Moderating Role of Absorptive Capacity between Entrepreneurial Orientation and Technological Innovation Capabilities

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ABSTRACT

The present study purposes to examine the moderating role of absorptive capacity (ACAP) on the relationship between entrepreneurial orientation (EO) and technological innovation capabilities (TIC) among small and medium enterprises (SMEs) in the construction industry. Due to the critical role of SMEs in construction industry, the purpose of this article is to examine to what extent the externally generated knowledge manifested in ACAP can strengthen the relationship between EO and TIC. To validate the proposed model, self-administered questionnaire were conducted to gather data from SMEs owners, 249 questionnaires returned and used for statistical analysis out of 278 distributed. The outcomes of present research reflect that both of ACAP and EO have significant effects on TIC. Furthermore, the results indicate the moderating role of ACAP on the nexus between EO and TIC.

Keywords: Absorptive Capacity, Entrepreneurial Orientation, Technological Innovation Capabilities
JEL Classification: M31

1. INTRODUCTION

Technological innovation capabilities have been attracting scholars' interest in recent years. It has been described as "the potential ability of an organization to position itself in an arena of modernism such as new product development, technology and other advancements that result in competitive advantages over its rivals" (Yang, 2012). Innovation is the ground for firm survival (Xia et al., 2011). For small and medium enterprises (SMEs), the innovation process vastly involves the external knowledge absorption, including acquisition, dissemination, and exploitation of new knowledge (Cohen and Levinthal, 1990; Liao et al., 2010).

The necessity to research the absorptive capacity (ACAP) construct in privet enterprises especially SMEs and compile empirical evidence on its effects in these enterprises' innovation has been vastly recognized (Celuch and Murphy, 2010; Flatten et al., 2011; Muscio, 2007). However, former efforts to do so seem deficient for two reasons. First, while SMEs aspiration is increasingly circumspect to take advantage of externally generated knowledge to achieve competitive advantage, such knowledge does not quite equally uphold by all enterprises, and thus, the priorities basked by the enterprises that have their own efficient ACAP (Cohen and Levinthal, 1990).

Enterprises would be unable to rely solely on the external knowledge resources, but also have to develop their own ACAP to acquire knowledge in an active way (Wang and Han, 2011). In other words, the mere existence of external knowledge does not necessarily mean to utilize it easily. Second, some aspects of SMEs innovation are constantly outward oriented owing to their close interact with customers, for example, entrepreneurial orientation (EO) in its dimension pro- activeness which includes expecting and reacting to future needs of customers and market, and thus developing a first-initiative preference compared to rivals (Lumpkin and Dess, 1996), to take advantage of opportunities that emerge in market place, and thus, pro-activeness may be significant to EO as it indicates an advanced perspective coupled with innovative activity and taking risks (Blesa and Ripolles, 2003; Huang and Wang, 2011).

Over time, this leads to grows the amount of acquired knowledge, where decision- makers become steadily overloaded with

various information which may negatively affects their decisions marketing in turn (Iii et al., 2009), an ACAP serves as a filtering mechanism to acquire and assimilate only the relevant and needed knowledge and then, transforming these knowledge pack into valuable outcomes (Hodgkinson et al., 2012), accordingly, the majority of SMEs are seeking to fill the internal deficit by using knowledge located external to its borders (Celuch and Murphy, 2010; Muscio, 2007). The enterprise's ability to interpret and exploit knowledge is a significant factor in the access of new knowledge, while the lack of such ability can sometimes deter or undermine the SMEs' innovation capabilities (Muscio, 2007). Such ability improves the capability of the SMEs to react to customer's needs that requires risk-taking and proactive methods (Boso et al., 2012a; 2012b; Huang and Wang, 2011).

This study is expected to contribute toward technological innovation capabilities (TIC) among industrial SMEs by decreasing the potential stumbling blocks of technological innovation adoption, highlights the role of EO and external generated knowledge in addition to stimulate innovation as no one of a similar study is found before. Still, the absence of a theoretical framework that reflects the moderating role of ACAP on its relation between EO and TIC forms a gap within the existing literature, and it can be depended to help industrial SMEs in their attempts to gain technological innovation and then employing it to achieve competitive advantages. In this regard, the study contributes novel evidence to extend the relevance of this key EO theory to privet enterprises management.

Entrepreneurial orientation researchers have so far neglected the implications of ACAP in their quest to gain the appropriate information to develop their TIC. We contribute to the role of EO by addressing this overlooking. SMEs have become a pillar of economic growth all over the world. Hence, SMEs economic contributions play an essential role in reducing the unemployment rate by creating new jobs in different fields and serving as suppliers for larger companies (Ar and Baki, 2011; Costică, 2013).

As regards to the Kurdistan region of Iraq (KRI), the private industrial sector, especially SMEs, has been experiencing a great deficiency in foreign expertise at different levels. Despite the external support from some countries, like the United States, still some SMEs operating in the health, agricultural and banking sectors have priority (USAID, 2011). Further, the local market depends almost entirely on imported goods, for example, the largest share of approximately 44.4% of Jordanian exports go to the Iraqi market (Al-Hyari et al., 2012), in addition to imports from other neighboring countries, such as Iran, Turkey and others countries as well. Industrial SMEs in the Kurdistan region constitute about 95.5% of all working businesses, contribute about 4.08% to the gross domestic product of the region and provide more than 13.331 job opportunities. These low contributions may be a reflection of their weak ability to innovate new products and manufacturing processes (RDSKR, 2011). According to the CIPE and RDSKR, industrial SMEs are still characterized by weak innovation ability, especially technological ability, that can provide new products and manufacturing processes to cover local market needs and to compete with imported goods as in the past (CIPE, 2007; RDSKR, 2014).

Since, the TIC of SMEs is related to the entrepreneurial efforts and their abilities to absorb external knowledge, the objectives of this study is to determine if EO and ACAP in developing country like KRI can improve TIC. This study also investigate the moderating role of ACAP on the relationship between EO and TIC.

2. LITERATURE REVIEW

Recently, a growing number of researches have focused on large firms' attitudes in being innovative. They have pointed out that EO and ACAP are the fundamental components in the effort to improve innovation capabilities of a firm (Börjesson et al., 2014; Chen, 2012; Cheng et al., 2012; Jung-Erceg et al., 2007; Weigelt and Sarkar, 2012). However, these researches have considerably elucidate the direct influence of EO and ACAP on the innovation capabilities. Thus, in addition to its direct influence, ACAP has intervening role on the influence of EO on TIC. This view is based on Sciascia et al., (2014) who report that EO becomes efficient only with the development of mechanisms to acquire, assimilate, transform and exploit external knowledge. Hodgkinson et al., (2012) also advocate that ACAP serves as a filtering mechanism to acquire and assimilate only the relevant and needed knowledge and then, transforming these knowledge pack into valuable outcomes.

This research focuses on the SMEs sector because they possess certain features, including: Less bureaucracy, higher tendency to take risks, possession of more specialized knowledge and faster reactions to the dynamic market demands. These characteristics allow SMEs to gain from external knowledge more effectively compared to their larger counterparts (Bigliardi and Dormio, 2009; Westerberg and Frishammar, 2012). Thus, they will have a significant effect on growth and innovation activities. In addition, SMEs can take advantage of financial preferential policies of governments (Guo and Shi, 2012).

Previous scholarly works have equally show the importance of firms' ability to knowledge absorption from outside their borders and activate this knowledge in a proactive and innovative response to the latent customers' needs in fostering firms' innovation (Otero-Neira et al., 2013; Wang and Chung, 2013). The proposed framework, Figure 1., underpinned by RBV (Barney, 1991) which demonstrate how the firms can achieve and maintain their TIC. Based on this theory, constant maintain of competitive advantage is a result of firm's resources and capabilities that are invaluable, scarce, imperfectly imitable, and irreplaceable (Barney et al., 2001), because a superior assortment of mixed resources assists the firm in adaptation to the conditions of uncertainty and risk that manifested in new innovations (Srivastava and Gnyawali, 2011). Thus, these resources and capabilities have considerable meaning to direct firm's innovation efforts (Zhang et al., 2009), Which may reflect to some extent the similarity between innovation strategies in SMEs and large firms. Figure 1 depicts the theoretical framework of this study.

Firms can survive in the business environment due to the demand for their products and possess certain resources to compete with others. Miller (1983) shows that simple firm' strategies affected by its owner personality and attitudes; and indicate that those

Figure1: Theoretical framework
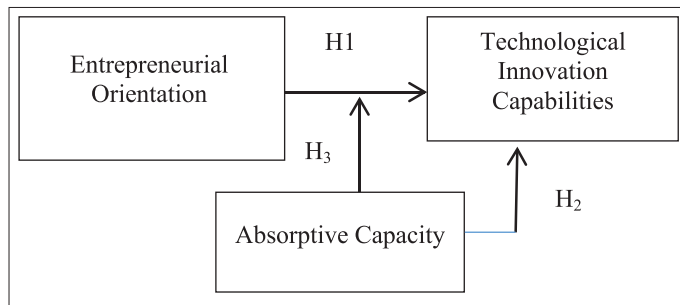
confident owners/managers of their abilities are most possible to be entrepreneurial. Based on this notion, Huang and Wang (2011) through their work characterized by promoting innovation levels in SMEs, have considered innovation as EO outcome. Empirical evidences showed that understanding EO as one of the crucial resources of the firm has a significant impact on the firm's ability to adapts to environmental changes through the provision different types of innovations (Hong et al., 2013; Li et al., 2008). As indicated by the relevant literature, firm that owns an EO must be characterized with risk-taking, pro-activeness and innovativeness (Baker and Sinkula, 2009; Jones and Rowley, 2011; Miller, 1983; Wales et al., 2013) to be able to understand the requirements of both market and customers and satisfy these needs through new innovations (Baker and Sinkula, 2009; Boso et al., 2012b).

Along these lines, Atuahene-Gima and Ko (2001) gave an accurate depiction for the relationship that link EO with innovation, they argued that the main reason implied in this relationship represented in one of the EO dimensions which is a high grade of innovativeness. Henard and Szymanski (2001) and Baker and Sinkula (2007) have also reported that product innovation strongly related with innovativeness. Moreover, researches highlighted the role of other dimensions of EO, for instance, risk-taking can foster firm's ability to produce new products and process (Chen, 2012; Cheng et al., 2012). Risk-taking nature promotes firms toward dedicate the necessary resources which help in obtaining new innovations (Ko and Lu, 2010; Zhou and Tse, 2005). Previous studies have also indicate positive influence of proactiveness on innovation and value creation (Zellweger et al., 2011). Hence, EO plays antecedent role of TIC (Weerawardena and Coote, 2001). This leads to the following hypothesis:
H_1: Entrepreneurial orientation is positively related to TIC.

Enterprises try to use various mechanisms through their endeavors to acquire externally generated knowledge in order to boost their innovative levels (Jung-Erceg et al., 2007; Weigelt and Sarkar, 2012). Sizable numbers of former researches have confirmed the notion that ACAP has an essential role in enhancing innovation (Laforet, 2011; Laukkanen, 2012; Tsai, 2001). Scholars like Scholars like (Caccia-Bava et al., 2006) have assert that ACAP of the firm possesses an active role in fostering innovation in its technological form, and it can also border the extent of value creation (Laukkanen, 2012), through determining the velocity, frequency, and the amount of innovation (Tseng et al., 2011). This leads to the second hypothesis:
H_2: ACAP is positively related to TIC.

Entrepreneurial orientation represents a learning process through which enterprises acquire the relevant knowledge about customers and competitors that available outside the organizational boundaries, to indicate current and future needs (Huang and Wang, 2011; Hughes et al., 2007). In this meaning, entrepreneurial firm derives innovation advantages from this stream of knowledge and take proactive steps (Atuahene-gima and Ko, 2001; Boso et al., 2012b).

As ACAP plays a critical role in supporting the learning ability which arising from a higher stock of existent knowledge in a specific field of work, then it is most likely that EO will achieve advantages from an enhanced ACAP and the relationship with innovation capabilities will achieve advantages likewise (Hodgkinson et al., 2012; Liao et al., 2007). However, increasing in attempts to predict the needs of customers and competitors trends will generates increasingly greater amounts of knowledge over the time, where decision-makers become steadily overloaded with various information which may negatively affects their marketing of decisions in turn (Iii et al., 2009), an ACAP serves as a filtering mechanism to acquire and assimilate only the relevant and needed knowledge and then, transforming these knowledge pack into valuable outcomes (Hodgkinson et al., 2012), which in turn may leads to an increase TIC and affect innovation levels within the firms. This leads to the following hypothesis:
H_3: ACAP moderates the relationship between EO and TIC.

3. METHODOLOGY

This study adopts cross-sectional design due to its ability in gathering data about specific phenomenon at a specific time, in order to support the intended model. Time dimension, on the other hand appears as a sensitive factor for present study to determine the influence of research variables on TIC. Two criteria represent the focus of attention of researchers to select the appropriate industry for present research: Firstly, the industry that interested in developing of its TIC. Secondly, the industry which has a vital role in the development of other sectors and rely significantly on external knowledge to develop its activities.

Construction SMEs in KRI was adequate for both of adopted criteria and determined as research targeted industry. A copy of construction SMEs that working in KRI boundaries in has adopted for sampling purpose in this research as it includes an up to date information, helps to determine working area, the numbers of employees, and the nature of industrial activity. The population in this study is all construction SMEs that operate in the three provinces of KRI namely, Erbil, Sulaimany, and Duhok. The total number of construction SMEs is 979 according to Ministry of Industrial and Trading of Kurdistan region. These enterprises are different in terms of production (construction materials) and cover wide variety of industrial activities include (Bricks, Concrete Blocks, Tiles, Asphalt, Readymade Building, and Gravel quarries). The target population for this research takes into consideration all these six categories to ensure the best levels of representation for

the research population where disproportionate stratified random sampling has been adopted.

Thus and based on (Krejcie and Morgan, 1970), it is adequate to select a minimum sample of 278 from the whole research population. The questionnaires were randomly distributed to targeted SMEs owners who picked from the list of construction SMEs. Out of the chosen sample 249 were returned back and involved in statistical analysis.

4. RESULTS AND DISCUSSION

As presented in Table 1, more than half (52.61%) of researched SMEs in the sample were established in 10-20 years ago. The majority (69.08%) of enterprises were considered to be small enterprises and the whole sample were owned by local owners. Finally, most of SMEs' owners (61.04%) in this sample hold secondary school certifications. In order to analyzing the collected data, PLS-SEM 3.2.0 software utilized in current study to prove the reliability and validity of measurement model before testing the proposed hypotheses, as the first step of (Chin, 1998) approach which includes two steps, namely; verifying the "outer model" measurement model and then examining the "inner model" structural model by testing hypothesis depending on bootstrapping procedures.

The investigated constructs evaluated by measuring convergent and discriminant validity of their items. Composite reliability (CR) and average variance extracted (AVE) have been used to measure convergent validity (Fornell and Larcker, 1981). As illustrated in Table 2, the values of (CR) ranged from 0.830 to 0.938 which more than 0.07, and the values of (AVE) exceeded 0.05 as recommended by (Hair et al., 2011) which prove the convergent validity of the proposed model and its measures.

In addition, Table 3 illustrates that square roots of AVE values that elucidated on the diagonal line are exceed other values outside this line in their respective columns and rows, which

emphasize the discriminant validity of measurement model of current study.

Hypotheses testing results shown that EO has achieved significant effects on TIC at significance level of 0.001 ($\beta = 0.352$, t = 3.085, P < 0.001). This figures support the assumption in H_1 of present study, and consistent with the results of (Atuahene-gima and Ko, 2001) study. Similarly, ACAP significantly affects TIC ($\beta = 0.287$, t = 1.99, P < 0.05), thus H_2 has been supported.

Table 1: Respondents' demographic information

Demographic variable	Categories	Frequency (n=249) (%)
Duration of operating in the Kurdistan Region of Iraq	<5	27 (10.84)
	6-9	86 (34.54)
	10-20	131 (52.61)
	20<	5 (2.01)
Number of employees in enterprise	<9 (small)	172 (69.08)
	10-19 (medium)	59 (23.69)
	20-99 (medium)	18 (7.23)
Enterprise ownership	Kurdish owned	249 (100)
	Non-Kurdish owned	0 (0.00)
Educational attainment	No certificates	9 (3.61)
	Primary school certificate	7 (2.81)
	Secondary school certificate	152 (61.04)
	Tertiary school certificate	36 (14.46)
	Graduate degrees	45 (18.07)

Table 2: Convergent validity analysis

Constructs items	Loadings	Cronbach Alpha	CR[a]	AVE[b]
TIC				
ProdInn1	0.82	0.835	0.885	0.609
ProdInn2	0.88			
ProdInn3	0.69			
ProdInn4	0.81			
ProdInn5	0.67			
ProcInn1	0.81	0.923	0.938	0.656
ProcInn2	0.86			
ProcInn4	0.85			
ProcInn6	0.92			
ProcInn7	0.67			
ProcInn9	0.89			
ProcInn10	0.71			
ProcInn11	0.73			
EO				
Proac1	0.74	0.815	0.865	0.518
Proac2	0.75			
Proac3	0.82			
Proac4	0.65			
Proac5	0.66			
Proac6	0.68			
Risk1	0.74	0.862	0.907	0.710
Risk2	0.88			
Risk3	0.88			
Risk4	0.87			
Innovati1	0.76	0.896	0.915	0.546
Innovati2	0.71			
Innovati3	0.75			
Innovati4	0.69			
Innovati5	0.82			
Innovati6	0.74			
Innovati7	0.72			
Innovati9	0.74			
Innovati10	0.71			
ACAP				
Acqu1	0.75	0.731	0.832	0.553
Acqu2	0.76			
Acqu3	0.73			
Acqu4	0.73			
Assi1	0.73	0.727	0.830	0.550
Assi2	0.78			
Assi3	0.73			
Assi4	0.73			
Trans1	0.79	0.766	0.850	0.587
Trans2	0.77			
Trans3	0.74			
Trans4	0.77			
Expl1	0.79	0.790	0.864	0.614
Expl2	0.79			
Expl3	0.77			
Expl4	0.78			

a: CR = (Σ factor loading) 2/{(Σ factor loading) 2) + Σ (variance of error)}. b: AVE = Σ (factor loading) 2/(Σ (factor loading) 2 + Σ (variance of error)}. EO: Entrepreneurial orientation, ACAP: Absorptive capacity, TIC: Technological innovation capabilities

Table 3: Correlations and discriminant validity

Constructs	1	2	3	4	5	6	7	8	9
1. Acquisition	0.744								
2. Assimilation	0.039	0.742							
3. Exploitation	0.179	0.060	0.784						
4. Innovativeness	−0.001	0.004	0.078	0.739					
5. Process Innovation	0.092	0.108	0.154	0.183	0.810				
6. Product Innovation	0.023	0.090	0.010	0.145	0.252	0.780			
7. Pro-activeness	0.047	0.028	0.092	0.075	0.124	−0.009	0.720		
8. Risk-taking	0.045	−0.022	0.000	0.113	−0.027	0.012	0.087	0.843	
9. Transformation	0.127	0.074	0.167	0.054	0.059	0.130	−0.014	0.040	0.766

Furthermore, the results illustrate the moderating effect of ACAP on the relationship between EO and TIC, where interaction variable introduced has significant effect ($\beta = 0.644$, $t = 5.072$, $P < 0.001$) and that support the assumption in H_3 of this study.

5. DISCUSSION

The present study aims to broaden our perception about TIC and its leverage within SMEs. Further, it analyzes the interdependencies between EO, TIC and ACAP. Major findings are reflected in terms of the significant effect of EO on TIC and the moderating effects of firms' ACAP on this relationship. These figures demonstrate that both firm's EO and ACAP are not only important factors should be taken into account but also they need to be matched in order to increase firm's TIC. This study broadens TIC research to the context of SMEs within developing economies. Thus, we have contributed to innovation capabilities literature by evidencing that EO and ACAP serves as substantial variable in enhancing innovation capabilities for SMEs in such economies; especially for the SMEs that possess scarce internal knowledge (Celuch and Murphy, 2010; Muscio, 2007) and therefore tend to rely highly on externally generated knowledge.

6. IMPLICATIONS

This study has serious practical implications for investigated SMEs; it provides new insights for both owners and managers to promote their firms' distinctive EO and ACAP to enhance their own TIC. The implications of this work are expected to be most obvious for construction SMEs and other industrial SMEs in which knowledge is moving ahead and innovation capabilities has been and continues to be a significant feature for successful firms. In today's organizations, where a large volume of relevant knowledge inhabits outside a firm's boundaries, this is an important message for SMEs within developing economies, who aim to develop sustainable TIC. Managers must realize the importance of knowledge value outside their firm's frontiers in leverage innovation capabilities, given to its significant role in learning new techniques, increasing innovativeness and pro-activeness of the firm, and reducing the risk levels that associated with innovation process.

7. LIMITATIONS AND FUTURE RESEARCH SUGGESTIONS

This work provide insights for entrepreneurship and innovation capabilities research, nevertheless, it has some limitations that

should be highlighted. First, this study is depending on data that collected from only local construction SMEs in KRI. Flatten et al. (2011) reported that organizational relationships especially the informal one are subject to national cultural differences effects. Thus, the ability to acquire knowledge from customers, suppliers, or other competitors might also rely on the national cultural circumference. Future work could research this topic based on a sample including enterprises from diverse national backgrounds. Second, our study concentrates exclusively on the effect of EO on TIC, future research have opportunity to focus on how to foster EO and examine what the antecedents for EO are. It would be interesting to distinguish between internal factors, on the one hand, for example, which leadership style or organizational culture attitudes, and the external factors, for example, competitive intensity, legislation, and the speed of changes in the desires of customers.

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