“Technological innovativeness and growth: a study of small scale manufacturing firms in Lagos State”

AUTHORS	Chinazor Franca Obunike http://orcid.org/0000-0003-4239-7870 Ama Aka Udu http://orcid.org/0000-0002-8576-8988

ARTICLE INFO	Chinazor Franca Obunike and Ama Aka Udu (2018). Technological innovativeness and growth: a study of small scale manufacturing firms in Lagos State. *Economics of Development*, *17*, 39-53. doi:10.21511/ed.17(4).2018.05
DOI	http://dx.doi.org/10.21511/ed.17(4).2018.05
RELEASED ON	Wednesday, 20 March 2019
RECEIVED ON	Wednesday, 26 September 2018
ACCEPTED ON	Thursday, 20 December 2018

JOURNAL	"Economics of Development"
ISSN PRINT	1683-1942
ISSN ONLINE	2304-6155
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	Simon Kuznets Kharkiv National University of Economics

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
31	1	9

BUSINESS PERSPECTIVES

Publisher:
LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

S. KUZNETS KHNUE

Founder:
Simon Kuznets Kharkiv National University of Economics, Nauky avenue, 9-A, Kharkiv, 61166, Ukraine
http://www.hneu.edu.ua/

Received on: 26th of September, 2018
Accepted on: 20th of December, 2018

Chinazor Franca Obuike, Ph.D., Faculty of Social Sciences and Management, Department of Business Administration, Federal University Ndufu-Alike, Nigeria.

Ama Aka Udu, Ph.D., Entrepreneurship Development Centre, Ebonyi State University, Nigeria.

Chinazor Franca Obunike (Nigeria), **Ama Aka Udu** (Nigeria)

TECHNOLOGICAL INNOVATIVENESS AND GROWTH: A STUDY OF SMALL SCALE MANUFACTURING FIRMS IN LAGOS STATE

Abstract

The study has the general objective to determine the extent of the relationship between technological innovativeness and firm growth using small scale manufacturing firms in Lagos State. The independent variable of technological innovativeness was operationalized into product-oriented innovativeness and process-oriented innovativeness, while the dependent variables of firm growth were operationalized into sales growth, employment growth, growth in firm size and market shares growth. This study employs exploration correlational research design. The sample population of a small scale enterprise in Lagos State accounts for eleven thousand and forty-four (11,044). Yamane's formula was used to get the sample size of three hundred and eighty-six (386), this was approximated to the nearest hundred to have 400 for equal distribution. Data gathered for this study was analyzed using the Pearson's Product Moment Correlation analysis in order to determine the relationship between them and a simple linear regression analysis to establish the extent of relationship between them using statistical Package for Social Science (SPSS) version 2.3. The correlation statistic shows that the linkage between the independent and dependent variables was low to moderate that product-oriented innovativeness shows a moderate positive relationship with sales and employment growth, while the process-oriented innovativeness shows low positive relationship with firm size thus allowing for regression analysis.

Keywords technological innovativeness, business growth, product-oriented innovativeness, process-oriented innovativeness

JEL Classification M13

Чиназор Франка Обунике (Нигерия), **Ама Ака Уду** (Нигерия)

ТЕХНОЛОГИЧЕСКАЯ ИННОВАЦИОННОСТЬ И РОСТ: ИССЛЕДОВАНИЕ МАЛЫХ ПРОИЗВОДСТВЕННЫХ ФИРМ ШТАТА ЛАГОС

Аннотация

Общая цель исследования – определить степень взаимосвязи между технологической инновационностью и ростом фирмы с использованием небольших производственных предприятий штата Лагос. Независимая переменная «технологическая инновативность» реализована в виде ориентированной на продукт инновационности и процессно-ориентированной инновационностию Зависимые переменные устойчивого развития рассматривались на примере роста продаж, роста занятости, роста размера фирмы и роста доли рынка. В статье используется структура корреляционных исследований. Общая совокупность выборки малого предприятия в штате Лагос составляет одиннадцать тысяч сорок четыре (11 044). Формула Ямана использовалась для получения размера выборки в триста восемьдесят шесть (386). Это число было округлено к 400 для равного распределения. Данные, собранные для этого исследования, были проанализированы с использованием анализа корреляции по смешанным продуктам Пирсона с целью определения взаимосвязи

между ними. Также применен простой анализ линейной регрессии для установления степени взаимосвязи между переменными с использованием статистического пакета для социальных наук (SPSS) версии 2.3. Корреляционная статистика показывает, что связь между независимыми и зависимыми переменными была низкой или умеренной для того, чтобы инновационность, ориентированная на продукт, демонстрировала умеренную положительную связь с ростом продаж и занятости, а процессно-ориентированная инновационность – низкую положительную связь с размером фирмы, таким образом, позволяя проводить регрессионный анализ.

Ключовые слова рост бизнеса, инновационно-ориентированная продукция, инновационно-ориентированное производство

Классификация JEL M13

INTRODUCTION

The current technological advancements are wielding considerable alteration in smoothing small business operative field. They impact firms and their products, consumers and market. More so than ever, this has resulted in turbulent and rapid changes in customers' tastes and needs, resulting in shortage of products brands' life cycles. The product brand that enhances firm's profitability today can be the cause of its failure in the near future as technologies are obliging firms to rethink and retool everything they do internally, especially the products they produced and the processes of production. Technology has intensified small manufacturing business innovativeness effort, making production faster, easier and cheaper than that of the larger organizations. This is because customers through technological advancements have prompt information of new innovative product brands of competitors. Therefore, most firms irrespective of their size have an innovative objective. The study argues that in order for firms to remain competitive in the global market, they need to intensify their efforts to achieve their innovative objectives through the improvement of existing products, introduction of entirely novel products and also introduction of new processes or techniques of production (Piening & Salge, 2015). Small scale manufacturing firms generally struggle to achieve these objectives in order to grow. As a result, technological innovativeness, once an option for small scale manufacturing firms, has become a crucial factor of their growth (Iorun, 2014).

Technology involves tools, techniques, materials and methods firms used to produce new product/process or improved products/or process. Technology can enhance small business innovativeness opportunities in manufacturing, logistic, customer service, finance and almost every business activity (Oyeku, Oduyoye, Asikhia, Kabuoh, & Elemo, 2014). The keyword in technological innovativeness is "novelty or improved product/services and processes" applied to a firm. Technological innovativeness therefore enables small scale manufacturing firms to either clinch to only product-oriented innovativeness, which includes altering the product shapes, dimensions, size, color or introducing improved versions of the existing products, or entirely introducing a novel product either to the firm or to the market. This is aimed at increasing sales growth and employment growth. It can also be achieved through process-oriented innovativeness achieved through altering the existing methods of production, using new or modified material in the process of manufacturing. This is aimed at reducing cost or quality improvement to ensure firm size growth and market shares growth. There is a need, therefore, for small scale organizations to be open to exploit existing technologies, generate new ones and engage in global technological collaborations.

OECD (2017) defines small scale business as enterprises whose paid employees number is between one to nine (1-9) and with capital between five million and not more than fifty million naira (N 5-50 mln) including working capital but excluding cost of land and/or a labor size of not more than nine workers. Nzewi, Onwuka, and Onyesom (2017) view small scale business as enterprises with staff strength of 11-100 and/or a total cost of not above 50 mln naira, including the cost of land. This study views small scale as technology-based small manufacturing firms that employ between one to nine (1-9) employees. The study uses small scale manufacturing firms in Lagos state. About 53% of all employed in manufacturing in Nigeria are located in Lagos State (Adebola, 2012). This sector dominates Lagos state economy and has contributed 29.60% of the state GDP in 2013 (Solapex, 2013). These firms by the nature of their operations are techno-based ones. Innovativeness in small manufacturing firms means very complex processes that involve processing, assembling and producing final products of

http://dx.doi.org/10.21511/ed.17(4).2018.05

both local and export market. They integrate, acquire or create new technology to develop new products, processes and services as the basis of their business competitiveness. They embrace technology in their day-to-day operations. Technological innovativeness enables firms to grow at the micro level and can aggregate industries and economies at the macro level. These firms are responsible for advancement in new products and process and for provision of the most employment opportunities in Lagos State. They are also the key indicator of the overall economic growth.

Growth is the result of the combination of firm's specific resources, capabilities and routines. Firms' growth can be determined by the extent to which firms' specific resources like employees, capital and knowledge are acquired, organized and transformed into sellable products and services through organizational routine, practices and structure. It refers to an increase, expansion or change over time. Small scale manufacturing firms' growth has been identified as a key driver for the creation of wealth and employment and economic development in every country. An impressive share of radical breakthrough innovations has been shown to originate from entrepreneurs and small firms' growth (Corradini, Demirel, & Battisti, 2016). These objectives as normally examined in this study (sales growth, employment growth, growth in firm size and market shares growth) can be achieved through technological innovativeness. This paper tries to find among the technological innovativeness types, the one that mostly affects firms' growth and the extent of this influence. It also establishes the extent to which these innovation types complement or substitute each other. These objectives are very important to firms as they help the management to explore these innovative types at the right time, since the relationship between innovative strategy used by firms and the degree of competition depends on the innovative types.

The general objective is to determine the relationship between the technological innovativeness types and firm growth using small scale manufacturing firms in Lagos State.

1. LITERATURE REVIEW

1.1. Meaning of innovativeness

Technology means the information, equipment and processes required to transform input into output in the organization (Kearney, 2017). Technology looks at how inputs are converted into outputs. It encompasses the way small scale manufacturing firms produce goods/services using tools, equipment, techniques and human know how. Innovativeness as the main characteristic of entrepreneurs has been defined differently by scholars. Thus, Schumpeter's (1934) in (Ferreira, Reis, & Pinto, 2017) in the seminal work on entrepreneurship define innovation as bringing new products or changes in the existing ones, using new methods to decrease costs, developing a firm's system, recognizing the role of market and increasing productivity. Innovativeness includes initiation or introduction of new products, service or process through a certain business model into the market place, either by utilization or by commercialization. It involves any form of change or newness, imitating foreign or local products, introducing new ways of production, or using new resources in production which can lead to value creation in the market place. It contributes to strengthening the competitive advantage of firms. Innovativeness is a complex and multidimensional activity that cannot be measured directly or with a single indicator and hence it needs to have a composite measure that reflects the firms' innovative capability for the purpose of performance. Braunerhjelm, Ding, and Thulin (2016) observe that the macro perspective innovativeness dimension involves firms creating model shifts in the science and technology and/or market structure in an industry, while the micro perspective innovativeness dimension involves firms manipulating the firm's existing market resources, technological resources, skills, knowledge or strategy. Innovativeness is classified into two groups, namely technological and non-technological innovativeness (Tseng, 2014; Rahman, Yaacobb, & Radzi, 2016). Non-technological innovativeness includes new or improved marketing-oriented, new or improved firms' strategy-oriented processes. Marketing innovativeness is the implementation of new or improved marketing methods involving significant changes in marketing mix. Organizational innovativeness comprises the overall innovative capabilities of introducing new or improved product to the market or opening up new market. This study focuses on the technological innovativeness.

1.2. Meaning of technology innovativeness

Technological innovativeness refers to the process by which firms master and implement the design and production of products/services that are new to the business irrespective of whether the products/services are new to their competitors or their customers or the world (Rahman, Yaacobb, & Radzi, 2016). This then implies that it involves the application of practical tools, equipment and techniques that make changes in the production and processes that result in novelty which adds values to customers and market. It is the application of tools, equipment, materials, methods and processes to engage in and support new ideas, novelty, experimentation and creative processes resulting in newness. SMEs that innovate must be equipped with technological competence from its employees, explicit customers that would require the innovated products and implicit market opportunities for the innovated products. This shows that firm's innovativeness depends on its internal and external factors (Saunila, Pekkola, & Ukko, 2014). A balance must be reached between these two. The internal factors depend on the internal technological capabilities of the firm and ability to assess external information from the external sources, mainly from customers. SMEs explore new product ideas through closeness with customers. This closeness with customers and constant analysis of the competitors' products through environmental analysis are the key drivers of innovativeness among these firms. Innovation, therefore, takes place when a competent firm is able to identify and respond to customer requirements by developing and improving product/processes. Technological prospecting entails the searching for, identifying, adapting and diffusing imported technology. It uses technologies that are readily available, adapting them to local economy. Technological changes have become intricately linked to the globalization of the world economy. The traditional technological methods and practices need to be revised to take into account the globalization of technology. Technological innovations have a tendency to increase firm's growth by reducing administrative and production costs, improving workplace satisfaction, gaining access to non-tradable assets (Mwaura, Gathenya, & Kihoro, 2015; Olughor, 2015).

1.3. Dimensions of technological innovation

The essence of these technological activities is to create greater values that ensure customers satisfaction through reduced price, increased qualities and work efficiency Kollmann T., & Stöckmann C. (2012). Technology makes whole lot of differences in the local made goods and foreign made goods. This means links between high innovativeness and technological leadership. Hence, Rahman, Rafisah, and Radzi (2016) found that advanced countries of the world are known to use advanced technology in their production compared to developing or undeveloped countries. Nevertheless, the goal of innovation is the creation of marketable competitive advantage rather than pure technological innovation. This shows that the personal characteristics of the firm owners have a lot of influence on the firm's technological innovativeness. Technology innovativeness also includes patent right, trade mark and design. Patent and design ownership only apply to ideas or creations that are new to the world, while trademarks are associated with product launches that may either be new to the firm or new to the world (Rahman et al., 2016). An active patent strategy allows commercialization through know-how transfer projects and licensing of those patents that cannot be realized efficiently inside the firm or do not fit its innovation strategy. Braunerhjelm, Ding, and Thulin (2016) group technological innovativeness as product-oriented innovativeness and process-oriented innovativeness. Most highly technological innovative small scale manufacturing firms achieve these two at the same time. This study adopts these two dimensions.

1.3.1. Product-oriented innovativeness

Technological product-oriented innovativeness involves either a new or improved product, which is distinguished significantly from previous products. Technological product-oriented innovativeness targets quality improvement of products. It offers potential protection to firms from market threats and competitors. It is the creation of new products or modification of existing products, technological newness in product and product differentiation to meet customers and market equilibrium. It is the result of producing and commercialization of new products/services or imitating foreign or competitors' product. It involves radical product which can be new to the firm or new in the market. The dimension of technological product-oriented innovativeness SMEs involve includes, therefore, cost effective, quality improved or improved versions of existing products or altogether new products, creating varieties of products, creating demands in the new markets leading to production and income growth

http://dx.doi.org/10.21511/ed.17(4).2018.05

and to employment growth. Ibidunmi, Iyiola, and Ibidunni, (2014) established a positive relationship between product innovation and an increase in sales volume, while Braunerhjelm, Ding, and Thulin (2016) conclude that it boosts the growth of small scale manufacturing firms more than process innovativeness.

1.3.2. Process-oriented innovativeness

Process-oriented innovativeness is a set of activities involving novel production methods or techniques in production operations that lead to the introduction of new or modified products. It involves creativity and ideas management. Lendel, Hittmara, and Siantova (2015) define it as a process of recognizing customer needs and innovation opportunities, generating innovative ideas and their elaboration, working with information and knowledge regarding innovation, realization of innovation activities and ensuring successful extension of innovation among customers. It involves the process of carrying out sequential activities or task of transforming creative ideas to products/services. The process-oriented innovativeness takes the form of material replacement, application of new technology, R&D and new combination of materials in production, redesign core operating processes, and change in technical process of manufacturing, imitating the methods of production/processes used by other firms, etc. to achieve cost reduction or quality improvement. Process-oriented innovativeness involves reengineering and improving internal operations of firms. It concerned with the creation of or improvement in techniques and the development in process or system. Its dimensions involve innovativeness in technology, skill, techniques, systems and procedures, which are used in the process of transforming inputs into outputs. It reduces the cost of labor and capital, determines productivity growth. Process failure may be due to lack of innovative expertise, failure to secure the flow of information in a firm, insufficient training and motivation of employees, etc. (Lendel, Hittmara, & Siantova, 2015). Process-oriented innovativeness can only be protected by intellectual property rights (Claudio & Andreas, 2014). Researchers conclude that SMEs are more likely to use process-oriented innovativeness than product-oriented innovativeness due to financial constraint (Rahman, Yaacob, & Radzi, 2016).

1.4. The relationship between product and process oriented innovativeness

The transformation of input raw materials in manufacturing firms requires technological touches on every step of the end-end processes innovativeness to form new product. In the process of converting input to output, values are created. From the conversion of input, product design and manufacturing, firms employ expert knowledge. Digital tools will be used to plan, stimulate and optimize the entire product development and production process through technologies and data computing. Technological innovativeness requires firms to have competencies relating to technology in order to produced novelty that relates to customer needs. The differences occur as a result of the use of new technological equipment, knowledge, materials, etc. Technologies are changing the nature of work and skills required of operators (Stanislawski & Lisowska, 2015).

Data is being at the heart of this firm's revolution, as product design, firm coordination and process optimization will require less human intervention. Hence, the proportion of technology will continue to increase and the proportion of labor will decline, even though labor will actually remain.

Abernathy and Utterback (2005) in Letangule, and Letting (2012) consider the sequential analysis of technological innovativeness as acquisition, absorption and diffusion of technology. Braunerhjelm, Ding, and Thulin (2016)

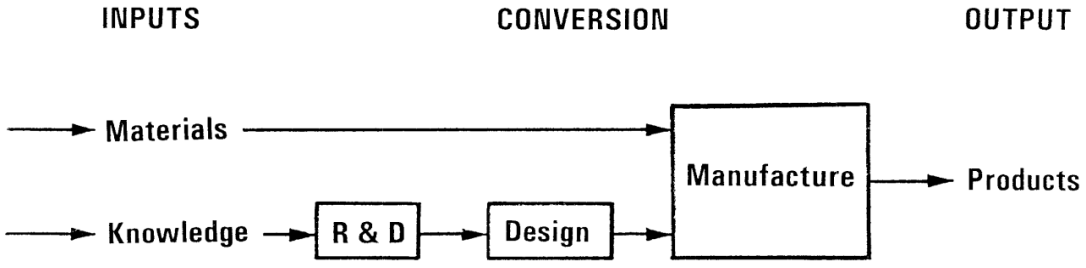

Figure 1. Sequential analysis of technological innovativeness

note that there is no piercing difference between the two types of innovation, it is either the overlap, or they take place in conjunction. The implication of the sequential approach of technological innovativeness is that both product-oriented and process-oriented innovativeness occur in the same way in all companies. In other words, there is no demarcation between product-oriented and process-oriented innovativeness. Sequential analysis of technological innovativeness implies that organizations, in their quest to create new or improved products, use new or improved processes knowingly or unknowingly. Rahman, Yaacobb, and Radzi (2016) note that firms with rapid technological changes and minor innovative process oriented may be more effective than those with incremental product-oriented innovativeness.

1.5. Drivers of technological innovativeness

The nature and structure of SMEs allow for innovativeness due to their flexible nature, small size, and closeness to customer although their innovativeness ability varies significantly depending on their sector, size, and focus, resources and business environment. They have fewer resources to conduct formal R&D than larger firms and hence, innovativeness is often less formalized in small firms. Hence, rather than spending on R&D to achieve high valued innovative products, employ high customer relationship management and marketing. This made them expert in knowing customers demand and analyzing competitors' products, especially in their niche market. The observed needs and market gap create opportunities for firms. These are translated to valued products/services through technological innovativeness. Small scale firms find it difficult to adopt technological innovativeness due to the nature of their size, they may find it difficult to invest in technology or have difficulty in the developing new technical capability or may not have need complementary assets to exploit their innovation in the market. Small firms are often more successful in developing new product-market combinations and in adapting products to the demands of niche markets or individual customers. The common indicators for measuring innovativeness is spending on R&D, but this indicator is not very useful for measuring innovation in SMEs and expenditure on R&D is an input measure of innovativeness and hence does not show the actual amount of innovativeness that is generated by the firms (Corradini, Demirel, & Battisti, 2016).

1.6. The dimension of small scale business growth

Growth can be attributed to an increase in factors of production, improvements in the efficient allocation across economic activities, knowledge and rate of innovation. Innovativeness is considered as one of the critical issues in the firm growth. The dimension of business growth used in this study includes: employment growth, sale growth, firm size growth and market share growth.

Employment growth: Employment generation is a very important aspect of the country economic growth. Small businesses are seen as a great force in generating employment in the country. Employees are the most crucial resource of an organization. Some expertise is embedded in them. Quality of employees affects the firms' ability to embark in innovativeness. While product innovation boost employment process innovation is associated with job losses.

Sale growth: This is considered a very important and popular determinant of micro business growth because business growth is measured through sales. Increase in sales makes it possible for businesses to invest in additional factors of production, such as equipment and employees, which in turn results in raising the profits of the business, although sales can be affected by inflation.

Firm size: The size of a firm mediates between the internal and external firm's environment. The size of a firm measured by its employees is a consequence of the firm's hiring strategy. It is also decisively influenced by the market-oriented view of Schumpeter and the resource-based view. Large firms are less likely to embark on innovativeness. It is well-known that small firms are more affected by innovativeness obstacles and thus they are prevented from innovative activities.

Market share: Market share is portion or percentage of sales of a particular product or service in a given region that are controlled by a firm. It is used by firms to determine their competitive strength in a sector as compared to other firms in the same sector. It takes account of the market conditions that may have improved or decreases sales which sale or revenue may not capture.

http://dx.doi.org/10.21511/ed.17(4).2018.05

2. THEORETICAL FRAMEWORK

2.1. Schumpeter's creative destruction theory

The theory of innovation was initially propounded by Schumpeter in 1934 (as cited in Sledzik, 2013). Schumpeter was an economist who coined the now famous term "creative destruction" to describe the outcome of the process of innovation by competing firms interacting in a given market place. Creative destruction refers to the portable opportunities seized by innovators, which ultimately benefit not just them but the whole society. The theory holds the assumption that an entrepreneur is one having three major characteristics: innovativeness, foresight and creativity. Creative destruction implies that the entrepreneurs destroy the prevailing equilibrium in the market thereby disrupting existing goals and changing the direction of the economy. They achieved this through creating a new market, introducing a new way to make products, discovering a new market for a product, finds a new sources of raw material and establishing new way of making things or organization.

2.2. The implications of creative destruction theory of Schumpeter

Firms should obtain new resources and combine existing ones in special ways to invest and innovate. The capability to take advantage of opportunity in the harsh environment should prompt large enterprises to endeavor to adopt innovation and enhance the totality of an organizations learning, innovation, and renewal and venture activities. The entrepreneurial mindset facilitates the championing of new valuable ideas, which are resourced and developed in an encouraging, enabling culture. The entrepreneurial's ability to convert creative insights and often homogenous inputs into heterogeneous outputs makes the firm a superior choice over the market.

3. METHODOLOGY

This study employs exploration correlational research design. This is used to establish the extent to which two or more variables co-vary, that is where changes in one variable are reflected in changes in the other variable. This survey involves determining the correlation between technological innovation and small business growth.

The sample population of small scale enterprise in Lagos State according to SMEDAN collaborative study with NBS (2013) is eleven thousand and forty-four (11.044). Yamane's formula was used to get the sample size of three hundred and eighty-six (386); this was approximated to the nearest hundred to have 400 for equal distribution. NBS (2013) notes that there are thirteen different industries in the non-oil manufacturing sector of Nigeria economy. Ten out of these non-oil manufacturing sectors were selected for this study as listed below. This is to enable proper evaluation across the manufacturing sector and the broadening the sample size. They also form the key manufacturing industries in Lagos State. Neymen allocation formula was used to distribute 40 questionnaires in each of these ten firms chosen across Lagos metropolis. Out of the four hundred questionnaires distributed, one hundred and fifty-three (153) were used for the analysis. The questionnaires items used 3-point Likert-scale type ranging from 1 to 3, with 1 = disagree, 2 = agree, 3 = undecided. The respondents indicated their level of agreement for each of the questionnaire items.

The variables of the independent variables (product-oriented innovativeness and process-oriented innovativeness) of this study were adopted from Karabulut (2015) with some modifications to suit the study. The essence of adopting measurement scale from a previous study is based on the fact that these measurement scales have already been validated in the previous study. Therefore, the construct validity is adopted. Reliability of the items was tested using Cronbach alpha. Technological innovativeness was loaded, as a multi-dimensional construct during the Principal Component Analysis (PCA) test for factor loading comprises product-oriented innovativeness which has Cronbach alpha of 0.811 with 7 items and process-oriented innovativeness that has Cronbach alpha of 0.802 with 6 items. In the same manner, firm growth was tested using Cronbach alpha and the acceptance level indicated .834; this was loaded as a multi-dimensional construct during PCA. This is made up of employment growth with Cronbach alpha of 0.801; sales growth with Cronbach alpha of 0.918, firm size growth with Cronbach alpha of 0.789 and market shares growth with Cronbach alpha of 0.777, all have 4 items grouped together in the analysis. All these indicate that the sample size used to derive the factorial loadings was adequate and the expected scale for measurement of dependent variable was met.

Data gathered for this study will be analyzed using the Pearson's Product Moment Correlation analysis in order to determine the relationship between them. A simple Linear Regression analysis was used to determine the extent of the relationship between the dependent and independents variables using statistical Package for Social Science (SPSS) version 2.3. The dependent variables as used in this study include sales (Y1), employment (Y2), firm size (Y3), and market shares (Y4), while the independent variables are product innovation (X1) and process innovation (X2).

4. RESPONSES TO QUESTIONNAIRE'S ITEMS

Table 1. Respondent manufacturing firms and questionnaires distribution

Source: Survey research (2018).

Manufacturing firms	Questionnaires distributed	Questionnaires not returned	Questionnaires used	Percent
Pulp and paper	40	29	11	7.2
Steel and metal	40	27	13	8.5
Beverages/Pure water firms	40	20	20	13.1
Plastic and rubber	40	26	14	9.2
Bakery	40	23	17	11.1
Textile	40	26	14	9.2
Soap and detergent	40	22	18	11.8
Furniture and wood	40	28	12	7.8
Nylon and foam	40	23	17	11.1
Insecticides and sprays, creams	40	23	17	11.1
Total	400	297	153	100

Table 1 shows the small scale as technology-based small manufacturing firms, distributed questionnaires and the returned questionnaires used for the analysis. Equal number of questionnaires was distributed among these firms. As usual, one does not expect equal responses and willingness to fill the questionnaire. Hence out of the 400 questionnaires sent, only one hundred and fifty-three returned were fit for the analysis. This makes the response rate 38%.

Table 2. Bio-data responses

Source: Survey research (2018).

Variables	Categories	Frequency	Percentage
Sex	Male	99	64.7
	Female	54	35.3
Number of employees	10-19	63	41.2
	20-29	41	26.8
	30-39	38	24.8
	40-49	11	7.2
Marital status	Single	38	24.8
	Married	59	38.6
	Divorced	26	17.0
	Widower/widow	30	19.6
Business age in years	1-5	61	39.9
	6-10	44	28.8
	10-15	28	18.3
	16 and above	20	13.1
Qualification	None/Primary	22	14.4
	Secondary	39	25.5
	Tertiary (HNS/BSC)	36	23.5
	Masters	30	19.6
	Professional	26	17.0

http://dx.doi.org/10.21511/ed.17(4).2018.05

Table 2 shows that there are more men (64.7%) than women (35.3%) in the small scale manufacturing firms in Lagos. The table also shows that small scale as manufacturing firms in Lagos decreases in employment generation as 10-19 employees is 41.2%, 20-29 is 26.8%, 30-39 is 24.8% and 40-49 employees account for 7.2%. Also in the business age in years, the same trend of decrease is also noticed as 1-5 (39.9%), 6-10 (28.8%), 10-15 (18.3%) and 16 and above (13.1%). The reasons for this decrease in the trend of employment or number of employees could be attributed to the general inherent nature of SMEs that lead to their prompt mortality rate. It could also be due to some other factors like personal characteristic of the owners and environmental factors.

4.1. Items on technological innovation (X)

Table 3. Analysis of variables of product-oriented innovation (X1)

Items	Sum	Mean	Std. dev.	Variance	Kurtosis	Ranking
Q1	274.00	1.7452	.68785	.473	–.857	6th
Q2	320.00	2.0382	.77530	.601	–1.327	3rd
Q3	256.00	1.6306	.67260	.452	–.687	7th
Q4	322.00	2.0510	.33581	.113	5.661	2nd
Q5	313.00	1.9936	.31002	.096	7.743	4th
Q6	285.00	1.8153	.40544	.164	.731	5th
Q7	324.00	2.0637	.33362	.111	5.482	1st

Table 3 shows that many firms use new material in production as this has 1st position in the descending ranking order. The use of latest technological equipment and tools used for products manufacturing rank second. The third position is the increased rate of improved versions of the existing products in the market. Many also admit that they have a new member of an existing product with new features that ranks fourth in the ranking order, while firms have prompt redesign and modify their products that has the 5th position. On the 6th position is the extent of differentiated brands of a product, while the extent to which a new products member with a substantial enhancement of existing features is on the 7th position.

Table 4. Analysis of variables of process-oriented innovation (X2)

Source: Survey research (2018).

Items	Sum	Mean	Std. dev.	Variance	Kurtosis	Ranking
Q8	289.00	1.8408	.38413	.148	1.494	5th
Q9	316.00	2.0127	.33944	.115	5.931	2nd
Q10	299.00	1.9045	.44984	.202	1.665	4th
Q11	327.00	2.0828	.35737	.128	4.103	1ST
Q12	314.00	2.0000	.27735	.077	10.451	3rd
Q13	289.00	1.8408	.38413	.148	1.494	5th

Table 4 shows that majority of the firms use new techniques in production as it is the 1st on the rank, while the 2nd is that many of them have acquired knowledge for the improved skills, techniques and procedures used in transforming input into output redesign core operating processes to improve efficiency and effectiveness. The 3rd position is occupied by the level to which a new introduced method of production brings operational effectiveness that is ranked fourth. Costs are controlled during the production process in the firms and saving are achieved by getting rid of unnecessary ones (the 5th position). The extent, to which process-oriented innovativeness has increased production capacity, cheaper price, and quality and improves production flexibility, occupies the 6th position.

4.2. Items on firm growth

Table 5. Analysis of variables for measuring the firm growth

Source: Survey research (2018).

Variables	Items	Sum	Mean	Std. dev.	Variance	Kurtosis	Ranking
Employment growth	Q14	343.00	2.1847	.45038	.203	.600	3nd
	Q15	328.00	2.0892	.39833	.159	2.821	5th
	Q16	314.00	2.0000	.56614	.321	.184	9th
Sale growth	Q17	338.00	2.1529	.69028	.476	-.887	4th
	Q18	357.00	2.2739	.72157	.521	-.967	2nd
	Q20	316.00	2.0127	.37532	.141	4.300	6th
Firm size growth	Q21	303.00	1.9299	.42539	.181	2.385	12th
	Q22	310.00	1.9745	.37466	.140	4.270	11th
	Q23	316.00	2.0127	.29930	.090	8.490	6th
Market share growth	Q24	312.00	1.9873	.45273	.205	2.004	10th
	Q25	347.00	2.2102	.51927	.270	-.005	1st
	Q26	315.00	2.0064	.28860	.083	9.403	8th

Table 5 shows the measures of firm growth, due to space and conveniences, the growth variables were grouped together. The table also shows that there is an increase in firms' business scope operation (the 1st position), while the rate of firms' inventory increase is on the 2nd position. Majority agreed that innovation increases the employment rate of the firm and occupies the 3rd position. An increase in firms' customers' patronage is 4th and employees' contribution boost firm's innovation is 5th. Increase in firm's cash at hand and increase in the share of innovated product is high in the market, both are ranked 6th. On the 8th position is the extent, to which improved product boost firms' profitability. The 9th position shows the extent to which many firms expanded their business into other geographical areas, the improved products created more value than that of other competitors rank 10th. The 11th position revealed that improved products are highly accepted in the market place and 12th position shows that the innovation has increased the firm's size.

4.3. Hypotheses testing

The initial analysis OF the data reveals that there were no violations in the assumptions of normality, test for linearity and test for homoscedasticity. The correlation statistic shows that the association between the independent and dependent variables WAS low to moderate, indicating the absence of multi-collinearity problems and thus allowing for regression analysis. The regression makes it possible to see how much changes would occur when one particular variable after another are included in the empirical model. The model estimation allows for viewing the contribution of each factor more clearly through the improvement of the R^2.

Re-statement of the research hypotheses

Null hypothesis 1. There is no significant relationship between product-oriented innovativeness and small manufacturing firm sales growth in Lagos State.

Null hypothesis 2. There is no significant relationship between product-oriented innovativeness and small manufacturing firm employment in Lagos State.

Null hypothesis 3. There is no significant relationship between process-oriented innovativeness and small manufacturing firm size growth in Lagos State.

Null hypothesis 4. There is no significant relationship between process-oriented innovativeness and market share growth of the small manufacturing firms in Lagos State.

http://dx.doi.org/10.21511/ed.17(4).2018.05

Table 6. Mean, standard deviation and correlations of X and Y

Source: Survey research (2018).

Variables	Mean	Std.Dev	(X1)	(X2)	(Y1)	(Y2)	(Y3)	(Y4)	(Y)
Product innovation (X1)	1.9936	.26547	1						
Process innovation (X2)	1,540.00	9.8089	.429**	1					
Sales growth (Y1)	985.00	6.2739	.401**	.367**	1				
Employment growth (Y2)	1,834.00	11.6815	.384**	.247**	.360**	1			
Firm size (Y3)	1,245.00	7.9299	.290**	.057	.000	.054	1		
Market shares (Y4)	1,948.00	12.4076	.235**	.291**	.254**	.309**	.084	1	
Firm growth (Y)	38.2930	38.2930	656**	.490**.	.606**	.684**	.352**	.787**	1

*Note: ** – correlation is significant at the 0.01 level (2-tailed). * – correlation is significant at the 0.05 level (2-tailed).*

The analysis of hypothesis one in Table 6 reveals a moderate positive relationship between product-oriented innovativeness and sales growth at r = 0.401< p = .00. The analysis of hypothesis two reveals a moderate positive relationship between product-oriented innovativeness and sales growth of small firms at r = 0.384 < p = .00. The analysis of hypothesis three reveals a very weak insignificant positive relationship between process-oriented innovativeness and size growth of small firms in Lagos State at r = 0.057 < p = .00. The analysis also reveals a very low insignificant positive relationship between process-oriented innovativeness and market share growth of small firms at r = 0.291 < p =.00 in the hypothesis four.

Table 7. Model summary of the variables predictors

Source: Survey research (2018).

Model	R	R-squared	Adjusted R-squared	Std. error of the estimate	Change statistics				
					R-squared change	F-- change	df1	df2	Sig. F change
(X1Y1)	.401[a]	.161	.155	.78981	.161	29.709	1	155	.000
(X1Y2)	.384[a]	.147	.142	.91478	.147	26.730	1	155	.000
(X2Y3)	.057[b]	.003	-.003	.74477	.003	.459	1	155	.000
(X2Y4)	.291[b]	.085	.079	1.42098	.085	14.331	1	155	.000

Note: [a] – predictors: constant, X1, [b] – predictors: constant, X2.

From Table 7, the model summary regression analysis relationship of hypothesis one confirms the correlation value of X1Y1 at r = 0.401< p = .00 indicating a moderate positive relationship between product-oriented innovativeness and sales growth of small manufacturing firms in Lagos State. The goodness of fit R^2 value (0.161) reveals that product-oriented innovativeness explains 16.1% variance in small manufacturing firms' growth in Lagos State.

The model summary regression analysis relationship further confirms the correlation value of hypothesis two (X1Y2) at r = 0.384 < p = .00 indicating a moderate positive relationship between product-oriented and small manufacturing firms' employment generation growth in Lagos State, while the goodness of fit R^2 value of 0.147 reveals that product-oriented innovativeness explains 14.7% of variance in small manufacturing firms' employment generation growth in Lagos State. The table further confirms the correlation value of hypothesis three (X2Y3) at r = 0.057 < p = .00 indicating a very weak positive relationship between process-oriented innovativeness and size growth of small manufacturing firms in Lagos State, while the goodness of fit R^2 value at 0.003 reveals that process-oriented innovativeness explains 00.3% of variance increase in the size growth of small manufacturing firms in Lagos State. The table further confirms the correlation value of hypothesis four (X2Y4) at r = 0.291 < p = .00, while the goodness of fit R^2 value of X2Y4 at .085 reveals that process-oriented innovativeness explains 8.5% of variance increase in small scale market shares growth.

Table 8. ANOVA

Source: Survey research (2018).

Model		Sum of squares	Df	Mean square	F	Sig.
X1Y1	Regression	18.533	1	18.533	29.709	.000b
	Residual	96.690	155	.624		
	Total	115.223	156			
X1Y2	Regression	22.368	1	22.368	26.730	.000b
	Residual	129.708	155	.837		
	Total	152.076	156			
X2Y3	Regression	.255	1	.255	.459	.499b
	Residual	85.975	155	.555		
	Total	86.229	156			
X2Y4	Regression	28.938	1	28.938	14.331	.000b
	Residual	312.973	155	2.019		
	Total	341.911	156			

Note: dependent variables: sales (Y1), employment (Y2), firm size (Y3), market shares (Y4); b – predictors: constant, product innovation (X1) process innovation (X2).

The analysis of variance in Table 8 (ANOVA) tests whether the model is significantly better in predicting the mean. This is based on the F-ratio, which represents the ratio of improvement in the prediction. The modes of X1Y1, X2Y2 and X2Y4 have values greater than 1 and are significant (p<0,5). However, model X1Y1 and model X2Y2 are highly significant at (p < 0.01) meaning that product-oriented innovativeness dimensions increase the probability of realizing greater sales growth and employment growth by the firms under study. Model X2Y4 has low positive F-ratio indicating a low prediction of process-oriented innovativeness on market share, while the firm size (X2Y3) at the 95% confidence level (.499) shows that the value produce is not statistically significant with positive levels of 0.499 variance.

Table 9. Model coefficients

Source: Survey research (2018).

Model	B	Unstandardized coefficients		Standardized coefficients, Beta	T	Sig. Lower bound	95.0% Confidence interval for B	
		Std. error					Upper bound	
1	(Constant)	3.685	.479		7.693	.000	2.739	4.632
	(X1)	1.298	.238	.401	5.451	.000	.828	1.769
1	(Constant)	8.838	.555		15.928	.000	7.742	9.934
	(X1)	1.426	.276	.384	5.170	.000	.881	1.971
1	(Constant)	7.420	.755		9.831	.000	5.929	8.911
	(X2)	.052	.077	.054	.677	.499	-.100	.203
1	(Constant)	6.973	1.440		4.842	.000	4.128	9.818
	(X2)	.554	.146	.291	3.786	.000	.265	.843

Note: a – dependent variables: sales (Y1), employment (Y2), firm size (Y3), market shares (Y4).

Table 9 shows the effects of the individual component of technological innovativeness on firm growth. The coefficient shows that among the four variables of firm performance employed by the study, the Beta column under Standardized Coefficients shows that the highest number in the beta is .401 (X1) of sales growth, which is significant at .000 ranked first in descending order followed by employments generation of 0.384 (X2) of the business under study ranked second. While market share (X4) is third (0.291) and firm size growth is ranked fourth at (X3) 0.054. It, therefore, indicates that between the two dimensions of technological innovativeness used for the study, product-oriented innovativeness (X1) impacts more small manufacturing firms in Lagos State rather than process-oriented innovativeness.

http://dx.doi.org/10.21511/ed.17(4).2018.05

5. RESULTS AND DISCUSSION

The results of the analysis show that technological innovativeness (product-oriented innovativeness and process-oriented innovativeness) and small manufacturing firms' growth divided into four groups: sales (Y_1), employment (Y_2), firm size (Y_3) and market shares (Y_4) is positively related to firm growth to some extent.

The analyses show significant evidence to reject the null hypothesis and accept the substantial hypothesis that there is a significant relationship between product-oriented innovativeness and small manufacturing firms' sales growth in Lagos. This finding is consistent with the previous studies of Bala, Mathirajan, and Krishnaswamy (2010), Ibidunmi, Iyiola, and Ibidunni, (2014), Rahman, Yaacob, and Radzi (2016) who conclude a statistically significant positive correlation between innovation and sales growth. Innovative small manufacturing firms which experience a high share of innovated products in their total sales relative to those which experience lower sales growth and employment growth had a positive influence on firm growth.

The analyses of hypothesis 2 show significant evidence to reject the null hypothesis and accept the substantial hypothesis that there is a significant relationship between product-oriented innovativeness and small manufacturing employment generation in Lagos State. This finding also confirms the previous findings of Diaconu (2011) who concluded that product-oriented innovativeness is positively related to employment, while process-oriented innovativeness is associated with job losses. This is also in line with Dachs, Hud, Koelher, and Peters (2015) who state that innovation stimulates employment. However, Vivarelli (2014) comments that the relationship between innovativeness and employment is not certain even though it impacts growth. It was also discovered from the study that sales and employment are higher at product-oriented innovativeness than process-oriented innovativeness. The positive correlation between product-oriented innovativeness and employment suggests that the key success of innovativeness is an idea and this idea comes from employees. No matter the technology (machine, equipment, processes, etc.) without the human resources to operate them, the result cannot be achieved. Automated machines that bring about advancement in technology cannot substitute human resources in any case. Machines cannot capitalize opportunities in the environment, firms are in high needs of qualified and innovative employees that would through creative ideas either create or discover and utilize these opportunities.

The analysis of hypothesis 3 shows significant evidence to reject the substantial hypothesis and accept the null hypothesis: there is no significant relationship between process-oriented innovativeness and firm size growth of small manufacturing firms in Lagos State. The result that process-oriented innovativeness has very low relationship with firm size growth in Lagos State supports the conclusion of Stanislawski and Lisowska (2015) that there is a negative and convex relationship between technological innovativeness and firm size growth. This could be a result of lack of economic of scale in small firms that requires firms to engage in the adaptation and development of new technology which prompts the firm to imbibe on improved processes to create something new to the market. Rahman, Yaacob, and Radzi (2016), in support of this conclusion, also note that all the factors employed in their study impact growth except firm size. They, therefore, ague that firm size affects growth by conditioning the effects of other factors on it, as a result growth from innovation will be limited by firm size. However, the study by Claudio and Andreas (2014) seems to contradict this result, because it concludes that innovation affects firm size arguing that small firm lacks innovative ability due to its resources limitation.

The analysis of hypothesis 4 shows significant evidences to reject the substantial hypothesis and accept the null hypothesis that there is no significant relationship between process-oriented innovativeness and market share growth of the small manufacturing firms in Lagos State. The finding that process-oriented innovativeness has an insignificant relationship with market share growth is against the finding of Letangule and Letting (2012) who state that there is a positive relationship between technological innovativeness and market shares.

The analysis clearly revealed that product-oriented innovativeness has high correlational value of 0.656, while process-oriented innovativeness is at 0.490 with firm growth. This also is in line with the previous findings that product innovation is turning out to be only significant in high tech industry firms (Rahman, Yaacob, & Radzi, 2016). Letangule and Letting (2012) conclude a positive relationship between technological innovation and firm performance. This shows that firms with product innovativeness either new or improved products, grow faster than firms that depend on processes innovativeness. However, a study proves that the diverse effects of innovation on firm growth depend on the organization types (Mendoza, 2015).

CONCLUSION, SUMMARY AND SUGGESTIONS

The purpose of this study was to empirically establish the relationship between innovation and firm growth. From the previous theoretical and empirical finding, the study supports the preposition that innovation relates to and has a positive impact on firm growth. The study has been able to create knowledge profiles to distinguish between product-oriented innovativeness and process-oriented innovativeness. From the analysis conducted, comparing the two, the study finds that small scale firms with high technical competence should be able to improve product shapes/dimensions, increase the range of products and as a result increase the share of innovated product in their total sales, which contribute to the growth of the employment, sales, firm size and market shares. However, the result shows that product-oriented innovativeness has more impacts than the process-oriented innovativeness. Therefore, it should be stressed that innovation growth effects are particularly important for manufacturing firms.

The result of this research is very important to government policymakers aiming at full employment and economic growth. The policies should encourage innovation among especially SMEs to involve in new product creation, to strengthen the employment generation in the nation and besides the organizational management should strive to increase their sales and market share by embarking on product-oriented innovativeness. The organization managers should employ staff with innovative ideas to sustain their growth.

LIMITATIONS OF THE STUDY

The result of the study may be affected by the time period of the study. This makes the researcher to use cross sectional survey rather than longitudinal survey. Longitudinal method would have aid in gathering more unbiased response as it engages in continuous gathering of data for the same purpose over a period of time. The researcher depends heavily on the small scale manufacturing firms' owners as the respondents to access the growth of their firms. This, therefore, may have resulted in response biases due to owners' perceptions. Privately owned firms are not always easy to study. In many cases, they are not subject to financial reporting requirements and little information is made public about their operations. This made it very difficult to obtain the needed information. Some respondents are reluctant to give information, because they did not believe in the assurance given them that the data to be collected were purely for academic purpose and would be treated in strict confidence.

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