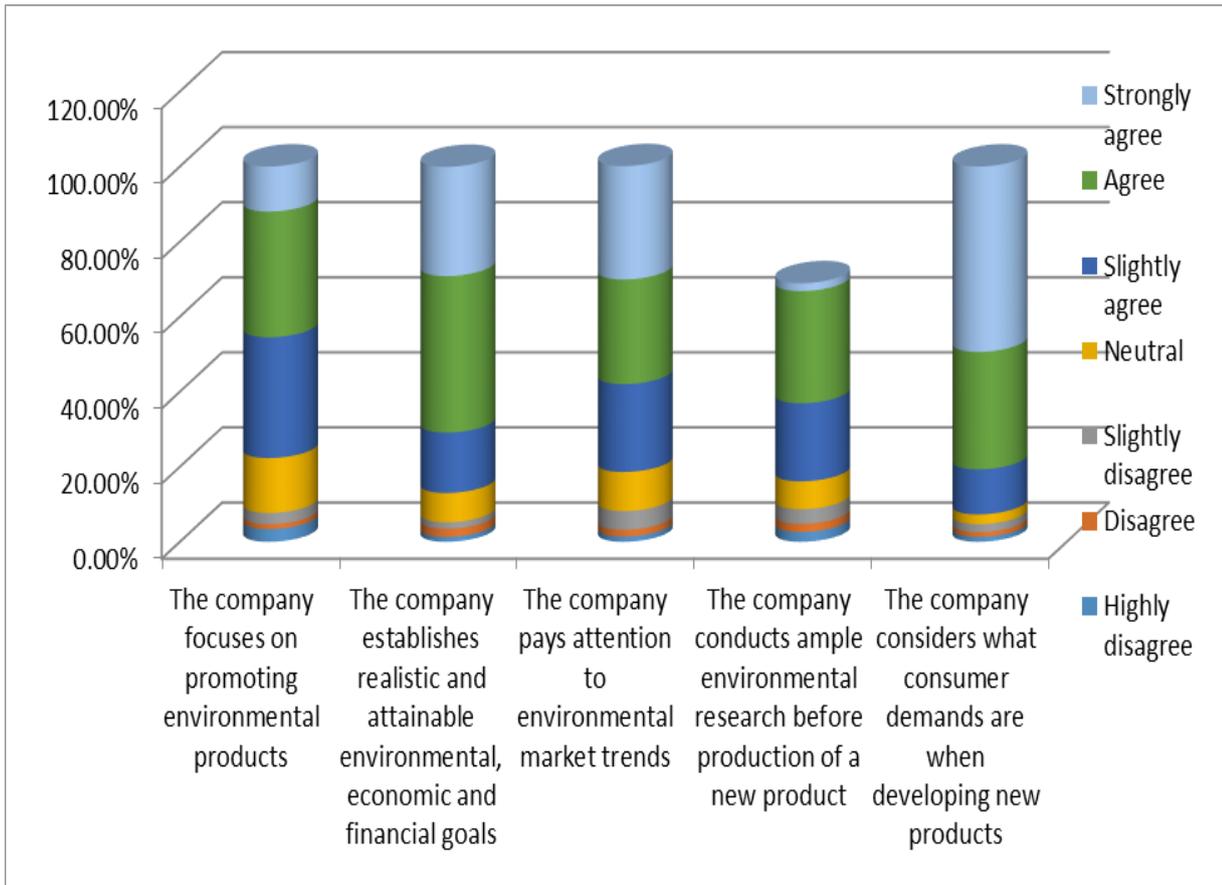
Table 1 Product Development

Effects of Product development on sustainable development among SMEs	Mean	Std. Deviation
The company is considering the potential destruction of the environment	4.2	1.9
In our product development, we consider the source of supply	5.3	1.4
The company has a policy that ensures the quality of products is environment-friendly	5.5	1.5
We believe that our products have a strict environmentally quality production process	5.6	1.4
Our products are labelled with international standards and customers are protected	5.6	1.6

Source: Research data 2015

From table 1, the mean scores were 5.3, 5.5, 5.6, and 5.6 respectively. The standard deviations were 1.4, 1.5, 1.4, and 1.6 respectively. This shows that a very good majority agreed that in market opportunity companies considering the potential destruction of the environment as a policy that ensures the quality of products are environment-friendly, companies products have a strict environmentally quality production process and products are labelled with international standards and customers are protected.

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	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), product development

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), product development

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
Product development	.258	.039	.281	1.51	.011

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, product development significantly influencing the growth of medium enterprises. The independent variable had a significant influence on product development 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 Product development had a significant influence on the sustainable development at (β 0.258, p>0.011)

Discussion

This study sought to establish the effects of product development and sustainable development among the SMEs in Nairobi County. The results of the tested hypotheses out of the existing literature on the existence of the relationship between product development and sustainable development. Accordingly, the hypotheses links were examined and reported. The hypothesis was found to be significant (product development), sustainable development as the ultimate dependent is influenced directly by product development.

The effects of product development on sustainable development according to the research findings were statistically significant. Therefore, there is a positive relationship between sustainable development and product development. New product development is the introduction of a new product to an already established market; or in a more general way, new product development is a method by which companies create new products in order to enter or main markets. As De Ko (2010)

believes traditionally, a product is designed based on the designer's experience and inspiration of artistic work and the final decision is made based on the manager's intuitive judgment of and subjective feeling.

Conclusion

In product development process, it is necessary to make an estimation of which environmental impacts will be most likely to occur throughout the course of the product's lifetime. It is important to create a dialogue between all departments and functions within the company so as to ensure that optimal environmental decisions can be made during the early stages of product development. Furthermore, it is essential that environmental stewardship becomes an integral part of the product development process, on a par with considerations such as cost, quality and design for manufacture.

The Pearson's Product Moment Correlation coefficient for product development is 0.435 with a corresponding p-value of 0.011 which is statistically significant. Therefore, there is a positive relationship between sustainable development and product development. This was however not supported by the regression test results product development had a significant influence on sustainable development at (β =0.258, p > 0.011), the coefficient was showing the positive relation between the variables. This finding is in agreement to the findings of Albino et al. (2009), who reported that there is the first evidence that higher implementation levels of environmental strategies are positively linked to the development of green products for companies with a strong commitment toward environmental sustainability (henceforth sustainability-driven companies).

According to Ndubisi & Nwanko (2013), the product should minimise the direct impact by integrating the use of abundant materials, reducibility, recyclability, reusability of its parts and packaging without compromising the design and quality. This makes the product more suitable to create a huge impact thus creating more interest among customers.

According to the study of Ecopreneur (2014), young entrepreneurs do not necessarily have better advantages even if they are physically capable, they still pale in comparison to the old and experienced business persons. But because of the presence of technology and the possibility to start fresh in the green product is their advantage rather than to modify the existing products and services to be interrelated to green which is difficult. It is their option that they can use to answer the challenge of the environment of their product design and how this can contribute to the safety of the environment, the price, value and effectiveness of the product being introduced. Therefore, product development is sometimes taken in greater strides by young entrepreneurs. Furthermore, product development has been beneficial especially for young entrepreneurs in terms of innovation. In fact, product development requires a certain amount of research and development, which can be beneficial in

creating new ways of doing things that may improve production processes, thus, enhancing product development.

Recommendation

The government should ensure stable framework conditions to underpin the environmental entrepreneurial business. Policy design in areas such as competition, the regulatory framework, the tax system, labour markets, financial markets and bankruptcy laws should ensure that regulation is not unnecessarily or disproportionately burdensome to SMEs, some green products are not only environmentally friendly but also double up to be superior to alternatives and are financially successful as well. This means that venturing into green production is a viable investment and as such it is recommended that environmentalist looking to go entrepreneurial should consider venturing into green production.

Similarly, there should be policies in place to ensure that in the production of green products and services, quality standards are met. Production firms also need to be encouraged to go green not only in their product development but also in the manufacturing process as it is pointless to manufacture green products by destroying the environment through pollution and emission of poisonous gases. Green production should cause very little negative externalities to the environment if they must cause any negative externality. The government should ensure that the conditions are in place for green entrepreneurs to implement radical, new ideas, and for their business to grow and have a large-scale impact on consumers, competitors, and other market players. Governments can support the diffusion of green practices along the supply chain by encouraging large companies to assist their small suppliers in meeting environmental requirements.

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