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The Mediating role of Market Orientation on Entrepreneurial Orientation, Absorptive Capacity and Technological Innovation Capabilities

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Abstract

The present study purposes to examine the mediating role of Market Orientation in its nexus among Entrepreneurial Orientation, Absorptive Capacity and Technological Innovation Capabilities among construction SMEs in Kurdistan region of Iraq. Due to the critical role of SMEs in construction industry for the reconstruction of Iraq in general and Kurdistan region in particular, the purpose of present study is to determine whether the Market Orientation has a mediating role in its relation with the examined variables, so as to examine that, the model of present study was developed. To validate the proposed model, self-administered questionnaire were conducted to gathering data from SMEs owners in Kurdistan region of Iraq, 249 questionnaires returned and used for statistical analysis Out of 278 distributed. The outcomes of present research reflect that both of Absorptive Capacity and Entrepreneurial Orientation have significant effect on Technological Innovation Capabilities. Furthermore, the outcomes of present study assert that the Market Orientation has a partial mediation mechanism in the nexus between Absorptive Capacity and Technological Innovation Capabilities.

Keywords: absorptive capacity, entrepreneurial orientation, market orientation, partial least squares, SMEs-Kurdistan region of Iraq, technological innovation capabilities

1. Introduction

Different types of innovation frameworks have been created that is consistent with the firm's strategic objectives (Ko & Lu, 2010). On the basis of the resource-based view (RBV), firms obtain competitive advantage by using resources in developing new products and processes (Beck, Janssens, Debruyne, & Lommelen, 2011; Pullen, de Weerd-Nederhof, Groen, & Fisscher, 2012), which reflect the firm's proactive response to the environmental changes (Hughes, Hughes, & Morgan, 2007; Lee & Tsai, 2005). Thus, the organization can obtain some type of advantage that could transform into positive outcomes (Carmen & José, 2008). It is worth mentioning that wide stream of studies dealt with behavioral factors through investigation of human capital (HC) role in promoting technological innovation capabilities (TIC) (Gallié & Legros, 2011; González-Loureiro & Pita-Castelo, 2013; Guo, Zhao, & Tang, 2013; Suying, Rong, Zhang, & Zhang, 2011). Nevertheless, these studies did not give adequate attention to some of the behavioral factors within the concept of HC such as entrepreneurial orientation (EO) (Atuahene-gima & Ko, 2001; Todorovic & Ma, 2008), absorptive capacity (ACAP) (Andersén, 2012; García-Morales, Bolívar-Ramos, & Martín-Rojas, 2013; Knoppen, Saenz, & Johnston, 2011), and market orientation MO (Adhikari & Gill, 2012; Atuahene-gima & Ko, 2001), despite their effective role in achieving innovation; due to the fact that HC ranks as most important resources and represents the main body of technological innovation (Guo et al., 2013; Xia, Yu, Xia, & Li, 2011).

This study is expected to contribute toward technological innovation capabilities among industrial SMEs by decreasing the potential stumbling blocks of technological innovation adoption, highlights the role of entrepreneurial orientation and external generated knowledge in addition to the role of market orientation to stimulate innovation as no one of a similar study is found before. Still, the absence of a theoretical framework that reflects the combined influences of entrepreneurial and market orientations in addition to the combined effect of absorptive capacity and market orientations 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 (Boso, Cadogan, & Story, 2012a; Cheng, Chang, & Li, 2012; Hodgkinson, Hughes, & Hughes, 2012; Wales, Parida, & Patel, 2013; Zortea-Johnston, Darroch, & Matear, 2011).

Therefore, this study hopes to contribute by producing TIC model based on confirmed behavioral factors. This will help the industrial SMEs to work through focusing on knowledge of both internal and external sources; in addition, it hopes to contribute in proving the significant role of MO in mediating the nexus between entrepreneurial orientation, absorptive capacity, and technological innovation capabilities. Moreover, present study will investigate the ability of RBV in predicting the role of behavioral factors that may affect technological innovation in developing country like Iraq given to the insufficient studies conducted in this country and Kurdistan Region (KR) in particular that deal with innovation topic.

2. Literature Review

2.1 Technological Innovation Capabilities

The innovation phenomenon was first initiated in the early human settlements and it has since affected civilizations and cultures. The newly invented innovative production and supply methods have always held great significance to the social group's survival in competitive environment. Some innovations have resulted in both agricultural and industrial revolutions with their great and ongoing impacts on human life (Ooi, Lin, Teh, & Chong, 2012).

The presumptions of RBV provide a theoretical framework that demonstrates clear viewpoint of innovation and its association with firm capabilities (Iii, Damanpour, & Santoro, 2009). According to assumption of RBV, only enterprises that possess specific capabilities will earn competitive advantages and, therefore, achieve new innovations over their rivals (Camisón & Villar-López, 2012).

Various innovation types are highlighted in literature. The most widely accepted classification is the one brought forward by Damanpour (1991), wherein he differentiates between technological and administrative innovations. technological innovations refer to new processes, products and services while administrative innovations refer to novel procedures and policies, and it is covered under the umbrella of non- technological innovation (Jiménez-Jiménez & Valle, 2011). While innovation is a blank term and may include many aspects, therefore, this study depend Product innovation capabilities and Process innovation capabilities as the dimensions of TIC. In the long run, the main source of enterprises competitive advantage is formed through technological innovation capability within these enterprises. The ability to readily offer novel products and adopt new production methods and processes in concise period has become an urgent competitive instrument for those enterprises (Camisón & Villar-López, 2012).

In this regard, Adler & Shenhar (1990) identified innovation capabilities through the following dimensions: *"(1) ability to develop new products that meet market needs; (2) ability to apply appropriate process technologies to producing these new products; (3) ability to develop and adopt these new products and process technologies to satisfy future needs; and (4) ability to respond to related technology activities and unexpected activities created by competitors*". As it is obvious, all these dimensions revolve around TIC of the enterprise. Thus, TIC is considered as one of the most critical factors to the enterprise in achieving competitiveness from the viewpoint of RBV, due to the fact that such capabilities might award extra valuable, scarce, differentiated and inimitable products and process simultaneously to a higher level of competition (Dhewanto et al., 2012).

2.2 Entrepreneurial Orientation

Danny Miller (1983) stated in his seminal article that an entrepreneurial firms are those that are involved in new innovations their marketplace, takes on risky projects and initially create proactive innovations ahead of its competitors. Miller in his work, positioned three characteristics namely "*innovation, proactiveness, and risk-taking*" as the core of EO and they are often taken together to develop a higher-order reflection of firm-level entrepreneurship (Miller, 1983; Todorovic & Ma, 2008; Wales, Gupta, & Mousa, 2011). These characteristics are explained in detail below:

2.2.1 Innovativeness: represents an inclination to advocate new ideas, newness, and masterly processes, through which firms can leave from prior practice and technology (Boso et al., 2012a; Lumpkin & Dess, 1996) and is considered one of the significant factors impacting business performance. Innovativeness is described as a concept that require increasing attention from researchers as well as practitioners as it signifies the degree of innovativeness contained in every novel product (Avlonitis & Salavou, 2007). The relation between innovativeness and innovation has been studied extensively in prior research, e.g., (Laforet, 2011). Therefore, innovativeness should be distinct from innovation success, as the latter is a behavioral construct (Baker & Sinkula, 2009). Grinstein (2008a) also claimed that innovativeness calls for considerable customer learning

effort/experience and as a result, to apply innovation in their processes, firms should possess sufficient information concerning their customers.

2.2.2 Proactiveness: refers to expecting and reacting to future needs of customers and market, and thus developing a first-initiative preference compared to rivals (Baker & Sinkula, 2009; Lumpkin & Dess, 1996). Due to this reason, proactive firms take advantage of opportunities that emerge in market place, and thus, proactiveness may be significant to EO as it indicates an advanced perspective coupled with innovative activity and taking risks (Blesa & Ripolles, 2003; Huang & Wang, 2011). Proactive firms expend efforts on environment observation and monitoring in an attempt to find new trends and stay ahead of the competition (Zahra, 2008) that is dynamically linked to the market signal (Hughes et al., 2007). Proactiveness can generate capacities allowing firms to come up with unique products/new markets far ahead of their rivals and the customer's expectations (Li, Zhao, Tan, & Liu, 2008). This is significantly affected by the explicit product-market strategy and the leader's personality (Miller, 1983). Proactiveness indicates entrepreneurial inclination to be ahead of competitors through both proactive and offensive moves combined; for instance, launching new products/services before rivals and anticipating future demand to bring about change.

2.2.3 Risk-taking: is related to a tendency to appropriate considerable resources to high-risk projects (Baker & Sinkula, 2009; Huang & Wang, 2011; Otero-Neira, Arias, & Lindman, 2013). It indicates committing resources to projects with ambiguous outcomes. On the whole, it represents the firm's tendency to deviate from the normal path and travel through the unknown (Zahra, 2008). In this regards, risk has three aspects namely risk-related with exploring the unknown without being aware or knowing of the success probability, risk related with investing significant resources into a risky project and finally, personal risk arising from potential unfavorable career implications if these projects are unsuccessful (Lumpkin & Dess, 1996). Moreover, innovation is primarily risky owing to the potential failure of the new offerings (Ko & Lu, 2010; Wales et al., 2011; Zahra, 2008), particularly in the case of SMEs (Jones & Rowley, 2011). Unless the firm is inclined to face such failure, it will steer clearly to refrain of such activities. Innovation generation is linked with steep learning curves referring to the ability of the firm to obtain new operational knowledge (Zahra & Hayton, 2008). While the potential for success is uncertain and low, successful activities will bring in financial rewards in the short- as well as the long-term (Atuahene-gima & Ko, 2001).

Therefore, firms possessing an EO are mostly characterized by risk-taking manner, like affording debts or assigning considerable resource appropriation in order to obtain high returns by taking advantage of market opportunities. Similarly, Lumpkin and Dess in (1996) brought forward another a couple of factors namely "*competitive aggressiveness and autonomy*". These two dimensions go beyond the former three and provide a description of the EO domain. Lumpkin and Dess (1996) described competitive aggressiveness as the efforts of the organization to overtake its market antagonists through the maintenance of a confrontational stance, and they described autonomy as the ability of the organizational members to independently promote promising entrepreneurial ideas and plans (Baker & Sinkula, 2009; Wales et al., 2011; Zellweger, Nason, & Nordqvist, 2011). However, researchers argued that competitive aggressiveness dimension overlaps with proactiveness concept, whereas, autonomy is argued a contextual variable that fortify entrepreneurial activities. That is way the three factors namely; innovativeness, proactiveness, and risk-taking, have been relied considerably in studying EO (Blesa & Ripolles, 2003; Huang & Wang, 2011). As such, this study has adopted the three main components for reasons set out above.

2.3 Absorptive Capacity

Earlier studies (Andersén, 2012; Flatten, Engelen, Zahra, & Brettel, 2011; Martinkenaite, 2012) defined ACAP as the capability to recognize, assimilate and apply external knowledge. In addition, Zahra and George (2002) gave another trend to this concept by categorized ACAP construct into two folds namely "potential absorptive capacity" (the capability for knowledge acquisition and assimilation) and "realized absorptive capacity" (the capability for knowledge transformation and exploitation). Moreover, they added that the transition from assimilation phase to transformation phase is considered as though the shift from potential ACAP to realized ACAP. However, one of the main drawbacks of ACAP highlighted in literature is that only few attempts were made to measure it out the context of research and development (R&D) (Muscio, 2007; Zahra & George, 2002). Therefore, traditional measurement of ACAP that adopted by researchers (e.g. R&D spending) may considered incongruous as they reflect only simple partial capture the broad concept of such dynamic capabilities. Thus, relative ACAP is 'more important to organizational learning within the firm than the traditional used measures of absolute ACAP (Liao, Fei, & Chen, 2007).

2.4 Market Orientation

The pioneering thesis concerning market orientation surfaced in the 1950s when Peter Drucker explained that customers are the core factor that preserves and protects the organization (Celuch & Murphy, 2010; Eris & Ozmen, 2012)and at that time, several expressions such as market focus or customer focus were employed to describe the concept (Foley & Fahy, 2009). After the significant contribution of Kohli and Jaworski (1990), many conceptual framework and empirical studies regarding MO were proposed in literature and this attracted the scholars' attention in the field of marketing (Tsiotsou & Vlachopoulou, 2011; Zhang & Duan, 2010).

This research depends on Kohli and Jaworskii approach to study MO which comprised of the following dimensions:

2.4.1 Intelligence generation: is a process of collecting the needed information linked to customers' desires, from the environment (Boso et al., 2012a; González-Benito, González-Benito, & Muñoz-Gallego, 2009).

2.4.2 Intelligence Dissemination: pertain to knowledge sharing among various sections and firm members (Beck et al., 2011; Chung, 2012; Zhang & Duan, 2010) and the exchange of ideas produced from intelligence among organizational parts through systematic and unsystematic methods (Chao & Spillan, 2010), both horizontal and vertical (Chung, 2012).

2.4.3 Responsiveness: is the development and employment of all needed actions towards the generation and sharing of intelligence to satisfy customers' needs (Beck et al., 2011; Chao & Spillan, 2010; Chung, 2012; Grinstein, 2008b; Todorovic & Ma, 2008) and related to performance and represents the speed and coordination of the implementation and review of relevant actions.

3. Theoretical Framework and Hypotheses Development

The framework aims to explain the influence of EO, ACAP, and MO on TIC among industrial SMEs. The proposed framework, figure1., underpinned by RBV (Barney, 1991) which demonstrate how the firms can achieve and maintain their TIC. The researchers understands that the firm's ability to increase the utilization of these resources depends on the availability of these resources at a given time, but creating a joint utilization of such resources efficiently have been debated to have considerable effects on innovation activities of the firms and their customers' expectations.

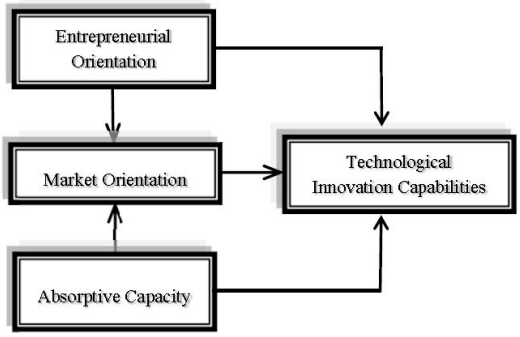

Figure 1. Theoretical framework

3.1 The Relationship between EO and TIC

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 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 entrepreneurial orientation 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, Song, & Yoo, 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 & Sinkula, 2009; Jones & 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 & Sinkula, 2009; Boso, Cadogan, & Story, 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 & Lu, 2010; Zhou & 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 technological innovation (Weerawardena & Coote, 2001). This leads to the following hypothesis:

H1: EO is positively related with TIC.

3.2 The Relationship between ACAP and TIC

Enterprises try to use various mechanisms through their endeavors to acquire externally generated knowledge in order to boost their innovative levels (Jung-Erceg, Pandza, Armbruster, & Dreher, 2007; Weigelt & Sarkar, 2012). Sizable numbers of former researches have confirmed the notion that ACAP has an essential role in enhancing innovation (Hurmelinna-Laukkanen, 2012; Laforet, 2011; Tsai, 2001).

Scholars like Scholars like Caccia-Bava, Guimaraes, and Harrington (2006) have assert that ACAP of the firm possesses an active role in fostering innovation in its technological form, and it can also border on the extent of value creation (Hurmelinna-Laukkanen, 2012), through determining the velocity, frequency, and the amount of innovation (Tseng, Pai, & Hung, 2011). This leads to the following hypothesis:

H2: ACAO is positively related with TIC.

3.3 The Relationship between EO and MO

Previous researches support the notion of close interrelationship between EO and MO (Atuahene-gima & Ko, 2001; Blesa & Ripolles, 2003). The relationship between EO and MO is based on the idea that the market is the focus of attention of EO (Zortea-Johnston et al., 2011). Where the dimensions of EO (innovation, risk-taking and proactiveness) try to meet the market changes, at the same time are influenced by the market itself. Researchers also argue that the synergies between MO and EO fortify firm's performance, as such suggesting an existence of relationship between the two themes (Slater & Narver, 1995; Todorovic & Ma, 2008; Zahra, 2008). In view of foregoing discussion, third hypothesis has been developed:

H3: EO is positively related with MO.

3.4 The Relationship between ACAP and MO

Previous academic efforts tried to link between absorptive capacity and market orientation through the main dimensions of these two constructs. As such, while firms in their quest to search for broad types of knowledge, acquisition process of related knowledge as ACAP dimension, participates with MO the generation of knowledge concerning customers and markets (Flatten, Engelen, et al., 2011; Kohli, Jaworski, & Kumar, 1993). Other researchers have reported that firm's responsiveness speed is affected by its ability to utilize the acquired knowledge, and thus sentient estimation of market alterations need ACAP to transform related knowledge into valuable outcome and deal properly with received signals from the market(Chang, Gong, Way, & Jia, 2012; Jantunen, 2005). Thus, the following hypothesis has been posited:

H4: ACAP is positively related with MO

3.5 The Relationship between MO and TIC

Among innovation antecedents in existing field of academic researches, MO has often been owned the solid relationship with firms' innovative efforts (Boso et al., 2012a; Grinstein, 2008b; Wang & Chung, 2013). The reason for this relationship backs to the role of MO in formation a deeper understanding of customers' needs and minimizes the falling in innovation failures (Atuahene-Gima, Slater, & Olson, 2005; Cooper, 1994). Because the firms that possess a powerful MO are looking carefully to their customers' manifest wants and react by develop their product and process to meet these wishes (Baker & Sinkula, 2007, 2009). Over time; new segments of customers appear to represent the focus point of the firms, with this regard, Beck et al., (2011) argued that MO positively linked with innovation that because determining of new customer segments result in development of novel products to satisfy their needs. Therefore, market oriented firms mostly to possess high level of innovation and new products developments (Grinstein, 2008a). In addition to promote their ability to understanding competitive situations (Jiménez-Jimenez, Valle, & Hernandez-Espallardo, 2008). In line with above arguments the following hypothesis has been formulated:

H5: MO is positively related with TIC

3.6 The Mediation Role of Market Orientation

There is an important claim pertained to the role of MO in the marketing literature, in terms of achieving superior business performance and competitive advantage over rivals (Grinstein, 2008b; Zebal & Goodwin, 2012).

However, there are some major requirements to be kept into consideration in order for MO to thrive and be effective (Lin, Peng, & Kao, 2008; Raju, Lonial, & Crum, 2011). A commonality between EO and MO is their emphasis on learning. Moreover, three antecedents of MO were identified by Kohli and Jaworski (1993). First, top management's enhancement of the significance of MO and knowledge sharing to realize suitable reactions to market needs; second, the examination of the way the organizational departments interact to influence MO; and finally, possession of an organizational structure that supports MO. This indicates that understanding customer and market needs is insufficient to achieve effective MO sans a high level of EO (Zahra, 2008; González-Benito et al., 2009).

On the other hand, Customer and market information gathering could be necessary to achieving strong MO (Baker & Sinkula, 2009) and hence, learning from customer needs and competitor behavior is deemed to provide a crucial input to the process of innovation (Otero-Neira et al., 2013). An efficient MO demands a commitment to acquisition of externally generated knowledge (Slater & Narver, 1995; Baker & Sinkula, 1999). Both market orientation and knowledge acquisition are similar conceptually, as they are both linked to the market-information-processing activities of the organization along with the values and norms driving the behaviors (Baker & Sinkula, 2007). According to the above discussions, following hypotheses have been posited:

H6a: MO has mediation effect on the relationship between EO and TIC

H6b: MO has mediation effect on the relationship between ACAP and TIC

4. Methodology

4.1 Research Design

This study adopt 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.

4.2 Population and Sampling

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 have a vital role in the development of other sectors and rely significantly on external knowledge to develop its activities.

Construction SMEs in KR of Iraq was adequate for both of adopted criteria and determined as research targeted industry. The latest copy of construction SMEs that working in KR boundaries in 2013 has adopted for sampling purpose for this research as it includes an up to date information, helps to determine working area, the numbers of employees, the nature of industrial activity, and the amount of capital per enterprise. The population in this study is all construction SMEs that operate in the three provinces of KR namely, Erbil, Sulaimany, and Duhok. The total number of construction SMEs is 979 for the year 2013 according to Ministry of Industrial and Trading of Kurdistan region (MTIKRG, 2013). 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) as illustrated in Table1. 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.

Table1. Targeted population and sample

Industrial Activities	Bricks	Concrete Blocks	Tiles	Asphalt	Readymade Building	gravel quarries	Total
Population	19	517	139	34	186	84	979
Sample	5	147	39	10	53	24	278
Percentage	0.02	0.53	0.14	0.04	0.19	0.09	100%

Source: MTIKRG, 2013

5. Measurement and Instrumentation

Within present research, scale questions that employed to measure the researched variables were adapted and adopted from former academic researches; all variables have measured employing multiple questions. For better clearness and avoiding respondents confuse the questions have been purposely categorized into grid. Following, a brief explanation of measurement for researched variables in our proposed model:

5.1 Technological Innovation Capabilities

The measurement scale adopted from (OECD, 2005) definition to measure TIC dimensions namely, product innovation capability, which refers to submitting of any novel product to satisfy customers' needs, and process innovation capability which involves firm's wide efforts to create or improve a new manufacturing method, and bring about new developments in the process or system. Camisón & Villar-López, (2012) and Jiménez-Jimenez et al., (2008) had used the instrument and found (Composite Reliability) above 0.81 for this instrument. Seven-point scale adopted to measure all the items where 7 determined for "Strongly agree" ranging to 1 for "Strongly Disagree".

5.2 Entrepreneurial Orientation

Drawing on (Miller & Friesen, 1982) definition of entrepreneurial firm "The entrepreneurial model applies to firms that innovate boldly and regularly while taking considerable risks in their product-market strategies", the EO instrument has been built. Previous studies have used this measure, Boso et al., (2012b) found that (Composite Reliability) ranging from 0.92 to 0.71, where Avlonitis & Salavou (2007) found that (Cronbach Alpha) is 0.78 which indicates that measures are reliable. Seven-point Likert scale utilized to measure all the indicators, where 7 determined for "Strongly agree" ranging to 1 for "Strongly Disagree".

5.3 Absorptive Capacity

Refers to firm capability to external knowledge acquisition, assimilate, transformation and exploitation to get new stock of knowledge. The questions have been adapted from previous literature (Flatten & Engelen, 2011) to be structurally short and more accurate. In addition, questions sequencing within this section done in logical manner, begun from knowledge acquisition to exploitation of knowledge. Flatten, Greve, et al., (2011) found that (Cronbach Alpha) for this measurements ranging from 0.90 to 0.70 to show enough reliability for this instrument. Seven-point Likert scale utilized to measure all the indicators, where 7 determined for "Strongly agree" ranging to 1 for "Strongly Disagree".

5.4 Market Orientation

The measure of MO is sourced from, (Kohli & Jaworski, 1993). Questions accompanied by five-point response scale where 5 assigned for "Strongly agree" ranging to 1 for "Strongly Disagree". Boso et al., (2012b) have shown a highly reliability exceeding 0.81, where Jiménez-Jimenez et al., (2008) have found that (Composite Reliability) ranging from 0.84 to 0.79.

The questionnaire items were validated in a pilot test conducted in 45 SMEs that prompted us to delete some items and modify others that were not obviously understood. Further, back-translation method has been applied to support instrument validation and ensure the equivalence in meanings and interpretations between the original and translated measures.

6. Statistical Analysis and Results

In order to analyzing the collected data, PLS-SEM 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".

6.1 The Outer Model

The following paragraphs discuss and confirm both of content and construct validity in order to verifying the measurement model.

6.2 The Content Validity

According to the psychometrics literature, content validity denotes that all the involved questions in measuring a determined construct should possess high loadings on that respective constructs to represents all facets of that construct (Hair, Hult, Ringle, & Sarstedt, 2014).Table2 a & b, illustrates significantly loaded of all items on their constructs which vouch the content validity of all indicators of path model for present study.

6.3 The Convergent Validity

Pertains to the level to which a measure of specific indicators gathering positively in measuring the same determined construct (Hair, Ringle, & Sarstedt, 2011). By virtue of SEM arguments, this validity could be approved through testing "item's reliability", "composite reliability" (C.R) and "average variance extracted" (AVE), when the indicators of all constructs have achieved specific limits, for example, C.R should be more than 0.7, AVE should be higher than 0.50, such figures refer to acceptable convergent validity of measurement model (Hair et al., 2011). Accordingly, figures in Table2 a and b. illustrate and confirm adequate convergent validity level of present study.

6.4 The Discriminant Validity

Discriminant validity reflects the divergence level among a set of indicators to distinguish a construct from others, hence, to achieve discriminant validity the shared variance between the items of a given construct must be more than the shared variance achieved with other constructs. According to multivariate analysis literature, a specific criterion should be fulfilled to confirm discriminant validity as discussed by (Hair et al., 2014) and illustrated in Table 3., the square roots of AVE values that appear on the diagonal line, must be greater than other values outside that line in their given columns and rows, this in turn, confirm the discriminant validity of measurement model of present study.

Table 2a. Content and convergent validity analysis for exogenous variables

Construct	Items	Loadings	Cronbach Alpha	CR[a]	AVE[b]
EO	Proac1	0.876	0.863	0.902	0.651
	Proac2	0.831			
	Proac3	0.909			
	Proac5	0.678			
	Proac6	0.716			
	Risk1	0.821	0.865	0.908	0.713
	Risk2	0.861			
	Risk3	0.899			
	Risk4	0.792			
	Innovati5	0.778	0.873	0.904	0.612
	Innovati6	0.833			
	Innovati7	0.815			
	Innovati8	0.661			
	Innovati9	0.788			
	Innovati10	0.807			
ACAP	Acqu1	0.733	0.742	0.838	0.563
	Acqu2	0.735			
	Acqu3	0.769			
	Acqu4	0.765			
	Assi1	0.731	0.759	0.847	0.581
	Assi2	0.749			
	Assi3	0.763			
	Assi4	0.805			
	Trans1	0.883	0.811	0.876	0.640
	Trans2	0.748			
	Trans3	0.755			
	Trans4	0.807			
	Expl1	0.880	0.855	0.903	0.700
	Expl2	0.906			
	Expl3	0.809			
	Expl4	0.742			

"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)}"

Table 2b. Content and convergent validity analysis for endogenous variables

Construct	Items	Loadings	Cronbach Alpha	CR[a]	AVE[b]
TIC	Prod Inn1	0.558	0.663	0.799	0.502
	Prod Inn2	0.769			
	Prod Inn4	0.722			
	Prod Inn5	0.762			
	proce Inn1	0.701	0.851	0.888	0.536
	proce Inn2	0.778			
	proce Inn3	0.805			
	proce Inn4	0.532			
	proce Inn6	0.798			
	proce Inn8	0.806			
MO	Gene1	0.700	0.676	0.802	0.504
	Gene2	0.669			
	Gene3	0.717			
	Gene4	0.750			
	Disse1	0.696	0.739	0.837	0.563
	Disse2	0.799			
	Disse3	0.825			
	Disse5	0.671			
	Respon1	0.642	0.759	0.838	0.510
	Respon2	0.655			
	Respon3	0.724			
	Respon4	0.790			
	Respon5	0.749			

"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)}"

Table 3. Discriminant validity for exogenous and endogenous variables

Constructs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1)Acquisition	**0.751**											
2)Assimilation	0.106	**0.762**										
3)Dissemination	-0.008	0.022	**0.751**									
4)Exploitation	0.336	0.223	0.070	**0.837**								
5)Generation	0.203	0.089	0.131	0.281	**0.710**							
6)Innovativeness	0.112	0.173	0.114	0.270	0.217	**0.782**						
7)Proactiveness	-0.084	0.172	-0.098	0.060	0.056	0.135	**0.807**					
8)Process Innovation	0.194	0.167	0.153	0.273	0.429	0.662	0.114	**0.732**				
9)Product Innovation	0.169	0.255	0.200	0.185	0.345	0.355	0.032	0.533	**0.708**			
10)Responsiveness	0.112	0.119	0.525	0.238	0.256	0.217	-0.084	0.281	0.308	**0.714**		
11)Risk-taking	-0.060	0.227	-0.090	0.064	0.076	0.143	0.649	0.131	0.086	0.052	**0.844**	
12)Transformation	0.357	0.317	0.195	0.585	0.296	0.132	0.027	0.218	0.199	0.313	0.001	**0.800**

6.5 Model Predictive Relevance

To determine the power of prediction of a given model, specific estimations should be utilized. According to the guidelines suggested by literatures, they are R^2, Cross-Validated redundancy (C-VR) and Communality (C-VC). R^2 value indicates the amount of the contribution of exogenous variables that explain the variance in the endogenous variable. In addition, Cross-Validated redundancy and Communality can be obtained by utilizing blindfolding procedures, and then the model has adequate predictive power if Cross-Validated values are higher than zero (Hair et al., 2014). Figures in Table4 illustrate that the obtained R^2 values are 0.29 and 0.10 for TIC

and MO respectively, which considered as moderate level (Cohen, 1988), whereas, cross validated redundancy of the TIC were more than zero. These results enhance the assumption of adequate prediction quality of present model.

Table 4. Predictive relevance of proposed framework

Endogenous variables of the Model	R Square for Endogenous variables	C-VR	C-VC
TIC	0.29	0.1229	0.4148
MO	0.10	0.0298	0.2960

6.6 Goodness of Fit

It is important to realize that the term fit has different meaning in PLS-SEM in compression with CB-SEM, thus, Goodness of Fit refers to the "*geometric mean of the average variances extracted and the average R2 for the endogenous variables*" (Tenenhaus, Vinzi, Chatelin, & Lauro, 2005), as illustrated in below equation:

$$\text{Goodness of Fit} = \sqrt{(\overline{R^2} \times \overline{AVE})} \quad (1)$$

As for present study, GOF value was 0.34 which considered medium in comparison with the criterion values suggested by Wetzels, Schröder, and Oppen (2009) (weak =.1, medium =.25, strong =.36). This result point out a sufficient standard of global validity for present model.

6.7 The Inner Model

The second step is to examine the structural model by testing hypothesis depending on bootstrapping algorithm. As shown in Table 5, EO positively and significantly affect TIC at significant level of 0.05 (β=0.297, t= 2.256, p<0.05). This figures confirm the assumption in H1 of present study, and consistent with the study for (Atuahene-gima & Ko, 2001). Similarly, ACAP significantly affect TIC (β=0.177, t= 1.96, p>0.05), thus H2 has been supported. Furthermore, ACAP significantly affect MO (β=.320, t= 2.976, P<0.01) and that support H4. In addition, MO significantly affect TIC (β=.336, t= 4.240, p<.001) hence confirming H5. Whereas, the result does not reflect any significant effects of EO on MO (β=.012, t= .145, p>.05), thus, these result not support H3. In fact these results reflect the path coefficients of the hypotheses after entering of the mediator variable MO.

Table 5. Testing the hypotheses

Hypotheses Number	Hypothesis	Path Coefficient	Standard Error	T-Statistic	P-Value	Hypothesis statement
H1	EO ---> TIC	0.297*	0.131	2.256	0.02	Supported
H2	ACAP ---> TIC	0.287*	0.091	1.96	0.05	Supported
H3	EO ---> MO	0.012	0.084	0.145	0.88	Not Supported
H4	ACAP ---> MO	0.320**	0.108	2.976	0.003	Supported
H5	MO --->TIC	0.336***	0.079	4.240	0.000	Supported

***P<0.001; **P<0.01; *P<0.05

Table 6. illustrate that EO has a direct effect on TIC (β=0.297, t= 2.109, p<0.05) but has no indirect effect (β=.0005, t= .018, p>0.05) and that not support H6a. Whereas, ACAP directly and indirectly affects TIC with indicators (β=0.287, t= 3.189, p<0.001) and (β=.110, t= 2.310, p<0.05) consecutively, hence confirming H6b. Furthermore, we can deduce that MO has a partial mediating effect on the relation between ACAP and TIC according to (Hair et al., 2014) variance accounted for (VAF) rule with VAF equal to 34%, of the influence of ACAP with TIC.

Table 6. Path coefficients for mediating analysis

		a		b		a*b		C		C'	
Hyp. No	Hypotheses	Path	T-value	Path	T-value	Path	T-value	Path	T-value	Path	T-value
H6a	EO ---> MO ---> TIC	0.012	0.145	0.297*	2.256	0.0005	0.018	0.297*	2.109	0.297	2.256
H6b	ACAP ---> MO ---> TIC	0.320**	2.976	0.297*	2.256	0.110*	2.310	0.287***	3.189	0.177	1.96

***:p<0.001;**:p<0.01; *P<0.05

7. Discussions

This research designed to evaluate the influence of entrepreneurial orientation, Absorptive capacity on technological innovation capabilities and examine the mediating role of MO on these relations within the industrial SMEs in Kurdistan region northern of Iraq as one of developing economies. Major findings are reflected in terms of the significant direct effect for each of entrepreneurial orientation, absorptive capacity, and market orientation on technological innovation capabilities. Further, the findings reflect the partial mediation effect of MO on the relation between ACAP and TIC. Surprisingly it was not possible to prove that role for MO on the relation between EO and TIC, which in turn may be attributed to the orientations of searched SMEs that focus more on enterprise' abilities; therefore, the focus is less on the future needs of the customer and responds to them in comparison with the risks that may face the enterprise. While the situation is different with ACAP, SMEs typically possess scarce internal knowledge (Muscio, 2007; Celuch & Murphy, 2010) and therefore tend to rely highly on externally generated knowledge about competition and customers, this is reflected in the level of influence of ACAP on MO and the mediating mechanism of MO on the nexus betwixt ACAP and TIC. This study broadens TIC research to the context of SMEs within developing economies. Thus, we have contributed to innovation literature by evidencing that MO serves as substantial innovation capabilities enhancing lever for young enterprises in such economies.

8. Implications

This study has serious implications for searched SMEs; it provides new insights for both owners and managers to promote their firms' distinctive EO, ACAP and MO to enhance their own TIC. SMEs should be aware of the need to balance their resources, because, the focus on one resource and the exclusion of another may have negative consequences on the competitive ability. For example, broad emphasis on explorative entrepreneurial efforts can confuse firms' existing capabilities, if these activities exposed to the failure, whereas, overemphasis on MO exploitative operations may make it difficult for the firm to avoid the tyrant customers (Hughes et al., 2007; Boso et al., 2012b). On the other hand, firm ability to absorb external knowledge is one of the main sources on which MO depends to apply this knowledge for commercial ends (Jiménez-Jimenez et al., 2008), therefore, without the ability to exploit the acquired knowledge, MO might not be positively related to the TIC. From the practical perspective assessment of customer's current and future needs that conducted in this study will benefit SMEs' management to understanding customers' behavior. This will, in turn, increase the potential success and growth of industrial innovation in both products and manufacturing process, due to the necessity to keep improving marketers' understanding of customer's behavior both from a personal perspective and also in terms of market demands.

9. Limitations

Like the rest of empirical studies, the present research has its restrictions that should be highlighted. Firstly, even with the explicit effect for both EO and MO on TIC have established in the present research and have been established also in others, we recognize that it might be a mediator of this relationship. Future studies should verify the complexities of the nexus among EO, MO and TIC to prove the mediating role of MO that we could not prove. Secondly, this study is depending on data that collected from only local construction SMEs in Kurdistan region of Iraq. Flatten, Greve, 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.

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