

Influence of Customer Demand and Green Product Innovation on Firms' Performance: A Case of Food Processing Firms in Tanzania

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Abstract

The study aimed at examining the relationship between customer demand, green product innovation and firm performance as a way of enhancing performance of firms. Lack of a clear link between these variables presented the research gap. Specifically, the study was guided by two research questions: a) Does customer demand influence green product innovation? b) Does green product innovation influence performance of the firm? Data was collected from 75 manufacturing firms in Dar es Salaam by administering questionnaires to CEOs, and technical and marketing directors of selected companies. The collected data was analysed using descriptive statistics and Chi-square to establish the relationship between the variables of this study. The findings show the kind of relationship that exists between customer demand and green product innovation, and between green product innovation and performance of a firm. This implies that managers have to study customer preferences in order to develop flexible strategies to satisfy their demands. By so doing, they will be in a position to develop new green products to meet customer needs that are likely to be priced high; this translates to improved profit rates and hence improved firm performance.

Keywords: Customer demand, green innovation, firm's performance, wealth creation

Introduction

Currently, there is an increased debate and interest on whether or not green product innovation can improve performance of a firm. Punjari (2009) pointed out that green product innovation can present an opportunity for firms to utilise, while other researchers such as Porter and Linder (1995) considered a win-win situation between green product innovation and performance of a firm. However, the debate on green product innovation and the manner it influences performance of the firm is still going on (Chen, 2001; Berchicci & Bodewes, 2005). It is worth noting that the relationship between customer demand, green product innovation and firm's performance is still controversial. Pujari (2006) argued that green product innovation cannot explicitly address problems of environmental concern, but it is not far from certain that green products can achieve market success. Customer demand is seen as an important element in stimulating green product innovation (Wei & Morgan, 2004) but by listening closely to customer wants it may impair the green product innovation process and its capabilities. Some empirical studies have shown a positive relationship between product innovation and firm's performance while others have shown otherwise (Koellinger, 2008) and this has resulted into conflicting views in the literature.

Following privatisation, trade liberalisation and regional integration in 2000s, performance of Tanzania's manufacturing firms has not been impressive. Tanzania remains behind regional models both in terms of quantity and quality of commodities produced in the region. Also,

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Tanzania continues to rely heavily on an agriculture sector which is unproductive, relying on extraction of raw minerals and low value adding manufacturing products, a pattern, which has resulted into a low and stagnated share of Gross Domestic Product (GDP) of 9.5% between 2000 and 2010, placing Tanzania below the regional average and the least industrialised economy in the world.

The importance of sustainable growth and performance of the industrial sector in Tanzania cannot be ignored because it contributed 9.5% of the GDP between 2000 and 2010, and employed 36% of all manufacturing labour. However, such employment level is still low and it calls for further investment into manufacturing through green product innovation in order to create additional jobs. Indeed, development and growth of the manufacturing sector in Tanzania are taken as key elements in attaining the 2025 National Development Vision by shifting focus from agricultural economy to a self-sustaining semi-industrialised economy that will transform the nation from a least-developed country to a middle income country by 2025, by transforming the current agricultural economy to an industrial economy. Analysis of industrial performance in Tanzania compared to other countries such as Kenya, Uganda, Malawi, Botswana, Mozambique, and Zambia which share the same geographical advantages such as endowments and competitive pressure indicates less successful performance thereby suggesting that there is still room for improvement in industrial performance (UNIDO, 2012). Therefore, the key question to be answered is: Does customer demand influence firm performance through green product innovations? The argument posed by this study is that a firm's performance can be improved by understanding the relationship between customer demand and its performance through green product innovation processes.

The aim of carrying out this study was prompted by the conflicting findings of existing literature on the relationship between customer demand, green product innovation and performance of the firm (Koellinger, 2008) and the scant literature available about customer demand, green product innovation and performance of the firm relationship. Sufficient knowledge on this relationship will help firms to establish new or improve existing operations and develop new strategies for enhancing firm performance in the market place.

Objectives of the Study

Generally, this study aimed at examining the relationship between customer demand, green product innovation, and firm performance. Specifically, the study examined the association of customer demand and green product innovation, and green product innovation and firm performance.

Literature Review and Hypotheses Development

The word 'green' is often interchanged with the term 'sustainability' (Liu, Chen, Kang, Ngai, & Li, 2005; Zhang & Wang, 2005; Engineer, 2007; Polcari, 2007). In principle, the word sustainability means ability of the present generation to meet its needs without preventing any future generation from meeting its needs (World Commission on Environment and Development, 1987). Melnyk and Smith (1996) defined green production as an integrated system of product design and process issues with aspects of manufacturing planning and control in a manner geared to identify, quantify, assess and manage flow of environmental waste with the goal of reducing or minimising environmental impacts while also maximising resources efficiently. Sustainability

requires manufacturing firms to increase their commitment towards future environment and takes responsibility of their present activities in the environment.

Green production refers to manufacturing firms adopting best practices in the design and production process of their goods that are consistent with demand of customers as well as their nature (Yang, Lu, Guo, & Yamamoto, 2003). Such practices link to sustainability with manufacturing firms having the ability to meet present customers' needs without infringing on the needs of future generations. The Agency Theory explains the behaviour and performance of the firm (Boychenko, 2013). Most businesses suffer from a recognised gap between their mandates and their performance. The theory assumes that performance problems arise when a principal delegates authority to an agent to act on his/her interest (s). Divergence of interests between the two parties may result in the agent's action differing from the principal's intention.

The focus of the theory is to find solutions to problems happening within agency relationships. In the context of seller-buyer relationship, customers cannot verify exactly that the selling firm has performed its delegated work appropriately with no violation such as making sure that there is no extra pollution or no harsh chemicals used in manufacturing (Boychenko, 2013). Such violation can cause serious threat to the performance of the firm. Performance of the firm is gauged by sales volume profit rates and firm reputation. These elements are important factors for a firm to compete in the market place (Chen, 2008; Oltra & Saint-Jean, 2009). Many firms take market share as a way to push up sales volume and to satisfy customer needs (Rex & Baumann, 2007). A relationship between market share, firms' performance and green production has been established (Rubik & Frankl, 2005; Iwu, 2010). Iwu (2010) argued that firms that have adopted green production have successfully pushed a big volume to the market place. On the other hand, reputation is one of the intangible assets used by firms to differentiate each other in the market place (Juma & Payne, 2004). In today's world, customers are using reputation as a tool to evaluate the quality of products they buy, and in turn, it has enhanced performance of the firms, corporate image and sustainability of the manufacturing firms that have adopted the green innovation technologies (Kwansa, Mayo, & Demirciftci, 2008).

Customer demand is a driving force for manufacturing firms to adopt or improve green product manufacturing with a motive to satisfy customer needs (Lin, Chen, & Huang, 2014). Nowadays, many customers are becoming aware of environmental protection issues along with trends of becoming green. Such awareness has changed their preferences and buying behaviours. Customers are focusing on buying products that limit or reduce environmental damage and they are even ready to pay high prices for products that are eco-friendly. In order for firms to meet the changing preferences and needs of customers, they need to change or invest into green technologies that will enable them manufacture eco-products to satisfy demand of customers. Hence, customer demand is assumed to be a key driving force for firms to adopt green innovation so as to raise performance of the firm. For example, Lin, Chen, and Huang (2014) studied green innovation of Vietnamese motorcycle manufacturers and found a positive relationship between demands of customers on green motorcycle to firms that had adopted green technology. However, this study was limited only to the motorbike manufacturers. Also, researchers acknowledge that customers' preferences are different across countries. They suggest that their model should be tested in different contexts to be able to make any meaningful generalisation.

Many nations are increasing stringent regulations to manufacturing firms towards becoming green. In Europe, for example, there is an increasing body of regulations that requires companies to reduce energy usage, institute waste management and observe ISO9001, ISO14000 as well as OHSAS000 (Dangelico & Pontrandolfo, 2010). In order to satisfy regulators, firms are forced to manufacture products that are green by introducing green designs and processes to their plants (Huang & Wu, 2010). Early adoption of green innovation will act as a competing tool that will differentiate non-eco and eco-friendly manufacturing firms. To support this, Tim, Steve, Ornella, and Peter (2013) studied green production and its role within competitive strategy in Europe. They argue that the importance of regulation is one of the major reasons that force manufacturing firms to adopt the green technologies. However, the researchers did not explain why other firms voluntarily adopt the green technologies without being pushed by existing regulations or bodies.

In recent years, green product innovation has become a competing tool for firms to survive, win market share and attain a competitive position (Gronhaug & Kaufmann, 1988). In practice, a good product will help firms to improve their market share, sales volume, and corporate image as well as to attract more customers. For instance, Wagner (2005) found that firms that have increased focus in producing green products and which reduce the extent of environmental damage have experienced a positive performance beyond firms that are not producing green products. Though Wagner (2005) established a positive relationship, the debate about customer demand, green product and performance of the firm has not been concluded.

Specifically, Hoffmann (2007) warned that poor product design and process in developing countries could result into serious waste management problems. Indeed, many firms in Tanzania are trying to turn into green technologies in order to minimise the impact of waste management on the environment, to differentiate themselves from their competitors and to maintain their market position. Hence, green product innovation will mean to maintain sustainability and firm's performance in future. Atuahene-Gima (2005) argued that firms that listen closely to customers may uncover needs of their customers. Therefore, customer demands play a big role in stimulating performance of the firm. Manufacturing firms that embark on green production will be considered as the first movers to experience improved performance. To support this, Meyer and Clavel (1996) assure that customers are even ready to pay for high prices for products from firms that embark on production of eco-friendly products.

Hypothesis Development

In today's world, customers have increased demand for green and efficient products and are even ready to pay for high prices (Meyer & Clavel, 1996). For a quick response, firms have embarked on green technology investments to innovate the production process, and to produce goods that are consistent with the best environmental management practices in the world. In short, it can be said that customer demand is a catalyst for firms to embark on green product innovation. From this argument the following hypothesis was formulated:

H1a: Customer demand does not influence green product innovation.

H1b: Customer demand influences product innovation.

Green product innovation aimed at minimising damage to the environment such as emission of carbondioxide, poor waste management as well as avoiding environmental damage penalties,

increased productivity, increased market share as reflected in an overall increase of the total sales volume, increased reputation and image of the business as well as enhanced revenues and profitability (Porter & Linder, 1995). Bonini and Oppenheim (2008) argued that firms that practice eco-innovation on energy efficient products have stimulated market share and new business opportunities as seen in the Toyota Prius hybrid cars. Based on this argument, the following hypothesis was formulated:

- H2a: Green product innovation does not influence firm performance
- H2b: Green product innovation influences firm performance.
- H3a: Customer demand influences firm performance.
- H3b: Customer demand influences firm performance.

Research Methodology

To answer the research questions, food processing firms in Dar es Salaam were studied. Dar es Salaam is a city that is more industrialised than any other city in Tanzania, with a bigger number and variety of food processing firms. In addition, the city is experiencing a lot of environmental damage. A total of 75 firms were purposively sampled to obtain the study population. Before data collection was done, a questionnaire was designed with four parts: respondents' profile, customer demand, green product innovation and firms' performance with a five-point Likert scale. The questionnaire was pre-tested in two stages. First, it was given to experienced researchers to review in order to ensure clarity, and were also requested to comment on the appropriateness of items, to operationalise the constructs. The questionnaire was then sent to three marketing and technical directors in the industry to comments on readability, ambiguity, accuracy and completeness of the instrument. The suggestions were incorporated in the final version to produce an instrument that yielded data with high validity.

Data was collected from marketing directors, technical directors and finance directors. The marketing, technical and finance directors were considered to be reliable sources of information concerning customer demand, green product innovation and firms' performance.

Variables and Measures

The questionnaire had four parts. The first part was used to collect descriptive statistics of respondents, the second part measured customer demand, the third part measured green product innovation and the last part measured firm performance. Table 1 shows the variables for each of the items in the questionnaire.

Table 1: Questionnaire Variables

Construct	Variables	Reference
Customer demand	<ul style="list-style-type: none"> • Customer requirement about green products • Price flexibility of demand for green products • Customer benefits for green products 	(Oltra & Saint-Jean, 2009)
Green products	<ul style="list-style-type: none"> • Increase in product varieties • Design for recycling 	(Zhu & Sarkis, 2004)

	<ul style="list-style-type: none"> • Quality improvement • Improving manufacturing technology of new green products 	
Firm performance	<ul style="list-style-type: none"> • Improved volume of sales • Improved profit rate • Improved reputation 	(Li, Su, & Liu, 2010)

Empirical Results

Descriptive analysis was used to analyse the data. Cross-tabulation and Chi-square were used to demonstrate the association between the study variables. Table 2 provides descriptive statistics of the dataset. The mean and standard deviation were calculated to measure the central tendency and dispersion of the study variables: customer demand, green product innovation and firms’ performance. Table 2 provides a summary of mean and standard deviations of customer demand, green product innovation and firm performance.

Table 2: Descriptive Statistics

	N	Mean	Std. Deviation
Customer demand	75	4.10	0.78
Green product innovation	75	4.26	0.73
Firm performance	75	4.33	0.86

Source: Field Data (2014)

Reliability and Validity

Since the data collection tool was pre-tested before data collection, the constructs were believed to have high content validity (Wong & Law, 2002). Reliability was measured by Cronbach á values. As shown in Table 2, Cronbach values for customer demand, green product innovation and firms’ performance were 0.848, 0.960 and 0.754, respectively; these were all above the threshold of 0.7 thereby indicating internal consistency and reliability of all measurements of the study indicators.

Table 3: Reliability and Validity Test

Constructs	Cronbach’s a value	Number of items	Remarks
Customer demand	0.848	3	Acceptable
Green product innovation	0.960	4	Acceptable
Firm performance	0.754	3	Acceptable

Source: Field Data (2014)

Hypotheses Testing and Results

As presented in the literature review, two hypotheses were formulated to test the relationship between customer demand, green product innovation and firms’ performance. These are presented below:

Hypothesis 1

H1a: Customer demand does not influence green product innovation.

H1b: Customer demand influences product innovation.

Hypothesis one tested the influence of customer demand on green product innovation. The statistical results are as shown in Table 4.

Table 4: Chi-Square Results

	Value	Degree of freedom	Asymp. Sig. (2- sided)
Pearson Chi-Square	48.626(a)	24	.002*
Likelihood Ratio	21.335	24	.619
Linear-by-Linear Association	1.718	1	.278
N of Valid Cases	75		

*Significant at $p < 0.05$

Source: *Field Data (2014)*

At 5% level of significance, the null hypothesis that customer demand does not have significant influence on green product innovation is rejected. By rejecting the null hypothesis, it means we accept the alternative hypothesis that customer demand influences green product innovation. It implies that customer demand forces manufacturing firms to embark on green product innovation.

Hypotheses 2 and 3

H2a: Green product innovation does not influence firm performance.

H2b: Green product innovation influence firm performance.

H3a: Customer demand does not influence firm performance.

H3b: Customer demand influence firm performance

Hypotheses 2 and 3 aimed at establishing relationship between green product innovation and firms' performance and to test the indirect relationship between customer demand and firm performance. The test results of this hypothesis are as shown in Table 5.

Table 5: Chi-Square Test Results

	Value	Degree of freedom	Asymp. Sig. (2-sided)
Green product innovation	23.789(a)	24	.004*
Customer demand	22.110(a)	12	.036*
N of Valid Cases	75		

*Significant at $p < 0.05$

Source: *Field Data (2014)*

At 5% significance level, the null hypothesis that green product innovation does not have a significant influence on firm's performance is rejected. By rejecting the null hypothesis, we accept the alternative hypothesis that green product innovation has significant influence to firms' performance. This implies that manufacturing firms that adopt green design and process can achieve a significant growth in sales volume, profit and firm reputation. Additionally, a significant indirect relationship between customer demand and firm performance. This implies that green product innovation can act as a mediator of customer demand and firm performance relationship.

Discussion of Findings

The empirical findings revealed that customer demand has significant influence on green product innovation. These findings are consistent with studies of Lin, Chen, & Huang, (2014) and Gronhaug & Kaufmann (1988). Customer demand can exert significant pressure to firms to adopt the green innovation design and process and introduce new products development strategies (Gronhaug & Kaufmann, 1988). A discussion with experts in the industry revealed that firms that had adopted a flexible strategy in meeting customer demands by introducing eco-friendly products had increased their publicity, which, in turn, enhanced their business revenue and profitability.

The study also found there was a significant influence between green product innovation and firm performance. The findings are consistent with findings by Ru-Jen, Kim-Hua, & Yong (2013). It means that green product innovation is an important ingredient to induce performance of the firm. A discussion with experts in the industries revealed that implementation of eco-innovation can require huge investments, which, in turn, enable firms to attain their competitive position. However, some experts said that with changing customer preference(s) and buying habits, many firms found it difficult to have flexible strategies of green production to meet customer demands. As a result, some firms tend to focus on measures of revenues and profitability without putting great attention on green product innovation as a way to enhance overall business performance.

Conclusion and Recommendations

The study aimed at examining the influence of customer demands on green product innovation, and the influence of green product innovation on firm performance. The results reveal positive results on this relationship. This study has provided useful managerial guidelines to manufacturing firms in Dar es Salaam on ways and strategies to enhance performance. By showing positive influence between customer demands, green product innovation and firm performance, it is recommended that firms should take a positive approach to study and understand customer preferences and to anticipate changes of customer preferences in the future and try to deliver products that satisfy customer needs. Firms that will be able to do this and satisfy customer needs accordingly will be able to enhance their performance. Also, green innovation should be taken as a competing strategy to enhance performance, and firms should always strive to maintain green innovation competence in order to attract more customers to their products as a way to boost their sales volume as well as firm reputation.

This study was not without some limitations. First, the study used a small sample size drawn from Dar es Salaam only. Other researchers can take a larger sample to include manufacturing firms from different regions in the country for a more reliable generalisation of results. Secondly,

the study used only the Chi-Square statistics in examining the relationship between the variables. In future, more tools of analysis can be used such as structured equation modelling, to enhance the relation of the research constructs.

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