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Assessment Of Absorptive Capacity And Innovation Performance Of Manufacturing Firms In Nigeria

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Abstract: ***Firms' innovation performance is mostly influenced by internal capabilities available within a firm. This paper empirically assesses the impact of absorptive capacitive (AC) on innovation performance of manufacturing firms in Nigeria thus enhance our understanding on the mechanism between AC and innovation performance. A total of 305 SMEs were sampled from subsectors such as; textile/leather/apparel and footwear subsector; wood/furniture and woodworks subsector; and domestic/industrial plastic and rubber subsector in Southwestern Nigeria. Data collected was analyzed using Structural Equation Modeling (SEM). Findings revealed that AC had high positive impact on innovation performance of the manufacturing firms. Particularly AC dimensions such as 'transformation' and 'exploitation' dimensions of AC are the best indicators of innovation performance within the manufacturing SMEs. Also, AC accounts for about 79% of variation in the innovation performance of the manufacturing firms. The study concludes that AC, particularly its transformation and exploitation dimensions are critical elements for the enhancing the innovation performance of the manufacturing firms in Nigeria.***

Keywords: Absorptive capacity, Innovation performance, Manufacturing Firms, Nigeria.

I. INTRODUCTION

The dynamic change in business environment resulting from innovation activities has made knowledge become significant for SMEs sustainable growth and survival. Economies now are becoming increasingly knowledge-driven, the acquisition, utilization and transformation of knowledge by firms to innovate and improve their competitiveness has remained indispensable (Higgins and Aspinall, 2011). Businesses failures today have been ascribed to firm's inability to absorb and transform knowledge from within and outside the business environment. Most essential changes in the organization of the innovation process within firms in the last two decades have been the increasing recognition of the importance of knowledge flows. Knowledge has remained the basic component for innovation in firms and the ability needed to absorb knowledge from outside and within the organization has become essential for building sustainable competitive advantage (Teece, 1998). The ability required to acquire, assimilate and transform knowledge into innovations and consequently improve firms' performance is known as *absorptive capacity* (AC).

Over the past two and half decades, there has been a growing interest of scholars in the concept of AC and its importance for organizations (Daghfous, 2004; Lane *et al*., 2006). Many researchers and practitioners have persistently cited AC as a major factor in determining whether an organization is able to acquire and make use of external knowledge profitably (Lenox and, King 2004; Harrington and Guimaraes, 2005; Bergh and Lim 2008). Absorptive capacity refers to a set of organizational routines and processes, through which firms recognize, acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capacity (Zahra & George, 2002). These routines and processes are essential for firms' recognition, acquisition, assimilation, transformation, and exploitation of knowledge for innovation. Absorptive capacity is the most important ability required by firms to effectively acquire and exploit new knowledge to increase its innovation performance. It therefore becomes necessary for firms to boost their AC level in order to

be able to effectively apply external knowledge innovatively (Daghfous, 2004). A firm's AC can affect the effectiveness of its innovation activities (Cockburn and Henderson, 1998). More so, AC allows firms to effectively acquire and utilize external knowledge as well as internal knowledge which affect their ability to innovate (Daghfous, 2004). Cohen and Levinthal (1990) in their seminal work developed the absorptive capacity construct and explored its relationship with innovation. Absorptive capacity improves the speed, frequency, and magnitude of innovation (Helfat, 1997; Kim and Kogut, 1996) and enhances learning within an organization (Autio *et al*., 2000; Rosenkopf and Nerkar, 2001; Simonin, 1999). AC represents the analytical link between the external stock of technological opportunities and the internal capabilities in developing new and improved products (Cohen and Levinthal 1990; Malerba and Torrisi 1992; Cantner and Pyka, 1998). The competence required by firms to evaluate and utilize outside knowledge is largely a function of the level of prior related knowledge. AC signifies the ability a firm possesses to identify/value, acquire and apply knowledge which can impact its innovation performance and competence (Fichman, 2004; Vinding, 2006). Schilling (1998) opined that a firm through its AC can increase its knowledge base, improve their ability to assimilate and exploit future knowledge, which will ultimately enhance their innovation performances. As opined by D'Cruz and Rugman (1992), a firm is likely to build a competitive edge given its ability to recognize, acquire, assimilate and transform knowledge into products or services that are novel and of better quality to that of its competitors. Thus for firms' survival and growth, AC has become essential for all firms including SMEs (Kaplan and Waren, 2007). Given the importance of AC in firms, several studies (Cohen and Levinthal, 1994; Lane and Lubatkin, 1998; Vinding, 2000; Lane *et al*., 2006; Zahra and George, 2002; Muscio, 2007; Liao *et al*., 2007; Fosfuri and Tribo, 2008; Liao, *et al*., 2010. de Jong and Freel, 2012) have assessed the impact of AC on innovation capability and innovation performance of firms. However, most of these studies (Vinding, 2000) focused on large firms and the impact of the various AC dimensions on innovation performance of firms was not taken into cognizance. Thus, this study assesses the impact of AC dimensions on the innovation performance of manufacturing SMEs in Nigeria.

II. LITERATURE REVIEW

ABSORPTIVE CAPACITY

The concept of AC over the past two and half decades has been recognized as the key to knowledge creation, acquisition, assimilation, transformation and application for organizations. It is the major component for sustainable growth and innovation in firms especially for SMEs (OECD, 2004). The concept of AC first originated in macroeconomics where it refers to the ability of an economy to utilize and absorb external information and resources (Alder, 1965). Thereafter AC was described by Cohen and Levinthal described AC as "the ability of an organization to recognize the value of new external information, assimilate it and apply it to commercial ends" (Cohen and Levinthal, 1990). They believed that firm's ability to exploit external knowledge is thus a critical component of innovative capabilities and argued that this ability to evaluate and utilize external knowledge is largely a function of the firm's level of prior related knowledge. However they measured AC as a uni-dimensional construct using R&D intensity as a proxy for AC. Their uni-dimensional measure of AC has been adopted by several scholars over the years, thereby largely neglecting the multi-dimensional aspect of the construct (Lane *et al*., 2006). Koza and Lewin (1998) saw AC as gauging the ability of a firm to use external knowledge. Whereas Mowery and Oxely (1995) defined AC as a broad set of skills required to handle the tacit component of transferred knowledge and the need modify this imported knowledge. More so, Kim (1997) defined AC as the capacity to learn and solve problems. Van den Bosch *et al*., (1999) developed a more integrated framework of the co-evolution of a firm's path-dependent absorptive capacity and the knowledge environment. Zahra and George (2002) building on the work of Cohen and Levithal, defined AC as the "set of strategic organizational routines and processes that makes it possible for businesses to acquire, assimilate, transform and exploit knowledge to create organizational dynamic capabilities". They extended the theory by specifying four distinct dimensions to absorptive capacity: acquisition, assimilation, transformation and exploitation. They recognized AC as a dynamic capability that influences the nature and sustainability of a firm's competitive advantage. Their view of AC as a dynamic capability makes AC amenable to change through managerial actions that can possibly redefine and deploy the firm's knowledge-based assets. They noted that two subsets of AC exists which include the potential AC (PAC) and the realized AC (RAC). PAC they opined, include a firm's ability to *acquire* and *assimilate* knowledge. It entails a firm's receptiveness to external knowledge. On the other hand, RAC, they noted consists of a firm's ability to *transform* and *exploit* knowledge. RAC reflects a firm's capacity to leverage absorbed knowledge and transform it into innovative outcome. They viewed AC as multi-dimensional construct i.e. consisting of four major capabilities which provided an insight into the processes and relationships within AC which serve as a guide to developing firms' AC. More so, they were able to relate AC to broader strategic outcomes and competitive advantage beyond innovation and learning opined by Cohen and Levinthal (1990).

DIMENSIONS OF AC

Cohen and Levinthal (1990) proposed that there are three dimensions of AC (identify, assimilate and apply) while Zahra and George (2002) proposed four dimensions of AC (acquisition, assimilation, transformation and exploitation). They extended the theory by categorizing AC into two (2) subsets: Potential AC (PAC) and Realized AC (RAC). They noted that PAC consists of the acquisition and the assimilation dimensions, while RAC included the transformation and exploitation dimensions. This study however combined both author's dimensions of AC to propose the five (5) dimensions of AC. Absorptive capacity has five dimensions. This study categorized identification and valuation, acquisition,

assimilation dimensions as PAC and transformation and exploitation as RAC.

Identification and Valuation: This capability as stated by Cohen and Levinthal (1990) involves recognizing and valuing new external knowledge. It is the ability to recognize that an external knowledge is useful to the firm and therefore needs to be acquired.

Acquisition: This capability has to do with a firm's commitment to gather knowledge. It determines the performance of individuals in gathering knowledge. It considers the speed of information flow, the discovery of new ideas and observation of quality of employees. The quality of firm's capacity to acquire is determined by the intensity and speed of the firm's efforts to identify, gather and learn knowledge (Zahra & George, 2002; Carmen, 2007).

*Assimilation: A*ssimilation refers to the firm's routines and processes that allow it to analyze, process, interpret and understand the knowledge obtained from external sources (Szulanski, 2000; Kim, 1998; Zahra and George, 2002). From this viewpoint, employees have to understand and take advantage of external Knowledge in discovering new suppliers, new methods and techniques and new products and services (Chauvet, 2002).

Transformation: Transformation is the internalization of new external information a firm's existing processes and products. Transformation entails the capability of a firm to develop and refine the routines that facilitate combining existing knowledge and the newly acquired and assimilated knowledge (Zahra and George, 2002).

Exploitation: Knowledge exploitation produces the final outcome of knowledge identification and evaluation, acquisition, assimilation, and transformation. Knowledge application as an organizational capability is dependent on the routines that allow firms to refine, extend, and leverage existing competencies or to create new ones by incorporating acquired and transformed knowledge into its operations" (Zahra and George, 2002). This is the stage where new knowledge is developed.

ABSORPTIVE CAPACITY OF SMALL AND MEDIUM ENTERPRISES

Research on AC has been concentrated majorly on large firms and the application of the concept to the context of small and medium enterprises (SMEs) in developing countries has been limited (Liao *et al*., 2003; Waalkens, 2006). According to Jones and Craven, (2001), different ways of measuring AC is required at the level of SMEs (Jones and Craven, 2001). Liao *et al*. (2003) have examined AC and its relationship with firm responsiveness among growth-oriented SMEs in the United States. Waalkens *et al*. (2008) adopted an extended concept of AC developed by Zahra and George (2002) in the context of Dutch architectural and engineering SMEs. Waalkens in his study combined R&D expenditure and other alternative measures of AC in measuring AC in the SMEs. Several features differentiate small and medium firms from large firms.

INNOVATION PERFORMANCE

Innovation performance refers to the outcomes and benefits generated by the process of innovation. Innovation is often referred to as the introduction of new or improved products or processes, changes in organizational structure, and marketing design based on new scientific or technology knowledge and/or organizational know-how (OECD, 2015). Innovation has remained an increasingly important element of globalization and competitiveness (Gorodnichenko, *et al*., 2010). As globalization and international competition intensifies, technology becomes more central to firms' innovation performance in the global market. This study measures AC as an explanatory variable for innovation performance in firms. The innovativeness of firms may be affected by both internal and external factors. External factors are basically associated with a firm's interaction with its external environment such as other firms, suppliers or buyers (Jorna and Waalkens, 2006). Internal factors include, for instance, a firm's inherited capacities, such as skills, accumulated experience and prior related knowledge of its workforce (Webster, 2004), organizational structure, communication network, R&D efforts, as well as the ability to respond appropriately to the intrinsic motivation of its employees (Jorna and Waalkens, 2006). It has been asserted that innovation plays an essential role in the survival of firms in the business environment.

III. METHODOLOGY

SAMPLE SELECTION AND DATA SOURCE

This study deployed a multi-stage sampling technique in selecting 320 manufacturing SMEs in Southwestern Nigeria. The first stage involved the stratification of manufacturing firms in Nigeria into three (3) major industrial axis which include; the Lagos-Ota-Agbara-Ibadan industrial axis; the Nnewi-Aba-Port Harcourt industrial axis; and the Kano-Kaduna-Jos industrial axis (Adeoti, 2011). The second stage involved the purposive selection of the Lagos-Ota-Agbara-Ibadan industrial axis were about 26.44% of manufacturing SMEs in Nigeria are domiciled (NBS and SMEDAN, 2010). The third stage involved the purposive selection of three Manufacturing SME subsector such as textile/leather/apparel and footwear; wood/furniture and woodworks; and domestic/industrial plastic and rubber. The last stage involved the random selection of registered manufacturing SMEs within the three subsectors. SMEs employing between 10 persons and 200 persons were sampled for this study. From the 320 copies of questionnaires distributed, the study retrieved 305 copies of questionnaires indicating a 95.3% response rate. Sampled respondents included those in positions such as chief executive officer/owner, director, manager, production personnel, and engineering/IT staff.

MEASURES

INDEPENDENT VARIABLE

The use of the AC concept in various fields reflects its multidisciplinary application but also makes it hard to establish unified criteria for its conceptualization and measurement. Therefore, identifying a measure of Absorptive Capacity that would bring together its primary characteristics requires an analysis of the measures used in prior research. Empirical studies on the subject present different forms of measurement for AC some take into account the described dimensions while other use specific indicators. However, the measurement scale for AC deployed in this study were drawn from George *et al*. (2001) Zahra and George (2002), Vinding, (2006), Liao *et al*. (2007), Soo *et al*. (2007), Jimenez-Castillo and Sanchez- Perez (2013) and Hutardo-Ayala and Gonzalez-Campo (2015). AC as an independent variable in this study was measured based on five dimensions which include; identification and valuation, acquisition, assimilation, transformation, and exploitation. Identification and valuation was measured using four (4) items, acquisition dimension was measured using seven (7) items, assimilation dimension was measured using six (6) items, transformation dimension was measured using eight (8) items, and exploitation dimension was measured using four (4) items (See table 1). These items were measured on five point Likert scale which included strongly agree (SA)=5, Agree (A) =4, disagree (DA)= 3, strongly disagree (SDA)=2, and indifferent (I)=1.

Dimension	Items
Identification and Valuation Capability	Experience in new knowledge search
	Ability to detect opportunities within the business environment
	Ability to identify useful market information
	Employees' familiarity with organization's challenges
Acquisition Capability	Emphasizing the need for exchange of information and experiences with firms within the industry
	Daily search for relevant information about the industry
	Employees' usage of industry information sources
	Employees engage in information exchange and experiences with other firms
	Sourcing information from suppliers, Attendance of training programmes /courses in knowledge institutions,
	Ability to quickly identify and acquire new market knowledge
Assimilation Capability	Deployment of planned job rotation
	Top management delegation of responsibilities to subordinates
	Firm's emphasis on cross-departmental support to solve problems
	Management encouragement of periodical cross- departmental meetings
	Existence of quick information flow within business units/departments
	Employees' wilful exchange of knowledge, information and experiences with colleagues
Transformation Capability	Deploying policies that encourages employees to engage in further training and continuous learning
	Employees' involvement in organizational restructuring and market strategy development
	Employees' ability to deploy new knowledge in their practical work
	Employees' ability to identify opportunities embedded in the new market knowledge that is distributed to them
	Employees' ability to use and apply market knowledge quickly to respond market changes
Exploitation Capability	Development of prototypes
	Application for patent
	Possession of patent
	Possession of registered trademark

Source: Authors

Table 1: Measurement Scale for AC Construct

DEPENDENT VARIABLE

The dependent variable innovation performance was measured using number of innovations introduced by the firms (Escribano *et al*., 2009; Tsai, 2009; Tsai and Wang, 2009). This include the number of product, process, organizational and marketing innovations introduced by the manufacturing SMEs.

RELIABILITY TEST

In order to ensure the internal consistency of the variables, variables measuring each AC dimension were subjected to reliability test using Cronbach's Alpha and a construct validity test using convergent validity. Reliability test illustrates the degree to which all the items in scale measure the same or construct and thus it is related to the inner-relatedness of the items within the test (Tavakol and Dennick, 2011). As opined by Nunnally (1978) and George and Mallery (2003,) a Cronbach's alpha should be 0.7 or greater.

VALIDATION OF THE MEASUREMENT SCALE FOR AC AND STRUCTURAL EQUATION MODELING (SEM)

To test the validity of the variables used in this study, exploratory factor analysis (EFA) was deployed using SPSS 17.0 (Bagozzi and Yi, 1988. Also, to examine the influence of AC on innovation performance, a confirmatory factor analysis (CFA) and SEM were deployed using AMOS version 23.0 software. In addition the study examined the construct's convergent validity (Anderson and Gerbing., 1988) including the fit of the model (Gefen *et al*., 2000). Indices for assessment included: factor loadings of the indicators (usually

loadings above 0.5 is deemed acceptable, Kaiser, 1974), composite reliability (CR) of various dimensions which must be higher than 0.7, Average Variance Extracted (AVE) which is usually higher than 0.5 but figures lower than 0.5 can be accepted if AVE is less than 0.5, but composite reliability is higher than 0.6 (Fornell and Larcker, 1981). Also, the fit of the model was assessed with multiple indices (Shook et al., 2004) such as: the normed-fit-index(NFI),the comparative fit index (CFI), the goodness-of-fit index (GFI),the standardized root mean square residual (SRMR), incremental fit index (IFI), Turker-Lewis index (TLI), and the root mean square error of approximation (RMSEA). Values of NFI, CFI, IFI, TLI and GFI higher than 0.90 signifies a good model fit (Byrne, 2006; Hair et al., 1998). Hu and Bentler (1999) opined that values of SRMR less than 0.08 indicate an acceptable fit. Values of RMSEA less than 0.05 indicate a good fit, and values as highas0.08 represent reasonable errors of approximation in the population (Browne and Cudeck, 1992).

IV. RESULTS AND DISCUSSION

SAMPLE CHARACTERISTICS

As shown in Table 2, majority of the respondents surveyed were male. This unfair balance in gender is also evident in Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) and National Bureau of Statics (NBS) report (2013) where it was reported that 92.1% of male are owners of manufacturing small enterprises as compared to 7.84% of female. Also, in terms of employment within SMEs in Nigeria, about 61% of males are employed as compared to about 39% of females (SMEDAN and NBS, 2013). This gender disparity within manufacturing SMEs has implication for the business climate in Nigeria given the fact that women constitute about 50.5% of Nigeria's population (NBS, 2014).However, the textile/leather/apparel & footwear SME subsector had a fair gender distribution of 50.5% males and 49.5% females. In terms of educational qualification, only about 31.1% of the respondents had higher educational degrees. Majority (32.2%) of the respondent had ordinary national diploma (OND) and senior school certificate (SSCE) (34.3%) as their highest educational qualification. This result revealed that majority (69.9%) of the respondent does not possess higher degrees which is a major obstacle to building AC for innovation within the firms (Oyeyinka-Oyelaran and Adebowale, 2012). More so, about 60.6% of the respondents had between 6 to 10 years of work experience and about 22.9% of the respondents had 11 to 15 years of work experience. And, about 10% of the respondents had over 15 years of work experience. Overall, 93.5% of the respondents surveyed had above 5 years work experience. This indicates that majority of the respondents having been the job for these numbers of years, had a considerable degree of on the job prior related knowledge which is an antecedent for developing absorptive capacity within firms (Cohen and Levinthal, 1990). About 90.6% of the respondents surveyed were within the ranks of chief executive officer, director and manager. Majority of the firms sampled were SMEs in Textile/leather/apparel & footwear subsector.

Variables		Frequency	Percent
Gender			
Male		199	65.9
Female		102	34.1
Firm Classification			
Small	10-49	254	83.4
Medium	50-200	51	16.6
Highest Educational Qualification			
No formal education		5	1.7
Primary school Certificate		2	0.7
SSCE/GCE		98	34.3
OND		92	32.2
HND		60	21.0
B.Sc/B.Tech		20	7.0
M.Sc./MBA/M.A		8	2.8
Ph.D		1	0.3
Subsector Type			
Textile/leather/apparel & footwear		186	61.0
Wood/furniture/woodworks		78	25.6
Domestic/industrial plastic & rubber		41	13.4
Work Experience			
1 – 5 years		10	6.5
6 – 10 years		103	60.6
11 – 15 years		39	22.9
Over 15 Years		17	10.0

Source: Authors

Table 2: Sample Characteristics

RELIABILITY AND VALIDITY TESTS

A reliability test was carried out on the variables to determine the internal consistency of the AC variables. The result revealed a Cronbach's Alpha of 0.781for identification and valuation dimension, 0.807 for acquisition dimension, 0.831 for assimilation dimension, 0790 for transformation dimension, and 0.879 for exploitation dimension. All dimensions had Cronbach's Alpha that is higher than 0.7 which suggests that the variables used for the study have relatively high internal consistency. Also, the convergent validity result shows that the composite reliability of the five AC dimensions ranged between 0.820 and 0.908 while the AVE ranged between 0.371 and 0.717. Although the AVE for 'acquisition' and 'transformation' is lower than 0.5 yet it is still within the acceptable limit since their CR is higher than 0.6 (See Table 3). Thus, this indicates that the convergent validity of the construct is adequate as (Fornell and Larcker, 1981).

VALIDATION OF THE MEASUREMENT SCALE FOR ABSORPTIVE CAPACITY

The factorial weights were obtained using principal component analysis with varimax rotation. The factorial weight in this study was set at significant loading cut-off of 0.5. This means that items with factor loadings less than 0.5 were suppressed as such variables can only explain a lesser variation in the related factor (Kaiser, 1974). Also, the higher

the absolute value of the loading, the more the factor contributes to the variable. Five (5) factors was obtained such that: factor 1 represents assimilation dimension, factor 2 transformation dimension, factor 3 represents acquisition dimension, factors 4 represents application dimension and factor 5 represents identification and valuation dimension (See Table 3). The five factors explained about 57.21% variance in the data which supports the multidimensional conceptualization of AC.

	Factors					
	1	2	3	4	5	
Identification and Valuation						Cronbach's Alpha = 0.781
Experience in New knowledge Search					0.812	
Ability to detect opportunities within the business environment					0.657	Composite Reliability= 0.820
Our employees can identify useful market information					0.660	
						AVE= 0.534
Employees are familiar with organization's challenges					0.677	
Acquisition						Cronbach's Alpha = 0.807
Our firm places emphasis on exchange of information and experiences with firms in the same industry			0.682			
Our firm daily searches for relevant information about the industry			0.711			
Employees use of industry information sources			0.735			
Our employees to exchange information & experiences with other firms			0.609			Composite Reliability= 0.835
Sourcing information from suppliers			0.634			
Attendance of training programmes/courses in Knowledge Institutions			0.556			
Ability to quickly identify and acquire new market knowledge			0.662			AVE= 0.422
Assimilation						Cronbach's Alpha = 0.831
Deployment of planned job rotation		0.589				
Top management delegation of responsibilities to subordinates		0.697				
Firm's emphasis on cross-departmental support to solve problems		0.668				Composite Reliability= 0.870
Management encourages periodical cross-departmental meetings		0.662				
Employees willful exchange of knowledge, information and experiences with colleagues		0.769				AVE= 0.519
Existence of quick information flow within business units/Departments		0.764				
Transformation						Cronbach's Alpha = 0.790
Employees quick understanding of new available market opportunities	0.528					
Our firm can duplicate existing technologies/products that were externally acquired	0.515					Composite
Our firm's policy encourages employees to engage in	0.712					

Source*: Authors*

Extraction Method: Principal axis factoring. Rotation Method: Varimax with Kaiser Normalization. AVE = Average Variance Extracted

Table 3: Content Analysis for Absorptive Capacity Construct

CONFIRMATORY FACTOR ANALYSIS

To assess the impact of AC on innovation performance, the study proposed that AC is positively related to innovation performance (Cohen and Levinthal 1990; Stock *et al*. 2001; Chen *et al*. 2009). As opined by Nonaka and Takeuchi (1995), the exchange and combination of newly acquired with existing knowledge, novel ideas and concepts results in innovation outcomes (such as new products and services). Also, as noted by Jantunen (2005), most studies in the innovation literature stressed the main role of the capacity in using external knowledge to innovate. Hence, this study applied structural equation modeling to examine the proposed relationship, the study modeled AC using five dimensions which include; identification and valuation, acquisition, assimilation, transformation, and exploitation. The results of the model estimation showed that the model fit is satisfactory

Hypotheses	Path			Standardized Regression Coefficients
H1a	Identification & Valuation	→	Absorptive Capacity	0.18*
H1b	Acquisition	→	Absorptive Capacity	0.16*
H1c	Assimilation	→	Absorptive Capacity	0.20**
H1d	Transformation	→	Absorptive Capacity	0.60***
H1e	Application	→	Absorptive Capacity	0.57***
H1	Absorptive Capacity	→	Innovation Performance	**0.79*** **

$\chi 2$	df	P Value	$\chi 2/df$	GFI	CFI	NFI	AGFI	IFI	TLI	RMR	RMSEA
6.769	3	0.080	2.256	0.993	0.984	0.973	0.950	0.985	0.921	0.227	0.064

Note: $\chi 2$ = Chi-Square, NFI =Normed-fit-index, df = Degree of freedom, GFI= Goodness of fit index, AGFI= Adjusted Goodness of fit index, CFI= Comparative fit index, TLI =Turker-Lewis index, IFI =Incremental fit index, RMR =Rroot mean residual, RMSEA = Root mean standard error of approximation

Table 4: Path Analysis of Impact of AC on Innovation Performance

These findings showed that AC explains about 79% of the variation in innovation performance of the manufacturing firms. Also, all AC dimensions particularly, transformation and exploitation dimensions, positively influences innovation performance of the firms (see figure 1). The five AC dimensions proposed in this study positively influences innovation performance of the firms. This result is consistent with (Jansen *et al*., 2005; Brettel *et al*., 2011; Jiménez-Barrionuevo *et al*., 2011).

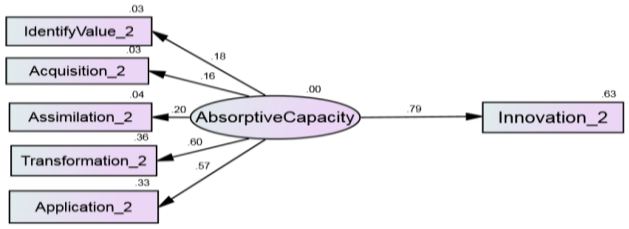

Figure 1: SEM of the relationship between AC and innovation performance

V. CONCLUSION

This study contributes to the theory and practice of measuring the absorptive capacity and the impacts of its dimensions on firm's innovation performance. To our knowledge, this study is one of the first attempts to test a multidimensional scale of AC on manufacturing SMEs using five dimensions (Jiménez-Barrionuevo *et al*., 2011). Our results shows that AC can be measured using five dimensions drawn from the works of Cohen and Levinthal (1990) and Zahra and George (2002). This study generates awareness with regard to the importance of AC and demonstrates that practitioners should foster the development of this capacity (Cohen and Levinthal, 1994). The study provides insights which advices firms on the importance of building AC and the

AC dimensions that has more influence on firms' innovation performance. Hence, manufacturing SMEs and policy makers must note that AC remains an essential element in small and medium sized firms. Though this study assessed the impact of AC dimensions on innovation performance of manufacturing SMEs, the study did not covers SMEs in the service sector as well as large firms. Further studies should examine the impact of AC dimensions on innovation performance in service SMEs and large firms as well.

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