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Impact of Human Capital on Firm Innovativeness: Evidence from SMEs in Nigeria

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Abstract

The capability to recognise and assess the competitive advantage of employees' transferable and innovative attitude is a critical to firms and policymakers. This study evaluate the human capital (knowledge, experience, professional proficiency and cognitive abilities) and its influences to innovativeness of small and medium-size Nigerian companies. Accordingly, a sample of 320 SMEs aged between 5 to 20 years form four different sectors participated in the study. Moreover, Structural Equation Modelling (using Smart PLS) approach was applied to assess the measurement model and the relationships between the constructs. Consequently, the findings shows that all the human capital dimensions are positively related to SMEs ability to innovate. The research expand the innovation literature by confirming the influence of human capital on SMEs innovativeness in a developing nation (Nigeria). Moreover, this finding will help managers of SMEs on how to improve their firms' ability to innovate by employing highly skilled and experience personnel in their respective organizations.

Keywords: Human capital, firm innovativeness, SMEs

1 Introduction

In the present globalized uncertain business environment, innovation is essential for organizational survival and competitive advantage. Accordingly, firms with superior innovative capabilities will be more successful in responding to a dynamic environment and improving their competitiveness (Wang & Chen, 2013). Moreover, the only way by which firm can effectively compete is by learning new skills which permit them to get, manage share, and use of information as well as knowledge (Abell &Oxbrow, 1999). As such knowledge become one of the primary strategic assets of the organization (Helfat, Finkelstein, Mitchell, Peteraf, Singh, Teece, & Winter, 2007. Tidd, 2006) which in turn lead to innovation (Claver-cortes, Patrocinio, Molina-Manchon, & Ubeda-Gacia, 2015). Furthermore, "strategy oriented intellectual capital management assist firms in understanding value creation process (Kim & Kumar, 2009) and "the essential significance that intellectual

capital has acquired within business organization. It is generally recognized that an organization's ability to innovate is closely tied to its intellectual capital, or its ability to utilize its knowledge resources (Subramaniam and Youndt, 2005).

Consequently, several intellectual capital classifications and measurement models have been appeared over time (e.g., Brooking,1996; Edvinsson & Malone, 1997; Viedma, 2000) and it has now become commonly recognized that intellectual capital groups intangibles together into three main components namely; human capital ; structural and relational capital. Therefore, the main concern of this paper is human capital aspect of intellectual capital and its link to firm innovativeness. Furthermore, the studies of innovative capabilities were mostly conducted on large firms (Kesking, 2006) and also in developed nations (Kesking, 2006). Only few studies were conducted in small and medium enterprises. Besides, small and medium enterprises are considered a powerful engine for nation's economic development. They are characterized by several micro and unorganized small business (Abiodum, 2003) thereby accounted for larger percentage of working population. Consequently, in many countries SMEs provide employment to greater percentage of labour force. For example, in Nigeria over the years, SMEs offers employment opportunities to a greater percentage of above 70 percent, thus making the citizens very productive, which the result helps in capital formation (Dauda & Akingbade, 2010).

However despite the role plays by SMEs in achieving economic growth, SMEs in developing nations such as Nigeria are performing below average. . For example, against international best practices Nigeria is rated poorly due to the core component dearth of intellectual capital in the public figure of human capital (innovation, operation and customer capital) of the SMEs owners (Nielsen et al., 2006). Subsequently, the position of Nigeria in global innovation index continue to decrease. For example, in 2014 the result shows that Nigeria was ranked 15 in Sub-Saharan Africa and 110 in the world (Global Innovation Index, 2014). This shows Nigerian's innovation performance has deteriorated compared to other countries and is lower than Switzerland (1), Japan (20), Hong Kong (4) and Korea (16). This indicates that Nigerian firms especially SMEs are left behind regarding innovation as well as technological readiness and overall economic development. Therefore, the present paper aims to explore the role of human capital on innovativeness of small and medium enterprises in Nigeria.

2 Conceptual Background and Hypotheses Development

2.1 Innovativeness

Lumpkin and Dess (1996) defined innovativeness as a firm's tendency to engage in and support new ideas, novelty, experimentation, and creative processes that may result in new products, services, or technological processes. Furthermore, when looking innovativeness from the resource based perspective, it stands as a valuable and idiosyncratic to firms, and also intangible asset that might help firms sustained competitive advantage and make it costly and difficult for rival firms to imitate (Barney1991). Furthermore, Dibrell et al., (2011) view innovativeness as a willingness of a firm to put more emphasis on the development of technology, new product and service and improvement of product line or process. They posited that firm innovativeness can be measured using indicators such as development of new

product, upgrading current product /service appearance and performance, producing in new R&D facilities to gain competitive advantage and level of innovation in firm marketing techniques as well as production process. Accordingly, we adopt Subramaniam and Youndt's (2005) classification and definition of innovative capabilities, which defines incremental innovative capability as the capability to generate innovations that refine and reinforce existing products and services, whereas radical innovative capability is the capability to generate innovations that significantly transform existing products and services.

2.3 Human Capital

According to Schultz (1993), the term "human capital" refers to as an important component in improving a firm assets and employees in order to increase productive as well as sustain competitive advantage. Human capital refers to the value of the knowledge and talent which is personified people within the organizational setting, comprises it know-how, experience, knowledge, competence, talent, creativity and attitude etc. (Davenport, Prusak & Wilson, 2003; Leif Edvinsson & Malone, 1997). Furthermore, some authors argued that, human capital is an attribute within individuals. For example, Legros (2012) argued that human capital is knowledge, skills and other attributes embodied in individuals that are relevant to economic activity.

2.4 Human Capital and Firm Innovativeness

A firm's growth is positively related to the quality of human capital and the firm's investment in it (Santos-Rodrigues et al., 2011). "Human Capital is the embodiment of knowledge, in better educated and productive people" (Santos-Rodrigues et al. 2011). In addition it is argued that human capital is among the essential innovation facilitating factors (Leiponen, 2005) and as majority of the firm-level innovations are incremental in nature, it points to their role in the "generation, adaption and diffusion of technical and organizational change" (Toner, 2011).

Accordingly, the important features of human capital are knowledge, experience, professional proficiency and cognitive abilities (Feli´cio, Couto & Caiado, 2014) allowing access to a wider range of opportunities (Davidsson & Honig, 2003).

In spite human capital and innovation relationship appeared to be blurred one, it has been examined by several authors from various perspective. Earlier empirical studies disclose the positive effects of some intangibles within human capital on innovation performance (Miller & Friesen, 1982; Zahra, 1996) and the fact that well-educated teams, as well as diverse experts managed most of the innovative organizations (Bantel & Jackson, 1989). Thus, "high-quality talents with good education and sophisticated skills" can develop increased cognitive abilities, causing to more productive as well as efficient activity to increase their job performance, which helps firms to have" better entrepreneurial judgment, run business more smoothly and ultimately improve the firm's innovative performance" (Martín-de-Castro et al., 2011). Subsequently, during the last decade, there have been much more evidence that human capital improve firm's capability to innovate or firm's innovative performance can be predict based on human capital (Marvel & Lumpkin, 2007). In addition, Rodrı´guez and Guzm_an (2013) confirm that human capital is a significant factor in the firm's innovative capacity of social economy of Spain. The literature also stresses that the entrepreneurs' determines

SME's innovative activity (Lasch, Roy, & Yemi, 2007).

In contrast, some authors consider employee-driven innovation (e.g. Kesting and Ulhøi, 2010). According to them employee at all organizational levels are "innovation capital" or "innovation assets" as a result, they linked human capital directly to firm's innovativeness. Therefore as Schiuma and Lerro (2008) argued, there is need for an appropriate balance of education types, and Richard (2000) highlights firms' need for a various stock of human capital. Consequently, several studies support these arguments. For example, literature examines more tacit traits such as; "managers' capabilities" (Fitjar et al., 2013); the "individual's creativity in innovation" (Storper & Scott, 2009); "founders' human capital" (Gimmon & Levie, 2010) and leadership are play a vital role in developing innovation throughout the organization especially in SME innovation. In an empirical study among 217 firms in China, Han and Li (2015) found positive link between human capital (form of intellectual capital) and firm innovativeness. Earlier, Rodrigues1, Dorrego and Jardon (2010) conducted a study among 68 firms in an auto components sector, "established in the Northern Spain and Northern Portugal". They used statistical method to estimate the parameters. Consequently, their result revealed that, human capital is positive and significantly influence firm innovativeness. However, some studies found negative result between work experience (old age) and firm innovative capabilities (e.g. Daveri & Pansi, 2015; Vinding, 2006). Based on the aforementioned empirical studies, the present study proposed the following hypothesis:

H1: There is significant relationship between human capital (knowledge, experience professional proficiency and cognitive abilities) and SMEs innovativeness.

Research Framework

Figure 1
Hypothesized model

3 Methodology

3.1 Measures

Firm innovativeness is operationalized as the firms' openness mind and willingness to accept new idea that becomes part of firm's culture to conduct business. Accordingly, firm innovativeness was measured using five items adopted from Lee and Tsai (2005) which were initially developed by Hurley and Hult, (1998). Example of these measures are: I. "Management actively seeks innovative ideas", Technical innovation, based on research results, is readily accepted". Human capital scale was

adopted form **Felício, Couto, and Caiado, (2014)**.

3.2 Sample and Data Collection

The data collection process took place within Small and Medium Enterprises (SMEs) located in Kano state Northwest Nigeria. Accordingly, 320 owner/manager of SMEs participated in the study. Respondents were given a self-administered questionnaires to assess the level of human capital and innovativeness in their respective organizations. Personal visits and telephone contacts help researchers retrieve 253 (79%) questionnaires which filled up by owner/ manager of SMEs. These SMEs comprises of 190 from manufacturing, 23 from agricultural sector, and 40 from service industries. Moreover, these sectors were represented by several areas.

4 Analysis and Result

4.1 Measurement Model

Descriptive statistics of the survey items are demonstrated in **Table I**

We used composite reliability to assess individual item reliability of the constructs (Hair et al., 2011). Following Hair *et al* (2014) rule of thumb of threshold of 0.4 and above, we observed that out of 20 human capital items we retained only 12 as their loadings are 0.4 and above (**Table II**). Similarly regarding firm innovativeness four items were retained from the original five items (**Table II**). Moreover to assess discriminant validity, we used Hetrottrait-Monotrait (HTMT) Ratio Criterion (Henseler *et al.,* 2015). Table III below, present the result of HTMT ration.

Table I
Descriptive Statistics

Huma Capital	Statement	Mean	SD
Knowledge			
HCP1	Academic level of the chairman	4.32	.684
HCP2	Academic level of the director/manager	4.45	.663
HCP3	Specific training of the chairman	4.32	.782
HCP4	Specific training of the director/manager	4.22	.743
Experience			
HCP5	Business experience	3.89	.910
HCP7	Technical/technological work experience	4.28	.736
HCP8	Commercial work experience	4.39	.746
HCP9	Industry experience	4.23	.612
HCP10	Diversified experience	4.06	.810
HCP11	Professional proficiency in technological area	3.99	1.02
Professional			
HCP12	Professional proficiency in company Management	4.09	.891
HCP13	Widespread knowledge	3.54	1.02
HCP14	Communication skills	4.06	.831
Cognitive Ability HCP15	Strategic decision-making regarding risk-taking Propensity	4.00	.762

HCP16	Ability to innovate	3.51	1.04
HCP17	Perception of risks and threats	4.10	.921
HCP18	Discovery and exploitation of opportunities	4.56	.654

Table II
Loading Composite Reliability and Average variance Extracted

Latent constructs and indicators	Standardized Loading	Composite Reliability	Average Variance Extracted (AVE)
Firm Innovativeness		**.863**	**.611**
FIN5	.771		
FIN6	.735		
FIN7	.832		
FIN8	.786		
Human Capital		**.900**	**.751**
Knowledge			
HCP1	.859		
HCP4	.904		
HCP5	.835		
Experience		**.803**	**.576**
HCP6	.751		
HCP7	.771		
HCP9	.753		
Professional Proficiency		**.816**	**.596**
HCP10	.770		
HCP13	.747		
HCP14	.799		
Cognitive Ability		**.832**	**.608**
HCP15	.793		
HCP16	.756		
HCP17	.790		

Table III
Hetrottrait-Monotrait (HTMT) Ratio Criterion of Discriminant Validity

Constructs	FI	K	E	P.P	C. A
Firm Innovativeness					
Human Capital:					
Knowledge	.643				
Experience	.196	.120			
Professional Proficiency	.728	.496	.067		
Cognitive Ability	.839	.684	.130	.754	

From the Table III, the result shows that all the HTMT values are less than the cut-off of 0.85 suggesting that discriminant validity has been established (Clack & Watson, 1995; Kline, 2011).

4.2 Structural Model

In previous section the measurement model has been discussed, therefore, this section evaluates the structural model of the study. The main assessing criteria for structural model are R-square (R^2) measure, predictive relevance (Q^2) effect size (f^2), and the level of significance of the path coefficient (Hair et al., 2011). Therefore, this study employed a "standard bootstrapping process whereby creating a huge samples (i.e. 5,000) (Hair *et al.*, 2011; Hair *et al.*, 2014), and 253 cases to evaluate significance of the path coefficients. In Table IV, below the R^2 value of endogenous latent variable is presented.

Table IV
Variance Explained in the Endogenous Latent

Latent Variable	Variance Explained (R^2)
Firm Innovativeness	49%

The result shows that the present research model explain about 49% of the total variance in firm innovativeness. This advocates that human capital dimension (i.e. knowledge, cognitive ability, professional proficiency and experience) jointly explained 49% of the variance of firm innovativeness. Thus, this result demonstrates an acceptable R^2 value which considered as moderate (Hair et al., 2011). Furthermore, f-square (f^2) can be explored to see whether the impact of a particular independent latent variable on dependent latent variable is substantive. Accordingly, Table IV presents the assessment of effect size (f^2) of this model.

Table IV
Effect Sizes (f-Square) of the Latent Variables Based on Cohen's (1988) Recommendation

	f-square (f^2)	Effect size
Knowledge-> Firm Innovativeness	.050	Small
Experience-> Firm Innovativeness	.024	Small
Professional Proficiency-> Firm Innovativeness	.084	Small
Cognitive Ability-> Firm Innovativeness	.087	Small

As demonstrated in Table IV above, the effect size of human capital dimension (i.e. knowledge, experience, professional proficiency and cognitive ability) on firm innovativeness are .05, .02, .084 and 0.87 respectively. Therefore, consisted with Cohen's (1988) recommendation, the effect size of these exogenous latent variables on firm innovativeness can be considered as small. Moreover, the assessment of predictive relevance is demonstrated in Table V and the result shown that endogenous latent construct's Q^2 is greater than zero, thus indicating predictive relevance of the model has been achieved (Chin, 1998; Henseler et al., 2009).

Table V
Cross Validated Redundancy

Total	SSO	SSE	Q^2 (=1-SSE/SSO)
Firm Innovativeness	968.00	713.55	.26

Lastly following causal paths stated in the hypothesized model were found to be statistically significant (Table VI): from knowledge to firm innovativeness (β=.128 t=.2.71 P<.003), experience to firm innovativeness (β= 0.25 t= 3.33 P<.001); professional proficiency (β=.17 t= 2.81 P<.01) and cognitive ability to firm innovativeness (β=.34 t=5.11 P<.00).

Table VI
Structural Model assessment

Path	Beta	Standard Error	T-Statistics	Sig.
Knowledge->firm innovativeness	.128	.046	2.776	.003*
Experience->firm innovativeness	.249	.074	3.352	.000*
Professional proficiency->firm innovativeness	.165	.061	2.713	.003*
Cognitive ability->firm innovativeness	.341	.067	5.124	.000*

Note:* significant at 1% level

5 Discussion

Generally, our findings demonstrates a strong support for the evidence that different dimensions of human capital separately as well as jointly influence firm innovative capabilities. Specifically we found knowledge to positively influence firm innovative capability. This suggest that high-quality talents and good educational background can develop and make managers and employees to be more productive as well as efficient activity to increase their innovative capabilities which in turn lead job performance. This finding is consisted with the knowledge based view and resource based view of the firm which view knowledge as an important organizational sources of competitive advantage (Patton, 2007). Similarly, our finding our finding shows that relevant experience (industry specific experience) positively related to firm innovativeness. Furthermore such experience comprises manager's knowledge and skills which accumulated during their careers. As a result, it becomes a critical input of a firm which lead to firm innovative activities. This result support the earlier findings (e.g. (Arthur, 1994; Benjamin, Balsmeier, Dirk, & Czarnitzki, 2014; Kor & Sundaramurthy, 2009). We further found a strong associations between owner/managers' cognitive abilities and firm innovative capabilities. Lastly, our result shows that the higher the professional proficiency of the manager the more the firm innovativeness. Thus our finding support the hypothesized model of a positive relationship between human capital and firm innovativeness.

6 Conclusion

This study shows the evidence that well-educated owners/managers of SMEs contributes to the development of better

abilities that lead to innovations in organizations. In essence, the higher the knowledgeable management the better the ability of the firm to innovate. Similarly, the study also demonstrates that manager's prior business and industry experience help in the development of better aptitudes of strategic decision within the firm which in turn lead to both radical and incremental innovations. Further, our findings revealed that firm innovative capabilities is influenced by professional proficiency. Lastly the study found that managers' cognitive abilities and skills help in creating new ideas in doing businesses. Overall, human capital dimensions is positively related to firm innovativeness of small and medium enterprises in Nigeria. This study presents a major contribution to the literature by confirming the influence of human capital dimensions on firm innovativeness in the context of SMEs in developing nation. Additionally, the study makes important contributions to the field of management by providing evidence of the effect of the professional aptitudes of managers, their experience, cognitive skills and professional proficiencies in the development of innovative organizations.

7. Future research

Future studies should assess the influence of human capital and firm innovativeness by comparing SMEs in the growth level with other SMEs in the maturity level. Additionally to introducing a mediating variable will further provide an insight of this relationship.

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