

THE KEY DETERMINANTS OF INNOVATION IN SMALL AND MEDIUM SCALE ENTERPRISES IN SOUTHWESTERN NIGERIA

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Abstract

This paper examined the key determinants of innovation in small and medium scale enterprises (SMEs) in southwestern Nigeria. Data for the study were collected using questionnaire and face-to-face interview with SME Owners/Managers. A total of 1,247 questionnaires were administered on four lines of business using stratified random sampling of which 996 representing 51.18% were returned and found suitable for analysis. This was supplemented with interviews of 38 SME Owners/Managers. The data collected were analyzed using appropriate descriptive and inferential statistics. The study revealed that eight factors were accounted for technological and organisational innovation performance of SMEs in the study area. These factors included accessibility to foreign inputs, government support, relevant academic educational background of owner/managers, comparing company's products regularly with those of its competitors, extent of investment in the Research and Development (R & D), extent of foreign collaboration/Number of external partners, prior experience of owner-manager, and availability of Patent and Copyright. In conclusion, the study found that accessibility to external inputs and extent of investment in the R & D are the most important factors that influence innovation in SMEs in southwestern Nigeria.

Keywords: Technological Innovation, Organizational Innovation, Determinant of innovation, Small and Medium Scale Enterprises, Southwest Nigeria

Introduction

The issue of Small and Medium scale Enterprises (SMES) has received a lot of attention over the years by scholars looking for sustainable development strategy (Akinbinu, 2001; Lanjouw, 1997; Olayiwola & Adeleye, 2005). These scholars see SMEs as one veritable means of poverty

alleviation; as a dominant employer of labour in developing countries; and as enterprises which operate in a highly competitive market whose labour intensive mode of production is most relevant to development aspirations of many countries.

Despite the fact that the SMEs had formed the bedrock of most low income countries, it often operates in difficult business environment and weak institutional settings with low access to physical and human capital (Lanjouw, 1997). Olayiwola and Adeleye (2005) observed that many SMEs are unable to maximize their potentials due to several factors such as inadequate access to long and short term capital, little knowledge of need for wide and distance market, low turnover/productivity, ignorance on the part of the entrepreneurs, reluctance to come into partnership or limited liability companies and lack of modern management practices. In spite of this however, the SMEs has remained a veritable tool of growth and development of the economies of the developing countries.

Nevertheless, a holistic review of the SMEs sector has shown that despite a lot of interventionist measures that have been put in place by the Nigerian government, the Nigeria's SMEs are not as productive as they should be. The major reason for this obvious poor performance of the SMEs is the lack of competitiveness of the domestic SMEs when compared with their counterpart in developed and emerging economies. Many initiatives have been proposed to improve the competitiveness of SMEs among these is innovation policy which has attracted the attention of not only policy makers, but also researchers and the business community (McAdam, Reid, Harris & Mitchell, 2008). This initiative is based on the assumption that providing innovative products with enhanced utility may help SMEs strengthen their competitive position at home as well as international markets. (Dangayach, Pathak & Sharma, 2005; Nguyen, Pham, Nguyen & Nguyen, 2008; Spielkamp & Rammer, 2006).

Innovation in the various forms in which it exists is nowadays an important key term to almost any company. Being innovative offers advantages over competitors and is therefore seen as essential for a firm to stay in the business. Innovative companies are a prerequisite for a dynamic and competitive economy (McAdam *et al.*, 2008; Tulus, 2011). Therefore, it may be of particular interest to find out what factors determine innovation. The study of innovation determinants in SMEs in this era of globalisation is relevant in this context as a critical factor for the sustainability and survival of developing countries' SMEs generally, and particularly Nigerian SMEs.

Multiple authors (ACS & Audretsch, 1988; Jegede, Ilori, Sonibare & Siyanbola, 2012) have researched this issue already for large firms, but for SMEs, not much information on determinants of innovation is known. Besides, since a large share of firms in developing countries particularly in

Nigeria consists of SMEs, it may be worthwhile to investigate empirically the factors that influence innovation in Nigeria's SMEs, hence this study.

Literature Review

Small and Medium Scale Enterprises: the Nigerian Context

Numerous scholars have attempted to define the concept of SME in Nigeria. For instance, according to Omisakin (1999), the Central Bank of Nigeria states that in the area of commercial banks, small scale industries are those with annual turnover not exceeding ₦5 million (\$30,303). The Nigerian Industrial Development Bank (NIDB) now Bank of Industry (BOI) defines as small scale, industries with project cost (investment and working capital) not exceeding ₦3 million (\$18,182). Moreover, the National Economic Reconstruction Fund (NERFUND) defined small-scale industries as those with fixed assets other than land but inclusive of the cost of new investment as not exceeding ₦10 million (\$60,606). In the Federal Ministry of Commerce and Industry's guidelines to the Nigerian Bank for Commerce and Industries (NBCI) in 1981/82, small scale enterprises are those with total investment cost not more than ₦500,000 (\$3,030) (excluding cost of land but including working capital). However, the NBCI, in its agreement with the World Bank, over the same period, defined small scale enterprises as one with project cost not exceeding ₦300,000 (\$1,818) and with cost per job created not more than ₦7,500 (\$45.5). Yet some states and institutions in Nigeria have reduced the capital base for the industry to as low as ₦150, 000 (\$909.1) and ₦250, 000 (\$1,515.2) respectively (Olayiwola & Adeleye, 2005). The Centre for Industrial Research and Development (CIRD) at the Obafemi Awolowo University, Ile-Ife (1979) had defined a small scale industry as an enterprise having a capital base excluding land of between 1 and 20 million (\$6,060.6 and \$121,212) and employing fewer than 50 full time workers (Johnson, 2006).

As in developed economies, Nigeria with the introduction of the National Policy on Micro, Small and Medium Scale Enterprises (MSMEs) has recently addressed the issue of definition as to what constitutes micro, small and medium enterprises. The definition adopts a classification based on dual criteria, employment and assets (excluding land and buildings) as shown below.

- Micro Scale Enterprises are those enterprises whose total assets (excluding land and buildings) are less than Five Million Naira (\$30,303) with a workforce not exceeding ten employees.
- Small Scale Enterprises are those enterprises whose total assets (excluding land and building) are above Five Million Naira (\$30,303) but not exceeding Fifty Million Naira (\$303,030) with a

total workforce of above ten, but not exceeding forty-nine employees.

- Medium Scale Enterprises are those enterprises with total assets (excluding land and building) above Fifty Million Naira (\$303,030), but not exceeding Five Hundred Million Naira (\$3,030,303) with a total workforce of between 50 and 199 employees.

This paper adopted the SME definition given by the National Policy on MSMEs.

Innovation

Different authors have different opinions about what can be called an innovation. For instance, Acs and Audretsch (1988) see innovation as a process that begins with an invention, proceeds with the development of the invention, and results in the introduction of a new product, process, or service to the marketplace. According to Damanpour (1999), innovation is the adoption of an idea or behavior, whether a system, policy, program, device, process, product, or service, that is new to the adopting organization. Avlonitis and Salavou (2007) see innovation as a company's ability to introduce new products, which are also successful. The third edition of the Oslo Manual (OECD/Eurostat, 2005) defines innovation as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace, organization or external relations." Also McCormick and Maalu (2011) defines innovation to comprise product or process, continuous or discontinuous, radical or incremental innovations leading to improved or new products. McCormick and Maalu (2011) see 'radical' innovations as new products that result from advances in knowledge/technology. 'Incremental' innovations include improvement of process or product designs, with or without up-grading of machinery and/or acquisition of new machinery. The duo concluded that the most common form of innovation for small firms is non-technological innovation which includes marketing innovation, measured by whether or not the firm has implemented a new design or product packaging, significantly changed the way merchandise is displayed, introduced a new channel for selling goods and services, or introduced a new method of pricing products. For the purpose of this study, the definition given by McCormick and Maalu (2011) is adopted because the definition is given in the context of SMEs.

Determinants of Innovation in SMEs

Hadjimanolis (2000) investigated several antecedents of innovation in small firms. He investigated the role of educational level, age, and prior business experience of the owner on innovative capacities of the company.

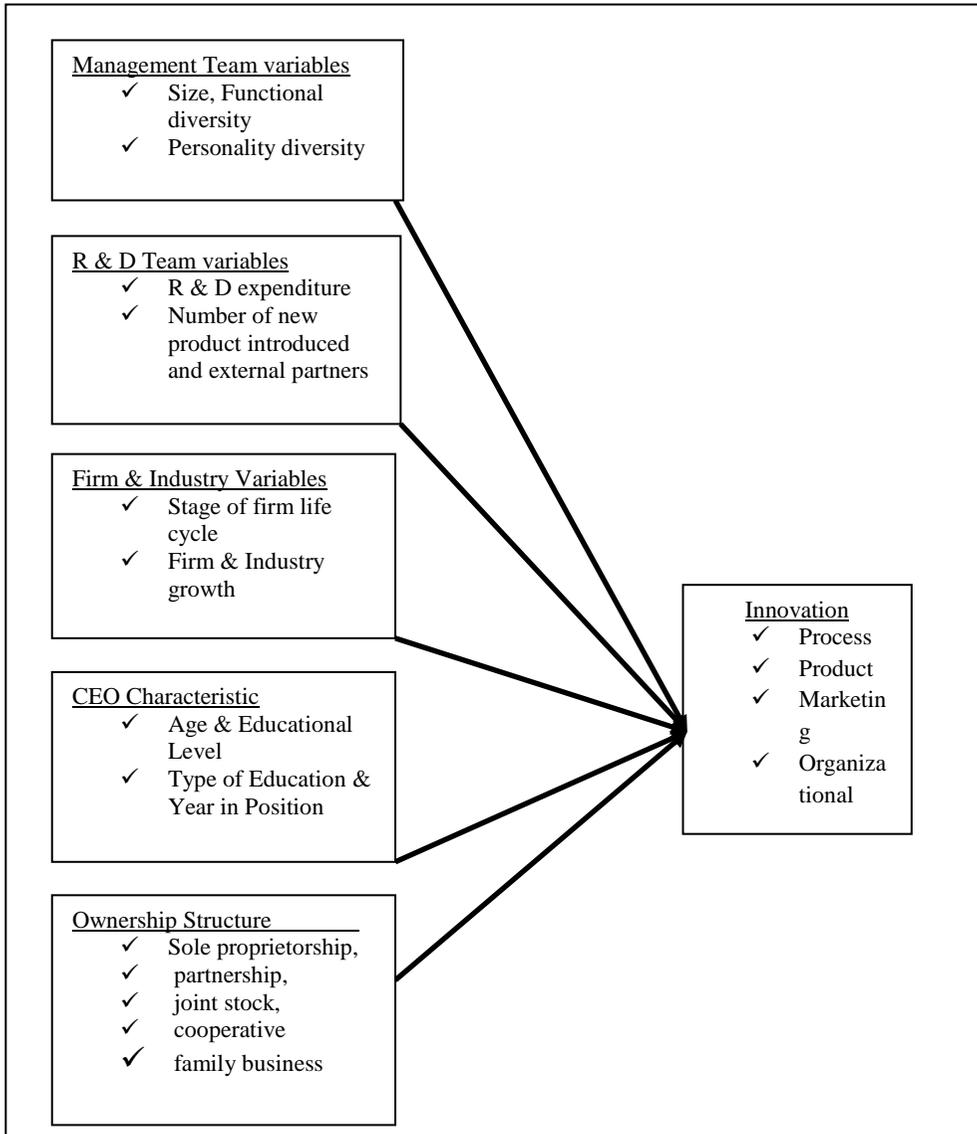
Somehow surprisingly there was little evidence found that the educational level of the CEO did have any influence. It was found, however, that prior experience in business did have a positive influence on organisational innovativeness of the company. Other research did indicate that there is a link between educational level of the CEO and company's innovative performance (Roper, 1998). Also various authors have already investigated the influence of diversity of management teams on their competitive attitude, and the actions undertaken to benefit from market opportunities (Cho, Hambrick & Chen, 1994; Hambrick & Cho, 1996). In the study conducted by Stanley and Haruna (2013) to examine the determinants of innovation in Ghanaian microfinance banks, it had been shown that there was significant relationship between company characteristics such as frequency of board meetings, educational profile of staff, ownership structure, number of branches/outlets, years of operation, company location, and some indicators of innovation.

There are many authors that have already investigated the role of investment in R&D and its influence on a company's innovative capacity. Several authors have already investigated and confirmed that R&D expenditure is positively related to company innovativeness (Acs & Audretsch, 1988; Hadjimanolis, 2000; Romijn & Albaladejo, 2002). These investments in R&D have more influence on product and process innovations than on organisational innovations, since most of the expenditures are dedicated to product and process R&D. It should also be noted that in general, the relation between R&D expenditure and innovativeness is positive, but at a diminishing rate. This means that after a double amount invested in R&D will generally lead to a less than double increase in output (Acs & Audretsch, 1988).

The influence of the use of external knowledge on innovation had been intensively investigated by various authors (Bougrain & Haudeville, 2002; Hadjimanolis, 2000). It is found that small firms that make use of their external networks perform significantly better. Among the external parties that can be contacted are universities, knowledge institutes, and suppliers. However, De Jong and Vermeulen (2006) noted that using the external network without investments in internal capacities does not lead to an improved performance and useful information does not only come from suppliers and knowledge institutes, but can also come from end users, the customers. Therefore, performing market research can lead to the acquisition of useful wisdom about customers' perceptions and needs (Hadjimanolis, 2000). It has also been established that the size of the firm has a significant positive influence on its innovativeness, measured in a small firm sample. Also, it is found that large firms can be more innovative, since they can

benefit from scale economies and are able to structurally spend large amounts of money to R&D (Damanpour, 1992; Hadjimanolis, 2000).

1.3 Conceptual Framework



Source: Author Design, 2015

Study Methodology

This study employed the survey research design. Southwestern Nigeria was purposively selected for the study because of a high concentration of SMEs in the area. Data for the study were obtained from a

survey of SMEs that have employees of between 10 and 300, registered with Small and Medium Scale Enterprises Development Agency of Nigeria (SMEDAN), and engaged in manufacturing, trade and distribution, services, and agro-allied activities. A total population of 6,239 SMEs was identified for the study. Out of these 1,247 SMEs representing 20% were selected for survey in the study area using a stratified random sampling technique. Data for the study were collected using questionnaire and face-to-face interview with SME Owners/Managers. A total of 1,247 questionnaires were administered on four lines of business using stratified random sampling of which 996 representing 51.18% were returned and found suitable for analysis. This was supplemented with interviews of 38 SME Owners/Managers. The owners/managers of the sampled SMEs in southwest Nigeria were asked to rate the twenty nine items in the survey questionnaire given to them according to their perception. Both factor analysis by principal component and regression analysis were used to identify the innovation determinants in Nigeria's SMEs. Besides, the items were subjected to Cronbach's Alpha in order to determine the internal reliability and consistency of the items.

Discussion of Findings

The study shows that majority of the SMEs owners/managers have formal education. Besides, the level of literacy among the SMEs owners is very high. For instance, 99% and 74.8% of the business owners/managers attended a minimum of elementary education and had one tertiary education certificate or the other respectively. This is in support of the previous study of Bowale and Akinlo (2012) which noted that level of education and literacy among SMEs' owners in Southwest Nigeria is high. Also the study shows that 80% of the sampled SMEs had been in operation within the last 15 years. Only 9% had been in operation for more than 25 years. The proportion of SMEs that were established within last 5 years (16.7%) was low when compared with the proportion of those that were established between 6 and 10 years (25.95%) and between 11 and 15 years ago (29.3%). This shows that the number of SMEs established or surviving in the region in the last 15 years is decreasing. But the fact that a sizeable number of the SMEs had been in operation for the past 15 years is a sign of improvement in the survival rate of the SMEs in South-West Nigeria. Besides, 94.38% of SMEs operating in the South-West Nigeria were small businesses with less than 50 workers. Moreover, trade & distribution and services were the most common forms of business that the selected SMEs were engaged in. This is represented by 38.43% and 32.12% respectively. This was followed by manufacturing (25.05%), and agro-allied businesses (4.40%).

The result of the Factor analysis by principal component shows that the Bartlett test of Sphericity was 829.859 at Significance level 0.000 and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.754 (*Table 1.1 in appendix 1*) which is believed to be at the acceptable range (well above 0.50) (Hair, Anderson, Tatham & Black, 1995). Therefore the assumptions for carrying out factor analysis were met. Cronbach's Alpha for the determinants measure was low at 0.317. However, twenty one items had item-total correlations below 0.10, these items were dropped. The resulting Cronbach's Alpha was an acceptable 0.604.

The communalities coefficients for the factor were all less than one and they range between 0.128 and 0.726. In summary, the communalities of the majority of the variables were above 50%. The implication of this is that more than 50% of the variances in all the variables are accounted for by the common factors while below 50% are accounted for by unique (unexplained) factors (*Table 1.2 in Appendix 2*). Two components were retained after factor extraction by principal component and these components explained 43.2% of the variance, which is still an acceptable percentage (*Table 1.3 in appendix 3*). A varimax rotation was applied which converged in 3 iterations. According to the accepted guidelines for identifying significant factor loadings (Hair *et al.*, 1995) 0.30 was accepted as the cut-off point for interpretation purposes. Two components were therefore identified as the main dimensions underlying the perceptions of the owners/managers about the key determinants of technological and non technological innovation in the selected SMEs (*Table 1.4 in appendix 4*).

Results showed that first and second components accounted for 29.62% and 13.60% of the total variance respectively. Besides, the two components consists eight items and these items had positive coefficient (B) and were statistically significant ($\rho < 0.005$). This means that the items had positive influence on innovation activities of sampled SMEs in southwestern Nigeria. Thus, the items are innovation determinants in sampled SMEs in the study area. The determinants are; comparing firm's products and services with those of its competitors ($B = 0.218, \rho = 0.000$); government support (financial and non financial) ($B = 0.472, \rho = 0.000$); accessibility to external inputs ($B = 0.470, \rho = 0.000$); relevant academic educational background of owner/managers ($B = 0.343, \rho = 0.000$); extent of investment in the Research & Development ($B = 0.504, \rho = 0.000$); extent of foreign collaboration and number of external partners ($B = 0.347, \rho = 0.000$); prior experience of owner-manager ($B = 0.317, \rho = 0.000$) and; availability of patent and copyright ($B = 0.504, \rho = 0.000$) (*Table 1.4 in appendix 4*).

Multiple regression analysis was performed on the items in the two components extracted earlier in order to ascertain the key determinants of innovation in the sampled SMEs. The extracted factor scores for each of the

components in factor analysis conducted were used as dependent variables in the model, and the independent variables were the extracted variables in each of the components. The regression results for component one and component two were contained in appendix 4 & 5 respectively. The value of the R^2 for component 1 and 2 were 0.916 (91.6%) and 0.968 (96.8%) respectively meaning that 91.6 and 96.8% of the variance in the dependent variable was explained by the models. The coefficients of all the variables in the both components in the models were positive and significant ($p < 0.5$). This shows that the variables had positive influence on innovation, and the influence was statistically significant (*Table 1.5 & 1.6 in appendix 5 & 6*). The implication of these results is that all the eight variables had positive significant influence on innovation. However, extent of investment in the Research & Development, government support, and access to foreign inputs (such machines, raw materials etc) had more significant positive impact on innovation in the sampled SMEs.

Conclusion

These findings are not unusual. They are in contention with the findings of previous studies. For instance, Jegede et al, (2012) found that the technological factors that accounted for the innovation performance included the educational qualifications, training and prior work experience of the heads of technical department, number of R&D staff and training, innovation, and, R&D investment. According to them, the important non-technological factors included interaction with competitors, consumers, suppliers and training institution. Also, Abereijo, Ilori, Taiwo, and Adegbite, (2007) find that innovative abilities was significantly related to some internal and external factors which included higher academic degree, education in science or engineering, relevant working experience in large corporation/multinationals and university/research institute of the founder/manager, the extent of investment in the research and development, and on employees training, and exposure to research and development outputs from the universities and research institutes. Besides, the study conducted by Suresh, McKenzie, and Woodruff (2009) reveals that firm size, owner ability, personality traits, and ethnicity were found to have a stronger positive effect on process and organizational innovations. Moreso, the findings are consistent with Stanley and Haruna (2013) that established that there was a significant relationship between company characteristics such as educational profile of staff and owners, and some indicators of innovation. The study concludes that the extent of investment in the R&D, government support, and access to foreign inputs are crucial factors in innovation activities of the Nigerian SMEs.

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Appendix One

Table 1.1: Assumptions of Factor Analysis and Data Reliability Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.754
Approx. Chi-Square		829.859
Bartlett's Test of Sphericity	df	28
	Sig.	.000
Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
.604	.642	8

Source: Field Report, 2015

Appendix Two

Table 1.2: Communalities

	Initial	Extraction
Extent of Investment in the R & D	1.000	.726
Extent of foreign collaboration/Number of external partners	1.000	.570
Prior experience of owner-manager	1.000	.344
Accessibility to external inputs	1.000	.514
Availability of Patent and Copyright	1.000	.128
We regularly compare our products and services with those of our competitors	1.000	.249
Relevant academic educational background of owner/managers	1.000	.456
Government support (financial and non financial)	1.000	.470

Extraction Method: Principal Component Analysis.

Source: Field Report, 2015

Appendix Three

Table 1.3: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.370	29.621	29.621	2.370	29.621	29.621	1.898	23.730	23.730
2	1.088	13.601	43.221	1.088	13.601	43.221	1.559	19.491	43.221
3	.981	12.267	55.489						
4	.904	11.304	66.793						
5	.789	9.864	76.657						
6	.653	8.162	84.819						
7	.646	8.072	92.891						
8	.569	7.109	100.000						

Extraction Method: Principal Component Analysis.

Source: Field Report, 2015

Appendix Four

Table 1.4: Rotated Component Matrix

	Component	
	1	2
Accessibility to external inputs	.712	
Government support (financial and non financial)	.685	
Relevant academic educational background of owner/managers	.630	
We regularly compare our products and services with those of our competitors	.471	
Extent of Investment in the R & D		.834
Extent of foreign collaboration/Number of external partners		.627
Prior experience of owner-manager		.510
Availability of Patent and Copyright		.340

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Source: Field Report, 2015

Appendix Five

Table 1.5: Regression Analysis of Component One
Source: Field Report, 2015

Model Summary								
Model	R	R Square	Adjusted R Square		Std. Error of the Estimate			
1	.957 ^a	.916	.915		.29076837			
<i>Predictors:</i> (Constant), We regularly compare our products and services with those of our competitors, Government support (financial and non financial), Accessibility to external inputs, Relevant academic educational background of owner/managers								
ANOVA ^a								
Model		Sum of Squares	df	Mean Square	F	Sig.		
1	Regression	911.215	4	227.804	2694.427	.000 ^b		
	Residual	83.785	991	.085				
	Total	995.000	995					
<i>a. Dependent Variable: REGR factor score 1 for analysis 1</i>								
<i>b. Predictors:</i> (Constant), We regularly compare our products and services with those of our competitors, Government support (financial and non financial), Accessibility to external inputs, Relevant academic educational background of owner/managers								
Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-6.077	.059		102.201	.000	-6.194	-5.961
	Accessibility to external inputs	.470	.011	.445	44.477	.000	.449	.490
	Government support	.472	.011	.419	41.935	.000	.449	.494
	Relevant academic educational background of owner/managers	.343	.011	.314	31.139	.000	.321	.364
	We regularly compare our products and services with those of our competitors	.218	.009	.243	25.341	.000	.201	.235
<i>a. Dependent Variable: REGR factor score 1 for analysis 1</i>								

Appendix Six

Table 1.6: Regression Analysis of Component Two

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.984 ^a	.968	.968	.17876383

a. Predictors: (Constant), Availability of Patent and Copyright, Prior experience of owner-manager , Extent of Investment in the R & D, Extent of foreign collaboration/Number of external partners

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	963.331	4	240.833	7536.267	.000 ^b
Residual	31.669	991	.032		
Total	995.000	995			

a. Dependent Variable: REGR factor score 2 for analysis 1

b. Predictors: (Constant), Availability of Patent and Copyright, Prior experience of owner-manager , Extent of Investment in the R & D, Extent of foreign collaboration/Number of external partners

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.637	.033		-141.435	.000
1 Extent of Investment in the R & D	.504	.004	.672	112.543	.000
Extent of foreign collaboration/Number of external partners	.347	.007	.312	50.294	.000
Prior experience of owner-manager	.317	.007	.277	46.262	.000
Availability of Patent and Copyright	.147	.004	.208	36.248	.000

a. Dependent Variable: REGR factor score 2 for analysis 1

Source: Field Report, 2015