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An Evaluation of Technology Innovation on the Performance of Indigenous Textile Weaving Firms in Southwestern Nigeria

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***A*bstract:** The study evaluated the impact of technology innovation on the performance of indigenous textile weaving firms in south-western Nigeria. Primary data were collected through structured questionnaire administered on indigenous weavers in the study area. Results of correlation analysis showed the relationship between business performance and source of raw material ($r=0.17$, $t=2.84$, $p<0.01$); product innovations ($r=0.10$, $t=1.65$, $p<0.05$); investment in technology innovations ($r=0.19$, $t=3.25$, $p<0.01$); business advisory services ($r=0.11$; $t=1.74$, $p<0.05$); reduction of tax ($r=0.11$; $t=1.73$, $p<0.05$), export incentives ($r=0.13$; $t=2.09$, $p<0.01$); and total capital investment ($r=0.21$; $t=3.55$, $p<0.01$). Factors with negative effect are cost of R&D ($r=-0.19$; $t=3.24$, $p<0.01$); threats by competitors ($r=-0.18$; $t=3.06$, $p<0.01$) and production of quality products ($r=-0.09$; $t=1.64$, $p<0.05$). Regression analysis and its impact on business performance were local marketing, ($\beta=17.95$, $z=11.18$, $p<0.01$); national marketing, ($\beta=18.35$, $z=1.64$, $p<0.01$); product innovations, ($\beta=3.17$, $z=3.03$, $p<0.01$); total capital invested, ($\beta=2.68$, $z=10.19$, $p<0.01$) and experience in business, ($\beta=2.66$, $z=2.96$, $p<0.01$). Factors with negative effect were payment of tax, ($\beta=-17.46$, $z=-21.31$, $p<0.01$); regional marketing, ($\beta=-17.38$, $z=-18.08$, $p<0.01$); local competition, ($\beta=-16.53$, $z=-9.02$, $p<0.01$). The study concluded that sale of products in the domestic market; product innovations; total capital invested and years of experience in business were the factors responsible for the resilience and sustenance of indigenous textile weaving firms. However, factors such as payment of tax, sale of products in regional market, local competition, trade liberalization and cost of R&D are the major constraints in the performance of firms in the industry.

JEL Classifications: L6, O12

Keywords: technology innovations, indigenous textile, performance evaluation and small enterprises

1. Introduction

The promotion of innovation, in particular technology innovation in developing countries, has become an area of research interest in the past two decades. The growing interest in the subject stems from the recognition of its importance because of the perceived failure of traditional economic policies. These traditional policies which are embedded in the privatization, liberalization, deregulation and structural adjustment policies (SAP) have clearly demonstrated their limits for promoting sustainable growth in developing countries (Aubert, 2005). Similarly, policies focusing on modernization, in terms of massive investment in infrastructure and institutions by governments, have not yielded the expected results. Thus, there is the tendency to take a critical look at technology including its creation and diffusion as the engine of economic development. Another reason adduced for interest in the subject is that most developing countries face genuine obstacles to innovation and this is precisely why they remain underdeveloped.

These obstacles derive from inappropriate business, technological and as well as the socio-economic environment (Aubert, 2005).

The overall context in which technology innovation takes place in developing countries is dominated by two global events. The first one, according to Aubert (2005), is the intensification of the globalization process. Globalization manifests itself by the importance of trade within the global economy. Specifically, globalization is the closer integration of countries and peoples of the world and the breaking down of artificial barriers to the flow of goods, services, capital, knowledge and people across national borders. It is also a process of creating a global market place of investments, trade and information through the integration of economic decision making on consumption, investment and savings across the world. The key elements of this process are the interconnection of sovereign nations through trade and capital flows, harmonization of the economic rules that govern relationship between sovereign nations, creating structures to support and facilitate dependence and interconnection, and creation of a global market place (Aubert, 2005). The second is the intensive and on-going technological change stimulated by scientific advances in all aspects of the economy particularly in the information and communication technology (ICT) (Aubert, 2005).

It was further suggested that as a consequence of both changes, a new development era is gradually replacing the industrial era just as the agricultural era was replaced by the industrial era. For instance, it was argued that the share of manufacturing activities is declining in most economies while the share of services is increasing. Knowledge and other intangible factors tend to replace capital and labour accumulation as a source of growth. A new growth pattern is taking place, engendered by a larger consummation of the total factor productivity. Unfortunately, the Bank of Industry (2006) reported that the share of manufacturing in Nigeria is still based on low-technology. For most firms there has been limited investment to modernize existing plant and machinery and in upgrading the production technology.

2. Review of Literature

In spite of the trend in the global economy, technology innovation climates in most developing countries are hampered by weaknesses of other key elements of knowledge-based economies which were defined as the four pillar framework. These are the levels of educational attainment, lack of appropriate technical skills, the business environment and the information infrastructure. Educational levels are very low in most developing countries. This is a significant barrier to the development and diffusion of technological innovation in these countries (Aubert, 2005). This means that there is a clear relationship between educational needs and the different phases of industrialization.

For instance, Ogbimi (2007) reported that in the pre-industrial phase, educational needs demand only basic literacy. In the industrial phase, more professional and medium-level skills are required. In the post-industrial phase, there is a need for a significant share of the population with tertiary education, with the rest of the population having at least functional literacy. Competent management with requisite modern management skills and systems is essential for any business enterprise. With globalization, the technical and management skills for success in the global market place have changed substantially. As a consequence of the unpredictable and problematic political, social and economic environment, the national innovation systems in developing countries are poorly constructed and are very weak (Aubert, 2005). The national innovation system, in this context, is defined as the set of organizations which include firms, universities and R & D institutes and their linkages through which innovation processes develop. On the enterprise side, a large number of micro and small-scale enterprises (MSEs) operate in the informal sector while medium and large-scale foreign based multinational firms tend to be more predominant in the formal sector (Ilori, 2006).

On the knowledge side, there is generally a limited research by scholars in developing countries having research facilities in Universities and R & D institutes which are poorly connected to local realities particularly to labour market needs and opportunities. Another major problem hindering the national innovation system is the lack of technological support services and infrastructure. Ilori (2006) further reported that public sector institutions tend to be numerous, particularly those providing support for enterprise development. In this over-crowed support system, provision of quality support for the promotion of technology innovation becomes problematic. Where this is possible, the organizations are rarely appropriate, lacking the flexibility and the drive crucial for entrepreneurship. These overall obstacles critically affect the innovation systems.

From the foregoing, it is evident that technology innovation, wherever it takes place, can be regarded as an indicator of the society or industry tendency for progress and its inherent capability to translate what may well have been an idea, into productive use. Unfortunately, Oyeyinka-Oyelaran (1996) showed that not much attention is paid to the study in developing countries whenever the issue of technological innovation is discussed, because of the prior assumption that developing countries are either incapable or do not need to carry out innovation. This is because technology innovation has also been associated with revolutionary scientific breakthrough which by all historical records had always been a monopoly of the richer industrialized countries. However, this is a rather limited definition of innovation. Beyond the first commercial exploitation of a product or process in the classical definition of innovation, the subsequent phases of imitations and adaptations are not just important but constitute critical sources of improvement on the original product or process (Oyeyinka-Oyelaran, 1996). Studies by Hollander (1965) and Earnst and O'Connor (1989) also demonstrate that subsequent stages of use of innovations contributed to important growth in productivity and enterprise performance.

3. Conceptual Framework

The framework shown in Figure 1 examined technology innovations as a creative process engaging a variety of activities, participants and interactions the outcome of which is a technological product or process (Beije, 1998). The conceptual framework derives from the Schumpeterian Theory (1934, 1943); the Theory of the Firm (Coase, 1937); Endogenous and Exogenous Theory of the Firm (Santoro and Chakrabarti, 2002) and Exchange Theory of the Firm (Smith, 2005) all of which are premised on the role of the entrepreneur in an enterprise; internal and external factors affecting technological innovations and organizational learning. These theories are relevant to the technological innovation behaviour of micro enterprises such as indigenous weaving firms in this study.

The theories suggest that the entrepreneur has a critical role to play in the technological innovation decisions of a micro and small enterprise. The researchers also argued that a better educated workforce as well as the development of human capital is a critical input in the acquisition and application of knowledge which are necessary for technology innovations. Lal and Dunnewijk (2008) also suggest that doing innovation is likely to lead to the accumulation of technological knowledge while imitation and adoption of techniques build up a wide variety of skills and experiences that is difficult to destroy. In this process, firms, industry and society learn. Technological learning is the way by which an enterprise builds up its stock of knowledge, experiences, skills and capabilities. The framework in Figure 1 also identifiedthe sources of innovations and factors affecting the performance of indigenous weaving firms in southwestern Nigeria.

Smith (2005) recognized that a conceptual definition of innovative enterprises is problematic because what should be measured is something that is either **'**new**'** or an **'**improvement' of an existing production process, product or service. Therefore, measuring innovation as shown in Figure 1 implies commensurability and novelty and these are basic problems for innovation indicators in general. In this study, the dependent variable for evaluating the impact of technology innovations is business performance which is represented by the average sales turnover of the firms in the last three accounting years.

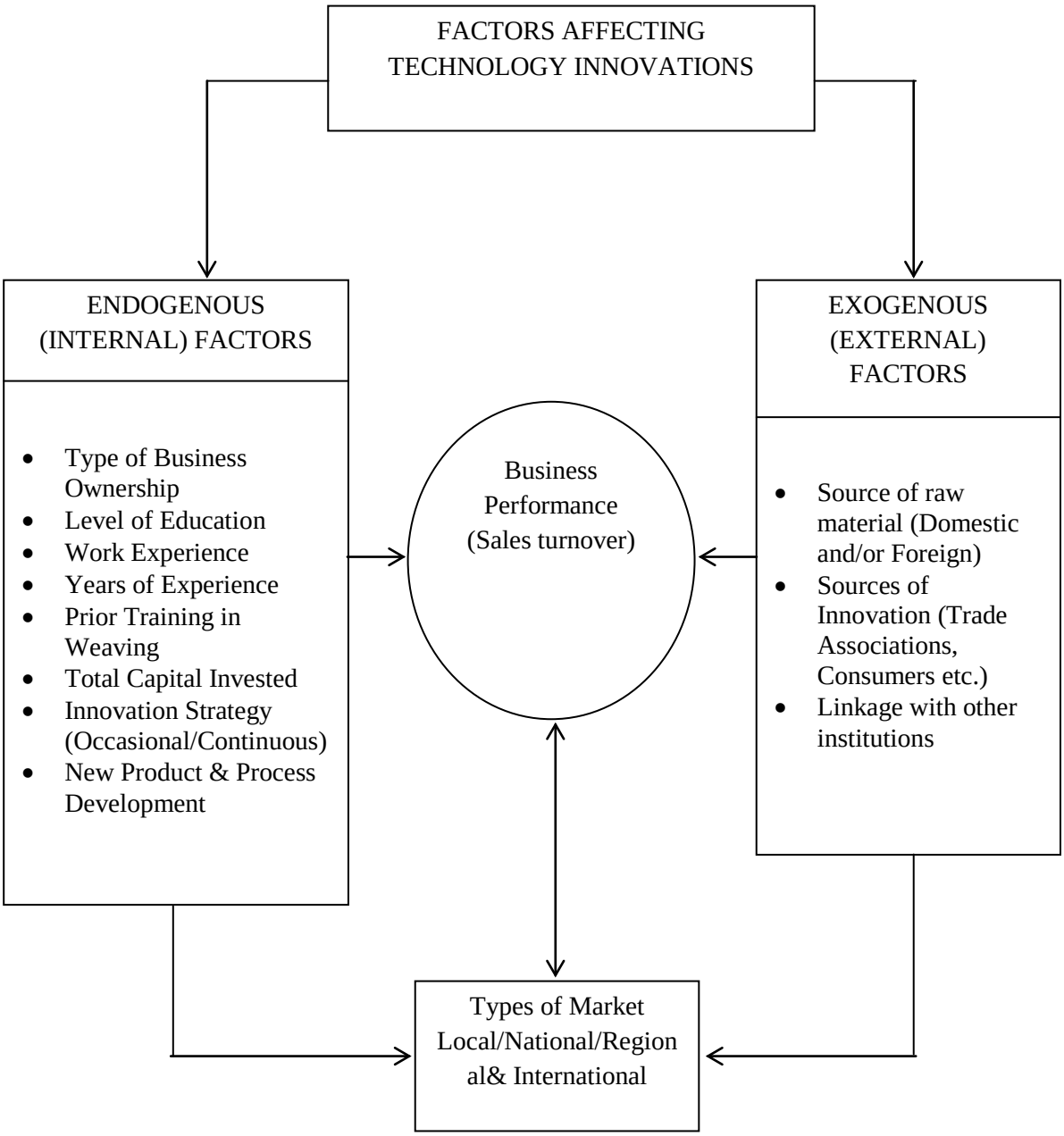

Figure 1. Conceptual Framework for Indigenous Textile Weaving Firms in Southwestern Nigeria

Several studies in the literature shows that innovative enterprises perform better than others and this is reflected in their sales turnover and profit. In the process, they acquire more resources to be more innovative. However, the calculation of profit is problematic particularly for micro and small scale firms operating in the informal sector. In most cases they do not keep accurate records of financial transactions to facilitate the calculation of profit. This has necessitated the use of sales turnover as a proxy for business performance in this study. Figure 1 further show that the relationship and factors affecting business performance is not always unidirectional. They are influenced by a variety of internal and external factors such as human capital (education, training and years of work experience); type of business ownership; innovation strategy; new product development; networking and linkage; while market preference is bidirectional.

The framework also recognizes the leadership role of the entrepreneur in an enterprise. Some of these include planning and the coordination of innovation activities in the firm (Schumpeter, 1934 and 1943). In addition, the entrepreneur brings a certain stock of human capital such as knowledge and skills into the enterprise which is obtained through education, training and earlier experience. Over time, the capability base of the enterprise is further enhanced through internal learning, informal experimentation, making minor adaptation to products and processes, in-house staff training, and so on (Drucker, 1985). All these factors have an effect on technology innovations and performance of an enterprise.

Similarly, Figure 1 further shows that technology innovation is also influenced by the type of business ownership structure such as sole proprietorship, partnership, cooperatives and limited liability companies. Small-scale enterprises are usually individual or sole proprietorship forms of business. Hence, the decision to be innovative or less innovative lies with the single individual. However, in case of enterprises that are partnership, cooperatives or limited liability companies, decision about technology innovations is not likely to be taken by a single individual but collectively by partners, members or management (Adegbite, 2011). The outcomes of both decision making processes has advantages as well as disadvantages. For instance, Noteboom (1994) suggested that sole proprietor enterprises can take quick decision, employ motivated people and have unique or scarce competencies while innovation decisions taken in other forms of business are based on inputs of several persons. Choice of market coverage shown in the framework influences and is also influenced by innovation activities. Choice of markets and the preference to network are also interrelated and singularly or collectively impact the enterprise's innovation practices. Lal and Dunnewijk (2008) further argued that choice of innovation is often determined by the market in which the enterprise operates. For less cost sensitive markets, like local, national or regional markets, product innovations may be preferred, while process innovations are aimed at flexibility in production processes, improvement in quality and reliability, and for high productivity to enhance competitiveness in the international market.

Network relations or linkage shown in the framework has an impact on technology innovations. Lal (2002); Santoro and Chakrabarti (2002); and Smith (2005) explained that for the external sources of inputs to technology innovations, interaction with suppliers, customers, public institutions; R&D institutes; tertiary educational institutions and industry associations may provide the missing inputs into the learning process which the enterprise itself cannot easily provide. External interaction may take place for the purpose of gathering information about technologies and markets; capacity building for skill acquisition; and also for obtaining various other inputs to complement the internal learning process. Some of these include external staff training, procurement of parts and components, advisory and consulting services and so on. The mobilization of external resources for technological innovation is called 'learning by interacting'.

In this study, indigenous textile firms fall into the category of enterprises that are consumer-dominated in line with the classification of technology-based business firms by Bell and Pavit (1993). These firms derive their immediate sources of technology innovations from the consumers of output. Apparently, because they are micro and small-scale enterprises, consumer-dominated firms tend to lack internal resources to engage in original research and development (R&D) activities to develop new technologies, which demand that such firms develop linkages to access technological inputs.

4. Objective of the Study

Research findings showed that not much has been done to know the impact of technology innovations on the performance of indigenous textile weaving firms in southwestern Nigeria. Previous studies by Okeke (2005), Meagher (2006) and Asakitipi (2007) emphasized cultural and management practices as factors responsible for its resilience while adequate attention has not been paid to the contribution of technology innovations on the sustenance of the sub-sector

and its modest contribution to industrial development. This suggests the need to investigate the role of technology innovation in the sustenance of the industry and why the indigenous textile weaving sub-sector is still thriving in spite of the economic hardship and the near collapse of the textile industry in the formal sector of the economy.

Hence, the objective of this study is to assess the impact of the technology innovation factors on the sustenance of the industry. The study will provide information on social and economic characteristics of operators in the industry; internal and external sources of technology innovations; and the impact of process and product innovations on business performance.

5. Research Methodology

Correlation matrix and Logistic regression model were used to measure the impact of innovation variables on sales turnover as a proxy for business performance. The Logistic regression of the sales turnover (dependent variable) in the study is a binary variable of 1 and 0. The variable 1 (one) measures the firms whose average sales turnover is greater than the mean sales turnover of **₦450, 088.00** (Nigerian Naira) of all the 273 respondents, while 0 (zero) are those with less than the mean sales turnover of the responding firms. In this study, 69% of the respondents have more than the average sales turnover of **₦450, 088.00.** To determine the relative impact of a variable, we analyzed the data in a multivariate framework. The binary logistics function provides estimates that must lie in the range between 0 and 1. The cumulative density function in explicit form is expressed as:

$$P(\chi) = (1\text{-}e^{-f(\chi)})^{-1}$$

Where the odds ratio is a log linear function and is given by its Log transformation:

$$1n\,[p/\,(1\text{-}p)] = a_o + b_1\chi_1 + b_2\chi_2 + b_3\chi_3 + b_4\chi_4 + b_5\chi_5 + b_6\chi_6 + b_7\chi_7 + b_8\chi_8 + b_9\chi_9 + b_{10}\chi_{10} + b_{11}\chi_{11}Ui \qquad (i)$$

Where χ is the set of variables expressed as:

χ_1= level_educ {education of respondents};

χ_2= train_weaving {training of respondents};

χ_3= work_exp {prior working experience};

χ_4= yr_bus {years of experience in business};

χ_5= inno_stratgy {innovation strategy (1=continuous and 0=occasional)};

χ_6= mat_sourc {sources of raw materials};

χ_7= new_prd {new product and process development};

χ_8= sourc_techin {sources of innovations};

χ_9= innov_factrs; {factors affecting innovations};

χ_{10}= type_mkt {types of market coverage}; and

χ_{11}= tot_cap {total capital invested}.

In using the Logistic regression model for the study, the maximum likelihood for estimating the parameters in the model was applied since it requires no restriction on the characteristics of the independent variables. The other factors in the log linear function in equation 1 above were expressed as:

bi = regression coefficients of the variables (where i = 1,2,**...,** n)

a_o = constant term/ intercept

Ui = stochastic/ residual error term

The Ui is a residual error which is normally distributed with an expected mean value of zero and variance d^2x. The study verified the model by the measurement of all the variables (dependent and independent) and estimate of their parameters. The one with the highest R^2 which is corroborated and validated by the F- Parametric test ratio of values that are statistically significant were chosen for the analysis. Data collected was edited, coded and analyzed by using descriptive and inferential statistics such as correlation matrix and logistic regression.

6. Results and Discussions

The results and discussions are presented in this section.

6.1 Total Capital Invested in the Business

The total capital outlay and sources determine the size of an enterprise. Access to capital is a major obstacle to the start-up and management of an enterprise. For instance, McMahon (2001) found that enterprise size is significantly linked to better business performance. In addition, sources of capital, especially by entrepreneurs who exhibit financial flexibility and diversify their financial portfolio (sources) were associated with better business growth.

Table 1. Total Capital Invested in the Business by Responding Firms in 2011

Description	Number	Minimum Capital	Maximum Capital	Sum	Mean	Standard Deviation
Total Capital Investment	273	₦ 42,000	₦1,400,000	9.3E + 07	₦422,652	₦ 964,935.93

Source: Result of Data Analysis (2012).

Table 1 indicates that the minimum capital invested by the responding firms is ₦42, 000.00 while the maximum capital outlay is ₦1, 400,000.00. Similarly, the average capital invested by the firms in 2011 is ₦422, 652.00. In Nigeria, businesses with a total capital outlay between ₦0.1 million and ₦2.0 million, excluding the cost of land and working capital, and employing up to 10 workers including family members, itinerant and apprentices are regarded as micro enterprises (Central Bank of Nigeria, 2004). It is therefore evident from this study that all the responding firms' falls within this classification as they all have a total capital outlay of less than two million Naira.

The implication of the low capital base is that most of the responding firms may not engage in research and development (R&D) activities due to resource crunch (Oyeyinka-Oyelaran and Lal, 2006). The limited resources at the disposal of responding firms may also affect their capability to invest in process and product innovations.

6.2 Annual Gross Sales Turnover of the Firms

Table 2 reveals that the responding firms had a minimum sales turnover of ₦18, 000 in Year 2009; ₦30, 000 in Year 2010; and 42,000 in Year 2011. Similarly, the maximum turnover of the firms in Year 2009 is ₦1, 510,420.00; Year 2010 is ₦1, 720,000.00 and Year 2011 is ₦1, 800,000.00. This implies that the minimum and maximum sales turnover keeps increasing on a yearly basis which could be an indication of

business performance. However, the average sales turnover is ₦450, 088.00 for the three accounting years while further analysis indicate that majority (69%) of respondents have more than the average sales turnover of ₦450, 088.00. The average sales turnover of all the responding firms supports similar findings by Omisakin (1999) and Akinbinu (2001) that most micro and small enterprises in Nigeria engaged in manufacturing activities have an average sales turnover of more than N400, 000 per annum.

Table 2. Sales Turnover of Responding Firms in Years 2009 – 2011

Year	N	Minimum Sales Turnover (₦)	Maximum Sales Turnover (₦)	Mean	Std. Deviation
2009	273	18,000.00	1,510,420	367,671.9	36381.87311
2010	273	30,000.00	1,720,000	462,370.0	66339.57756
2011	273	42,000.00	1,800,000	520,223.4	76947.53810
Average Sales Turnover (2009-2011)	-	-	-	**₦450,088.00**	-
Valid N (listwise)	273				

Source: Result of Data Analysis (2012).

6.3 Correlation Analysis

The correlation analysis in Table 3 shows the relationship between the dependent variable, (Sales Turnover), (Y_0) and each of the independent variables. The result indicate that there were significant and positive correlations between business performance (Y_0) and source of raw material (r=0.17, t=2.84, p<0.01); product innovations (r=0.10, t=1.65, p<0.05); investment in technology innovations (r=0.19, t=3.25, p<0.01); business advisory services (r=0.11; t=1.74, p<0.05); reduction of tax (r=0.11; p<0.05); export incentives (r=0.13; t=2.09, p<0.01); and total capital investment (r=0.21; t=3.55, p<0.01). The positive correlation implies that each of the variables enhanced the performance of the firms.

Table 3. Correlation Analysis on Performance of Indigenous Weaving Firms

Description	r [Sign (1%)]	t-value [Sign (1%)]	r [Sign (5%)]	t-value [Sign (5%)]
(Y_0) Annual Sales Turnover in 2011				
Source of Raw Materials	0.17	2.83989		
Technology Innovations	0.19	3.255492		
Cost of R&D	-0.19	-3.23806		
Threats by Competitors	-0.18	-3.06431		
Export Incentives	0.13	2.090886		
Total Capital Invested	0.21	3.553502		
Product Innovations			0.1	1.654501
Reduction of Tax			0.11	1.730022
Business Advice			0.11	1.738126
Quality Products			0.09	1.637790

Source: Result of Data Analysis (2012)

Similarly, business performance has statistical significant correlation, though negative, with cost of R&D (r=-0.19; t=3.24, p<0.01); threats of competitors (r=-0.18; t=3.06, p<0.01) and production of quality products (r=-0.09; t=1.64, p<0.05). These variables had negative impact on the firm's performance. Hence, cost of research and development (R&D), threats by competitors and production of quality products were inversely related to the performance of the enterprises. This implies that costs of research and development (R&D) and competition by local and foreign textiles mostly from Asian countries with locally made indigenous textiles reduced the performance of the enterprises.

6.4 Regression Analysis

In Table 4, the Logistic regression analysis showed those factors that had significant (p<0.01 and p<0.05) contribution to business performance. These factors and their coefficient and z values are education of apprentice weavers which had a coefficient and z value of -2.25 (β= -2.25; z=-2.55; p<0.01). This means that for each additional apprentice weaver with primary education employed, the sales turnover could decrease business performance by ₦2.25. Litvak (2002) suggested that this type of education i.e. primary education is not business related or technical in nature to enable the apprentice weavers undertake process and product improvements to enhance business performance.

The years of experience in business had positive coefficient values. Respondents with less than 10 years of experience had a coefficient and z value of 1.82 (β = 1.82, z=2.01; p<0.05); 11 to 20 years of experience had a coefficient of 2.66 (β = 2.66, z=2.96; p<0.01); and 21 to 30 years had a coefficient of 1.88 (β =1.88, z=2.02; p<0.05). This means that for each additional years of experience of the weavers, there would be an increase of ₦1.82; ₦2.66 and ₦1.88 respectively in sales turnover and the overall performance of the industry. The outcome supports the findings of Kristiansen et.al, (2003) in their study of small enterprises in Indonesia which showed that length of years in operation was significantly linked to business success and reduced the high mortality rate associated with small industries. Similarly, the experience of owners, particularly the level of skill and knowledge, is also an important factor and has been found to affect innovation activities **(**Hirschman**,** 1992**)**. The positive contribution of years of cumulative experience in business by respondents in this study could be one of the factors responsible for the sustenance and resilience of the indigenous textile weaving firms.

Other important variables such as the factors affecting technology innovations also contributed positively and negatively but significantly to the performance of the textile weaving firms. For instance, the presence of functioning R&D institutes had a coefficient value of 3.17 (β=3.17, z=3.03; p<0.01) which means that a unit of assistance given to enterprises in the sector by R&D institutes could increase business performance by ₦3.17. The significance of the coefficient at 1% level implies that provision of technical assistance by R&D institutes could contribute positively and significantly to business performance. Firms develop external linkages with R&D institutes for inputs to their technology development. Smith et al., (1995) suggest that collaboration between firms and R&D institutes can provide firms with skills, knowledge, and access to facilities needed to effectively enhance the firm's capabilities for technology innovations by exchanging complementary resources and growing competencies to generate value-added synergies.

Presence of business development centres had a coefficient value of 2.98 (β = 2.98, z=2.74; p<0.01). This showed that services provided by business development centres such as business registration, access to capital and business advisory services could significantly increase the sales turnover by ₦2.98. Lal (2002) explained that interaction with public institutions for business advice could provide the missing inputs into the learning process which the enterprise itself cannot easily provide. Similarly, Santoro and Chakrabarti (2002) in their study showed that external interaction may take place for the purpose of gathering information about technologies and markets; capacity building for skill acquisition; and also for obtaining various other inputs to complement the internal learning process. The mobilization of external resources for technological innovation is called 'learning by interacting' (Lal, 2002).

Table 4. Logistic Regression Analysis

Dep.	Coeff.	Std. Err.	Z	P>|z|	[95% Conf.	Interval]
edu1	-1.493631	1.070556	-1.40	0.163	-3.591881	.6046203
edu2	-2.252028	.8845199	-2.55	0.011*	-3.985656	-.5184012
edu3	-1.226752	1.095448	-1.12	0.263	-3.373791	.9202868
edu4	-.3675913	1.593918	-0.23	0.818	-3.491613	2.756431
train2	-.5155413	.5143903	-1.00	0.316	-1.523728	.4926453
train3	-3.012691	1.729991	-1.74	0.082	-6.40341	.3780282
workx1	.3789259	.9046453	0.42	0.675	-1.394146	2.151998
workx2	2.347835	1.844151	1.27	0.203	-1.266634	5.962305
yr_bus1	1.817102	.902253	2.01	0.044*	.0487183	3.585485
yr_bus2	2.661792	.8984782	2.96	0.003**	.9008073	4.422777
yr_bus3	1.881467	.9318265	2.02	0.043*	.0551206	3.707813
innost1	.8855809	.6494959	1.36	0.173	-.3874078	2.15857
matsor2	.5522874	1.473328	0.37	0.708	-2.335382	3.439956
matsor3	-.496225	.6107391	-0.81	0.417	-1.693252	.7008016
newprd1	-1.082516	1.351502	-0.80	0.423	-3.731411	1.56638
q9_1an	-.9135766	1.078271	-0.85	0.397	-3.026948	1.199795
q9_1bn	.8085657	.9457394	0.85	0.393	-1.045049	2.662181
q9_1cn	-.211092	.6390184	-0.33	0.741	-1.463545	1.041361
q9_1dn	.5737956	1.367795	0.42	0.675	-2.107033	3.254624
q9_1fn	.2589658	.6378849	0.41	0.685	-.9912657	1.509197
q9_1gn	.0862581	.6290317	0.14	0.891	-1.146621	1.319138
q9_1hn	.7258129	.7017151	1.03	0.301	-.6495235	2.101149
q9_1in	.0655698	1.268777	0.05	0.959	-2.421187	2.552327
q9_1jn	.3952659	.5291612	0.75	0.455	-.6418709	1.432403
q10_1	3.169986	1.04718	3.03	0.002**	1.117551	5.222421
q10_2	2.979281	1.088776	2.74	0.006**	.8453193	5.113243
q10_3	-16.53527	.9587091	-17.25	0.000**	-18.4143	-14.65623
q10_4	-17.46176	.8192787	-21.31	0.000**	-19.06752	-15.85601
q10_5	-1.625271	.8102174	-2.01	0.045*	-3.213268	-.0372744
q10_6	-16.53406	1.833456	-9.02	0.000**	-20.12757	-12.94055
q10_7	-16.32131	1.871687	-8.72	0.000**	-19.98975	-12.65287
loc_mkt	17.95054	1.605725	11.18	0.000**	14.80337	21.0977
nat_mkt	18.35227	1.725015	10.64	0.000**	14.97131	21.73324
reg_mkt	-17.37996	.9610617	-18.08	0.000**	-19.2636	-15.49631
int_mkt	-1.375124	1.381042	-1.00	0.319	-4.081917	1.331668
tot_cap	2.67954	3.207288	10.19	0.000**	26.39337	38.96571

Source: Result of Data Analysis (2012)

NOTE:

**significant at 1% ($p \leq 0.01$)

*significant at 5% ($p \leq 0.05$)

KEY:

Dependent Variable: Sales Turnover (Yo)

Independent Variables:

{χ_1= edu1(χ_1^1), edu2(χ_1^2), edu3 (χ_1^3), edu4(χ_1^4)};

{χ_2= train2(χ_2^2), train3 (χ_2^3)};

{χ_3= workx1(χ_3^1), workx2(χ_3^2)};

{χ_4= yr_bus1(χ_4^1), yr_bus2(χ_4^2), yr_bus3(χ_4^3), yr_busi4(χ_4^4)};

{χ_5= innost1(χ_5^1), innost2(χ_5^2)};

{χ_6= matsor1(χ_6^1), matsor2(χ_6^2), matsor3(χ_6^3);

{χ_7= newprd1(χ_7^1), newprd2(χ_7^2)};

{χ_8= q9_1an(χ_8^1), q9_1jn(χ_8^9)};

{χ_9= q10_1(χ_9^1), q10_7(χ_9^7)};

{χ_{10}= loc_mkt(χ_{10}^1), nat_mkt(χ_{10}^2), reg_mkt(χ_{10}^3), int_mkt(χ_{10}^4)};

{χ_{11}= tot_cap}.

Description of Independent Variables:

χ_1= education of respondents {edu1=founder/MD; edu2=apprentice weavers; edu3=contract weavers; edu4=itinerant weavers}.

χ_2 = training in weaving {train2=family tutelage and train3=weaving school).

χ_3 = prior place of work (workx1=family weaving business and workx2=family tutelage}.

χ_4 = years of experience in business {yr_bus1=1-10 years; yr_bus2=11-20 years; yr_bus3=21-30}.

χ_5 = innovation strategy {innovst1=occasional innovation; innovst2=continuous innovation}.

χ_6 = sources of raw materials {matsor1=local; matsor2=foreign and matsor3=both foreign and domestic}.

χ_7 = type of new product development {newprd1=product modifications}.

χ_8 = sources of technology innovations {q9_1an =seminars, training and conferences; q9_1bn=customers; q9_1cn=suppliers of machinery and equipment; q9_1dn=R&D efforts within the firm; q9_1fn=business/weavers associations; q9_1gn=market research; q9_1hn=legal right to use the innovation of others; q9_1in=consultancy services; q9_1jn=hiring of qualified personnel}.

χ_9 = factors affecting technology innovations {q10_1 = functioning R&D institutes; q10_2 = business development services; q10_3=law to protect innovations q10_4=payment of tax; q10_5=cost of R&D; q10_6=competition from local and foreign textiles and q10_7=effect of trade liberalization}.

χ_{10} = market coverage {loc_mkt=local market; nat_mkt=national market; reg_mkt=regional market and int_mkt=international market}.

χ_{11} = total capital invested in the business.

Government regulations to protect product and process innovations through patenting had a negative coefficient value of -16.53 ($\beta_=$ -16.53, z=-17.25; p<0.01), which indicate that for each unit of increase in lack of access to product and process innovations patented, sales turnover could decrease by ₦16.53. A patent, which is an exclusive right granted by the Nigerian government for the manufacture and sale of a product or access to process technology, could exclude other businesses from making, using, selling or offering for sale a patented invention or product (National Office of Industrial Property, 2002). This lack of access to patented products and process is regarded by respondents in the study as a factor that could contribute negatively to business performance since most of the firms do not engage in any scientific research. Instead, they imitate the products and process of other firms in the industry.

Payment of tax to government and other agencies also had a negative coefficient and z values of -17.46 ($\beta_=$ -17.46; z=-21.31) which is significant at 1%. This showed that each unit of tax paid to the government could decrease sales turnover and business performance by ₦17.46. Payment of tax is an expense to the business and could reduce the financial resources available for an enterprise. McMahon (2001) suggested that limited financial resources could be a major obstacle to a firm's ability to engage in product and

process innovations. The negative response to the payment of tax by respondents in this study supports the findings.

The cost of research and development (R&D) by the firms had a negative coefficient and z values of -1.63 ($\beta_=$ -1.63, z=-2.01; p<0.05) which implies that for each unit of increase in the resources spent on research and development (R&D), the overall business performance could decrease by ₦1.63. Research and development (R&D) for product and process innovations involve financial expenditure, skills and expertise which may not be available to an enterprise (Bell, 1984). This probably explains why responding firms that are mostly micro and small enterprises with limited resources believed that expenditure on R&D would have a negative effect on their business performance. This is a major drawback for firms in the industry.

Furthermore, threats by local and foreign competitors also had a negative coefficient value ($\beta_=$ -16.53, z=-9.02; p<0.01). This showed that for each unit of increase in the number of local indigenous textile producers as well as foreign firms importing other textile products into the country could substantially reduce the firms' sales turnover and performance by ₦16.53. The findings shows that the ease of establishing indigenous weaving enterprise with very little capital outlay could pose a serious threat to the operators in the industry. Also, the effect of trade liberalization policy of government on the industry had a negative and significant coefficient and z value of ($\beta_=$ -16.32, z=-8.72; p<0.01) which means that any policy made by government to liberalize trade could reduce sales and business performance by ₦16.32. This corroborates the findings of Fakoya (2008) that trade liberalization and importation of goods from other countries had a negative impact on the performance of local manufacturing industries in Nigeria.

Sale of textile products in local and national markets had positive coefficient and z values of ($\beta_=$17.95, z=11.18; p<0.01) and ($\beta_=$18.35, z=1.64; p<0.01) respectively. This implied that each unit of indigenous textile sold in the local and national markets could increase sales turnover and business performance by ₦17.95 and ₦18.35 respectively. On the contrary, sale of products in West Africa Market had negative coefficient value of ($\beta_=$-17.38; z=-18.08). It is significant at 1% probability level and could decrease business performance by ₦17.38. The results showed that sale of textile products in the local and national markets made positive contribution to business performance while sales made at the regional market had a negative contribution. This is probably due to the availability of local textile products such as "Kente" in Ghana and other local textiles in the West African sub-region that are similar to indigenous textiles of Nigeria. However, the attraction of indigenous textile in the local and national markets could be due to the innovation strategy adopted by the firms which is often determined by the market in which the enterprise operates (Lal, 2002). Firms that concentrate on local and national markets adopt occasional innovation strategy while those that concentrate on regional and international markets adopts continuous process improvements which is a requirement for high product quality in the international market (Oyeyinka-Oyelaran and Lal, 2006).

Finally, total capital invested in the enterprises had positive coefficient value of ($\beta_=$2.68; z=10.19) which is significant at 1% level of probability. The result showed that for each additional Naira invested in the business, sales turnover increased by ₦2.68. The result supports the findings of McMahon (2001) that additional financial investment in an enterprise could enhance its total capital outlay and resources available for process and product innovations.

7. Conclusion and Recommendations

The study concluded that the large domestic market for the products, product innovations, total capital invested and years of experience were the prominent factors responsible for the resilience and sustenance of the indigenous textile weaving firms in southwestern Nigeria. However, factors such as payment of tax, sale of products in regional market, intense local competition, trade liberalization and cost of R&D are major constraints on the performance of firms in the industry. The study recommends that government

should review the corporate income tax as well as double taxation which is a burden to operators in the sector. It should also review its policy of trade liberalization which is characterized by uncontrolled importation of textiles to Nigeria mostly from Asian countries which is having a negative impact on the development of indigenous textile industry in Nigeria.

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