Enhancing Competitive Advantage in the Turbulent Environment of the Thai Gems and Jewelry Industry Groups SMEs: Interaction between Social Integration Mechanisms and Absorptive Capacity

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Abstract--- Purpose- This study is to test and develop a model of how SME's entrepreneurs can enhance competitive advantage in turbulent environment. By having the absorptive capacity (ABC) that may serve as a mediator role with a variety of external knowledge sources and social Integration is a driving factor within the organization **Design/methodology-**This study was a survey with 270 SMEs in Thai gems and jewelry industry. SEM was used to examine the proposed model. **Findings-**The results indicated the important role and influence of ABC as a mediator variable between environmental turbulent and external knowledge sources on competitiveness. Besides, social integration mechanism was an important mechanism of the organization when the environment was highly turbulent, and the organization had to rely on a variety of external knowledge sources. **Originality/value-** The implications for findings of this research are for operators and public policy. This developed model is suitable for SME entrepreneurs. If having absorptive capacity, strengthening corporate culture and strategic alliances will be able to seize and create superior business opportunities for policy makers. It can be used as information in formulating policies that are conducive to entrepreneurs, such as import-export tax rates, creating platform, financial support and a hub. The gap between PCAB and RCAB is reduced by maintaining social integration mechanisms and will receive value from ABC.

Keywords--- Competitive Advantage, Turbulent Environment, Thai Gems and Jewelry SMEs, Social Integration Mechanism, External Knowledge Source, Absorptive Capacity.

I. Introduction

The gems and jewelry industry in Thailand is the industry with the third largest export value of the country, creating a value of 1 trillion baht per year or 8% of the country's GDP by the export situation in 2018, the highest export value, respectively, is gold that has not been molded. Genuine jewelry, colored gemstones and imitation jewelry (The Gem and Jewelry Institute of Thailand (Public Organization), 2018a). In 2016, A group of 71 gems and jewelry is the product in the SME group that has the highest export ratio and the highest export growth (Office of Small and Medium Enterprise Promotion, 2017). In an industry that has a large number of entrepreneurs and related workers from the upstream, midstream and downstream industry, characteristics and operation patterns of the industry is different from other industries in a business that is mostly a household business model that uses capital and skilled workers. Most entrepreneurs in the industry are small and medium-sized enterprises. Which acts as a contractor for large operators with a proportion of 90 percent and another 10 percent are large entrepreneurs. There are about 5-6 hundred thousand workers in the system. There are also small gemstone cutting households that are not included in many industrial factories (Kasikorn Research Center, 2015). Even with imports, more than 90 percent are raw materials for production, but also include the important uncut sources of the world. This is an industry that has future opportunities because the growth rate of the world industry is still at high level including Thailand being recognized for the skill of its workers in the industry. This is because it requires the special abilities of entrepreneurs, Thai specialists, and value creation from quality improvement (National Industrial Development Master Plan 2012-2031).

Despite government policies of all ages having formulated a strategy aimed at promoting and supporting industries there is increasing potential to create a global market developed through online systems such as online gem detection systems. There is a service unit to advise consumers to check the accuracy of the gemstones 24 hours.

Increase distribution channels through electronic commerce (E-Commerce) create a brand image confidence for consumers. There are increased research and innovation capabilities, and technical institutions for production, design and branding. Including being a central agency in coordinating cooperation from various sectors. Both in the country and abroad (The Gem and Jewelry Institute of Thailand (Public Organization), 2018a). There is support for these as opportunities, but at present small and medium-sized enterprises and entrepreneurs are having to face obstacles that are constraints to operations. Issues such as the important role of technology on production, consumer behavior towards purchasing luxury products, labor shortages and discontinuity in the succession of technicians in the community. In just a few years, the number has decreased by more than half, as well as some entrepreneurs are just contractors for production and knowledge transfer in a narrow circle (Malshe et al., 2012; The Gem and Jewelry Institute of Thailand (Public Organization), 2018b).

Moreover, the jewelry industry faces many challenges from economic uncertainty. The growth of the millennial consumers and the widespread presence of online businesses in the digital age means adaptation in the modern era is the key to business survival. When the external environment is highly dynamic, causing a wide range of obstacles, uncertainty in international trade, politics, society, markets and technology will increase and the cycle of products will be shorter. Production efficiency values that must be delivered to customers along with the needs and preferences of customers that change rapidly. Therefore, it is necessary for entrepreneurs to develop new products, and new channels to respond to those changes continuously (Engelen et al., 2014; Zahra et al., 2006; Zhai et al., 2018a).

In the knowledge-based economy era, upgrading the capabilities of the industry must be developed from technology. Initially using concentration in the workforce based on expertise to pilot into being "The center of the world of gemstones" must be upgraded to fully realize human potential (National Industrial Development Master Plan 2012-2031) and to develop a community enterprise network (Gem and Jewelry Institute of Thailand (Public Organization), 2018b). People development is at the heart of the organization development which not only responds to the needs of customers effectively but is also an important foundation for developing strategic alliances to cooperate with each other in the industry (Li et al., 2017; Zhai et al., 2018) as well as increase the competitiveness of the country. Development of the ability to absorb knowledge in a knowledge society therefore is important (Zahra and George, 2002) to small organizations that have the flexibility of internal management and external restrictions rather than large organizations (Ling et al., 2008; Fogg, 2012; Harris et al., 2013; Tejada and Moreno, 2013).

Successful SME entrepreneurs need to be effective in maintaining a valuable knowledge base with initiative. Encourage employees to learn, transform knowledge and use of knowledge (Gray, 2006; van Doorn et al., 2017; Zhai et al., 2018) because the benefits from knowledge rely on the dynamic capabilities of the organization. They must change the knowledge embedded in the process of the organization to effectively respond to changes in environmental conditions (Engelen et al., 2014; Jundahuadong and Sornsuwit, 2018; Patterson and Ambrosini, 2015; Teece et al., 1997; Vincent, 2008). Executives have a duty to set policies, make decisions about seeking outside knowledge, synthesize what knowledge is appropriate for production development. They must also create a corporate culture, defining methods for absorbing knowledge to gain new strategic value creation (Leal-Rodríguez et al., 2014; Roberts, 2015).

From such situations we can study the important role of absorptive capacity which is the mediator variable between environmental turbulent, social integration mechanisms and external knowledge sources on competition. Especially, the social integration mechanism is an important mechanism for small and medium-sized enterprises, gem and jewelry Thai industry groups, the manuscript proceeds as follows, where we first described the theoretical background and hypotheses development. Second, detailed the design and execution of an empirical study to test the research of hypotheses. Third the results, discussion and conclusions. Finally, study limitations, and suggestions for future research.

II. Theoretical Background

Over the past several decades, every organization faces much turbulence in the environment. Which affects survival and sustainability focusing on the knowledge base and is like a source of competitive advantage (Zahra and George, 2002; Jansene et al., 2005), especially after competing for the advantage in the technologically advanced industry that use resources as a strategy and protect valuable technology assets with strict intellectual property rights. But this strategy is not enough to create a sustainable competitive advantage. Because those who have a competitive advantage in the market must have the ability to respond in a fast and flexible amount of time together with effective management capabilities by coordinating and developing core competence to create "dynamic capability" which is a natural strategy to create organizational changes (Teece et al., 1997; 2012; 2016; Hervas-Oliver et al., 2011; van Doorn et al., 2017).

However, organizations cannot survive in the competitive industry for a long time.

If the organization uses only resources from internal sources to create survival for growth. Having the ability to absorb and create value from new ideas new tools and new technologies are essential (Mustafa et al., 2012). Developing specific competencies or competencies of an organization using existing capabilities to respond to changing environments.This situation is related to the organization's operation process (Jiménez-Barrionuevo et al., 2011; Langley et al., 2013; Teece, 2016) and the specific capabilities of the organization will focus on the important role of appropriate strategic management in adaptation. Integration and skills in organizing organizations in new ways, both internally and externally, by formulating resources and ability to compete to be competitive (Vincent, 2008; Teece, 2012; 2016).

In particular, the absorptive capacity is a dynamic capability (Zahra and George, 2002) and is a natural strategy that can create change for the organization (Hervas-Oliver et al., 2011; Teece et al., 1997; van Doorn et al., 2017) because organizational change comes from the combined ability of resources within the organization. It must be ready to learn nature and ability to adapt to situations. For this reason, absorbing new things from the external environment requires knowledge and experience of human resources within the organization that are related to prior related knowledge as a base to lead to the recognition process, to understand, innovate or respond to new things that are quickly accepted. Leading to the ability of organizations to recognize new information from external occurrences of assimilation and applying to use in commercial industries (Cohen and Levinthal, 1990).

In the past, the definition and classification of acquisition may have some differences, but still be implicit and have similar meanings (Cohen and Levinthal,1990; Lane et al., 2006; Lane and Lubatkin, 1998; Mowery and Oxley,1995; Todorova and Durisin, 2007; Van Den Bosch et al., 2003; Zahra and George, 2002) especially the conceptual framework of Zahra and George (2002) defines, "absorptive capacity is a dynamic capability" and can be divided into 2 components: potential absorptive capacity and realized absorptive capacity, which consists of 4 dimensions complementary roles are as follows:

Component 1 Potential Absorptive Capacity (PCAB) consists of acquisition capability dimension and assimilation capability dimension. It is an attempt to identify, recognize and seek new knowledge from outside and assimilation of new knowledge that is obtained from the outside. Which assimilation depends on prior knowledge level and trigger factors.

Component 2 Realized Absorptive Capacity (RCAB) includes transformation capability dimension and exploitation capability dimension. The transformation capability dimension as the ability to fuse the existing knowledge within the organization with new knowledge that is sought from outside by relying on the human capital and organizational capital resource. The exploitation capability dimension as the ability to transforming knowledge into operations, resulting in results from the value of knowledge such as new knowledge, new methods, new products and services, etc.

Despite the ability of SMEs to absorb and manage knowledge is an important factor in achieving goals and building competitiveness. The ability to compete with industrial competitiveness is achieved through superior productivity, both in terms of lower costs than competitors. Or the ability to offer products with superior value and premium price. When ensuring superior quality and customer price acceptance, the organization's advantage does not depend on having the cheapest inputs but is the ability to improve and innovate (Porter and Van der Linde, 1995). Dynamic capabilities and knowledge provide a link between strategies for those seeking a source of competitive advantage (Wright et al., 2001; Zahra and George, 2002). For measuring the ability to compete based on the concept of ability to absorb that knowledge.There has been a lot of research that evaluates performance using proxies, which are research and development (R&D) (Flatten et al., 2011; Camisón and Forés, 2010; Lichtenthaler, 2009; Lane et al., 2006; Zahra and George, 2002; Cohen and Levinthal 1989, 1990). And suitable for large corporations that have intensive research and development and have no investment limitations, but if considered deep, it is a matter of time and finance, especially most SMEs do not have a large budget to apply specifically in research and development (R&D). Including the high cost of patent registration and a long time (time-consuming) even without these things it does not mean that an organization cannot seek knowledge and make good use of it (Chauvet, 2014; Moilanen et al., 2014; Lee, 2007). In addition, the evaluation of competitiveness there are many gaps, lack of accurate measurement, suitable for SMEs and businesses using basic technology. Leading to operational risks measuring the competitiveness of an appropriate organization should measure both financial and non-financial perspectives (Kaplan and Norton, 2001). Therefore, the measurement of awareness. According to subjective data in the dimension of customer, market, profit, and product side by comparing with the main competitors in the industry. Therefore, it is used to measure the competitiveness in a variety of industries. Including in the context of SMEs (Engelen et al., 2014; Lichtenthaler, 2009; Moilanen et al., 2014). From the literature review, there are different studies in context, roles and outcome. As shown in Table 1, it shows some studies in the context of SMEs.

Table 1: Roles and Results of Ability to Absorb Knowledge between 2013 -2018

Authors/year	Independent variables	Dependent variables	Mederator Variables	Moderator Variable	findings
Zhai et al., (2018)	Entrepreneurial Orientation (EO)	Innovation Performance		ABC Environmental dynamism	• ABC is a regulatory variable that causes EO to have a positive relationship with its innovation performance • ABC is a regulatory variable that increases the EO and the company's innovation performance as the level of environmental dynamics increases
van Doorn et al., (2017)	Environmental Dynamism including the needs of customers, competitors, technology and regulations	Entrepreneurial Orientation (EO) including Risk Taking, Innovativeness, and Proactiveness		TMT ABC include Recognized the Value, Assimilate, and Apply new Knowledge Upper Echelons Perspectives	Searching for information from outside is an important variable that affects the relationship between environmental dynamics and EO • TMT's ABC is a regulatory variable that makes the search for external information by TMT affecting the relationship between the dynamic environment and EO

(Continued) Table 1: Roles and Results of Ability to Absorb Knowledge between 2013 -2018

Authors/Year	Independent Variables	Dependent variables	Mederator Variables	Moderator Variables	Findings
Andersén (2015)	Family attributes of family firms including Social Capital, Patient Capital, and Characteristics	ABC all 4 dimensions			• High family levels will benefit RCAB. and negatively affecting PCAB • Organizations with high family status have a low ability to identify and understand external knowledge • Family relationships positively correlate with the ability to transform and use knowledge but with an opposite relationship with the ability to seek (explore) knowledge • Family relationships have many benefits and advantages in the process of absorbing knowledge
Engelen et al., (2014)	Entrepreneurial Orientation (EO)	Firm Performance		ABC all 4 dimensions Market turbulence	•EO has a positive relationship with performance through ABC that is a moderator •ABC strengthens the relationship between EO-performance in a volatile market environment • Performance will increase when ABC has a high level

(Continued) Table 1: Roles and results of ability to absorb knowledge between 2013 -2018

Authors/Year	Independent Variables	Dependent variables	Mederator Variables	Moderator Variables	Findings
Leal-Rodríguez et al., (2014)	ABC	Innovation Performance	Cultural Barriers (CB)		• CB which is an intermediary, decreases in transmission PCAB-RCAB and RCAB-IO are linked together. Which will lead to innovation in the organization
Guo and Wang (2014)	Environmental Turbulence (ET)	External Search Breadth (ESB)	ABC		• ABC and ET have a negative relationship with the ESB • ET increases. ESB tends to increase • ET has a positive relationship with knowledge expansion
Sciascia et al., (2014)	Entrepreneurial Orientation (EO)	Firm Performance	ABC		•PCAB and RCAB have a positive influence on the transmission parameters between EO-Performance with a high level of relationship •EO are effective only when the mechanisms of seeking, absorbing, converting and utilizing are well developed in an industry at low - medium technology that delivers high performance
Armstrong and Lengnick-Hall (2013)	PCAB	Social Integration Mechanism		RCAB	The cross-functional team has a negative relationship with the RCAB and is a regulatory variable that has a negative relationship between the PCAB-RCAB. • The cross-functional teams have a positive relationship with PCAB • Social Integration Mechanism has a negative relationship with RCAB at the same time, it is a change variable that has a negative relationship between PCAB-RCAB with no statistical significance

Source: Prepared by author

However, even though the development of Absorptive Capacity Model (ABC) has passed a variety of components and results are different, but implicitly demonstrating the importance of learning, which will help improve the performance and create sustainable competitiveness. Therefore, the level of acquisition is important for creating value under dynamic environment for the Thai gem and jewelry industry operators. Which is a product that requires specialized expertise as the core competency of Thai workers in creating added value in products that are faced with market fluctuations, technological fluctuations and resource constraints by using the acquisition model knowledge of Zahra and George (2002) is the framework for this research. Shows the connection according to the research conceptual framework as in the figure 1.
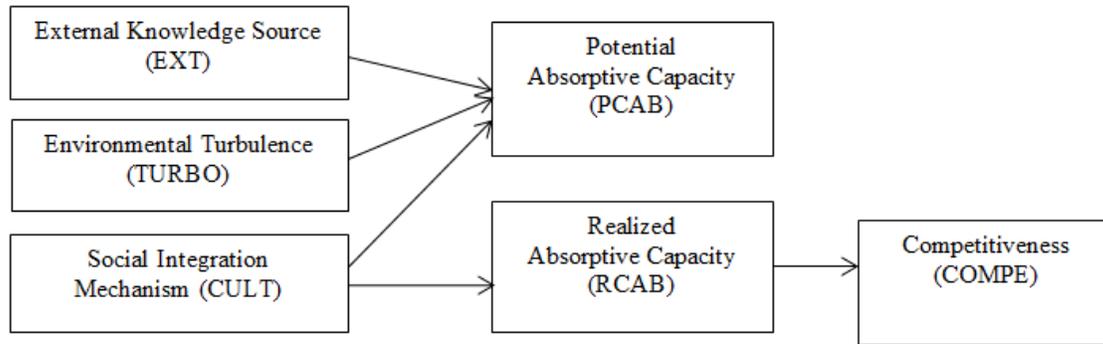
Figure 1: Conceptual framework

Source: Prepared by author

III. Hypotheses Development

3.1. External Knowledge Sources (EXT) and Absorptive Capacity (ABC)

Under intense competitive conditions makes it difficult to predict the situation precisely, and every organization cannot survive alone. At present, many business organizations are increasingly relying on knowledge and external resources to foster innovation to improve performance and create survival for the organization (Hervas-Oliver et al., 2011; Ireland et al., 2002; Li et al., 2017). EXT have several forms that the influence of ABC is a link to the prior knowledge which is an important antecedent factor of ABC (Ven den bosch et al.,1999). The accumulate knowledge and experience this also shows an increase in the ability to seek new knowledge of individuals. While also raising the level of ability to call and use existing knowledge as well (Cohen and Levinthal,1990), but reliance on resources that do not have similarities may need to improve the efficiency of knowledge seeking efforts and reliance on tangible and intangible resources from external sources will allow the organization to learn new things and have the ability to create with more value (Harrison et al., 2001).

Exposure to knowledge at the breadth and depth has a positive influence on the trend of exploring new knowledge. The organization will seek knowledge to create a clear understanding from different sources of knowledge. Which a variety of knowledge sources influences the level of ability to seek and assimilate knowledge which constitutes a significant ability to PCAB (Zahra and George, 2002). Although dependence on external sources is unique in the learning process of each source, it is inseparably related. There is work that supports togetherness and has a positive relationship (Cassiman and Veugelers, 2006; Harrison et al., 2001; Zhai et al., 2018). Exposure to external knowledge from different sources and interdependencies is also an opportunity to develop the PCAB (Zahra and George, 2002) that must be maintained to create competitive capabilities for the industry with employees as core competency, especially SMEs that do not have an internal R&D department, it is necessary to rely on external resources to create innovation or create new value (Classen et al., 2012; Hervas-Oliver et al., 2011; Ortega-Argiles et al., 2009; Rammer et al., 2009).

SMEs that have expanded their search breadth, EXT, or have increased business alliance searches can develop to create value from access to EXT, sharing innovation between organizations. This causes the linking of research and development strategies between suppliers, customer, competitor, government and university etc. (Classen et al., 2012; Lisboa et al., 2011; Wang et al., 2015; Zahra and George,2002). For entrepreneurs in emerging markets the government may have to encourage entrepreneurship through education and training programs. The long-term possible outcome is an increase in successful strategic alliances (Li et al., 2017; Nagati and Rebolledo, 2012).

From the review of research literature, even though some have mismatched opinions about the role of the importance of relying on EXT that affect the ABC. Due to knowledge spill-over mechanisms (Moilanen et al., 2014; Van and Zwart, 2004) there is lot of literature that supports EXT affected by the ABC and competitiveness (COMPE) of SMEs. Accordingly, we expect:

Hypothesis 1. The external knowledge source (EXT) has positive direct effect to potential absorptive capacity (PCAB) and have positive indirect effect to competitiveness (COMPE) through potential absorptive capacity (PCAB) and realized absorptive capacity (RCAB).

3.2. The Environmental Turbulence (TURBO) and Absorptive Capacity

The external environmental turbulence is a trigger factor that has a positive influence on achieving ABC. It also influences the ability for knowledge spillover and develops superior knowledge within the organization (Liao et al., 2003; Todorova and Durisin, 2007; Zhai et al., 2018). Internal environment shows weakness and the strength that the organization, while an external environment shows the opportunity and threat that affects the market attractiveness. By acquiring knowledge from outside the organization often to respond to environmental turbulence and compliance with various strategies because of the impact of the environment (Droge et al., 2008; Hervas-Oliver et al., 2011; van Doorn et al., 2017).

The external environment is important for analyzing the impact on the ABC because the differences in the environment show different values of dynamic capability (Eisenhardt and Martin, 2000; Liao et al., 2003; Rammer et al., 2009; Teece,2012; 2016). The ABC is dynamic capabilities that create value in a dynamic environment better than others (Engelen et al., 2014;Teece et al., 1997; Zahra et al., 2006; Zhai et al., 2018). SMEs entrepreneurs operating under highly market turbulent conditions but with the ability of ABC at a high level, will pass on high performance (Engelen et al., 2014; van Doorn et al., 2017). Under dynamic capabilities which focused on two important environments: technology turbulence and market turbulence (Droge et al., 2008; Hervas-Oliver et al., 2011; Lichtenthaler, 2009; Zhai et al., 2018). Market turbulence reflecting the changing preferences of customers, resulting in a gap between customers' needs and customers' wants, which is difficult to predict. The competitive status and evolution of the environment and market volatility will increase the ambiguity and risk in business processes and the causal factors that link between strategies and performance (Wang et al., 2015; Zhai et al., 2018). The technological turbulence is a major driving force that creates creative destruction. It has revolutionized products and the production process has accelerated the pace of changes that affect other broad factors. Facing challenging decisions about investment costs, risks and returns with high uncertainty. Therefore, it is important that Cohen and Levinthal (1990) said that technological opportunities are related to the possibility of dedicated resources to promote innovation, influence the learning curve, as well as affect the market structure and innovation. Accordingly, we expect:

Hypothesis 2. The environmental turbulence (TURBO) have positive direct effect to potential absorptive capacity (PCAB) and have positive indirect effect to competitiveness (COMPE) through potential absorptive capacity (PCAB) and realized absorptive capacity (RCAB).

3.3. The Social Integration Mechanism (CULT) and Absorptive Capacity

ABC is used to study and explain knowledge sharing between organizations that can bring external knowledge to improve performance. It can create competitiveness (Cohen and Levinthal, 1990; Lenox and King, 2004; Zahra and George, 2002), while sharing knowledge within the organization that involves a social integration mechanism (CULT) that connects the corporate culture (Chang and Lin, 2015; Thomas and Wood, 2015). Even when seeking external knowledge, a lot cannot be guaranteed that it will always be used. This is because the process of sharing knowledge between PCAB and RCAB will have gaps between each other. If this gap is wider, the impact to the RCAB (Armstrong and Lengnick-Hall, 2013; Zahra and George, 2002) is therefore necessary to the important role of the CULT which is required to facilitate the flow of information allowing the organization to transform and utilize information sharing knowledge within the organization. Which implies that the concept of corporate culture as a study guides and explains the phenomenon knowledge sharing within the organization (Andersén, 2015; Cepeda et al., 2012; Gray, 2006; Khoja and Maranville, 2010; Leal-Rodríguez et al., 2014; Santos et al., 2007; Zahra and George, 2002).

Organization culture is holistic, has been defined in the past as a social structure related to beliefs and behaviors. There can be a variety of levels in each organization. Also appearing in the characteristics of each life span of the organization (Detert et al., 2000; Leal-Rodríguez et al., 2014; Schein, 1983) is a set of basic motto bases that define the behavior of people in the organization that are successful organizations. They receive more productivity because of the supportive culture and values that are valuable to employees (Andersén, 2015; Schein,1983; Vega-Jurado et al., 2008). Having shared values with trust, these are important causes for the organization's performance (Cepeda et al., 2012).

ABC is an important component of the dynamic capability for developing organizational innovation capabilities (Cepeda et al., 2012; Cohen and Levinthal, 1990; Zahra and George, 2002) especially for SMEs having knowledge of exchange mechanisms is the key to making knowledge transfer possible. If there is a commitment to innovation or creativity, it must have a consistent organizational culture. Organizations that use CULT such as routine based activities that help motivate members will help reduce barriers to sharing and exchanging knowledge from PCAB to RCAB (Armstrong, 2006; Jansen et al.,2005; Santos et al., 2007; Thomas and Wood,2015). It can be said that the organization

cannot survive without the ability to manage the social integration problems of internal groups organization (Schein, 1983; Mustafa Kamal and Flanagan, 2012). Accordingly, we expect:

Hypothesis 3. The social Integration Mechanism (CULT) have positive direct effect to potential absorptive capacity (PCAB) and realized absorptive capacity (RCAB) also have positive indirect effect to competitiveness through potential absorptive capacity (PCAB) and realized absorptive capacity (RCAB).

IV. Methodology

4.1. Methodology

The empirical research was conducted in Thailand's gem and Jewelry small and medium-sized industrial firms registered in the department of industrial works about 627 firms. Using multi-stage random sampling to determine the size of SMEs in accordance with the regional employment criteria. Hence, the response rate is estimated to be 360+ (360 x 0.4) = 504 to prevent errors as well as to reduce discrepancies from the questionnaire responses of the sample group.Questionnaires has 270 responses in response to the questionnaire sent by mail to the business owner, executive or Information management may not cooperate as expected. Therefore, the response rate of valid questionnaires is 53.57%, which is a good response rate and acceptable level (Mc Guirk and O'Neill, 2016; van Doorn et al., 2017). Results shown in Table 2.

Table 2: Geographical Allocation

Geographical Allocation	Size of SMEs			
	Small	Medium	Large	Total
Population size	386	191	50	627
Sample size	310	154	40	504
Response size	159	92	20	270
Response size (Response rate)	159 (51.39%)	92 (59.74%)	20 (50.00%)	270 (53.57%)

4.2. Measurement

The measurement of variables was adapted based on the previous scale. The reliability of the questionnaire was between 0.936 - 0.945. The reliability of the whole questionnaire was 0.944.

For general information of respondents are adapted from the Classen et al., (2012); Gray (2006); Lee (2007); van Doorn et al., (2017); Zhai et al., (2018) questionnaire. There are 5 check list style questions.

The general information of the gem and jewelry manufacturing business is adapted from Guo and Wang (2014); Khetpiyarat et al., (2012); Khoja and Maranville (2010); questionnaire. There are 10 check list style questions.

The level of business ability receive information from external knowledge sources that affect the ABC has been adapted from Classen et al., (2012); Laursen and Salter (2006) to a Likert rating scale of 7 levels, 12 questions.

Information of ABC consisting of the dimension of acquisition capability, assimilation capability, transformation capability and exploitation capability has been adapted from the Jensen et al., (2005), is a Likert rating scale of 7 levels, 15 questions.

The level of response to the turbulence of the environment (TURBO) consists of market turbulence and technology turbulence adapted from Jaworski and Kohli (1993). The measurement used in each component is a Likert rating scale of 7 levels, 8 questions.

The Information on social integration mechanisms (CULT) consisting of cross-functional teams, task oriented culture, risk oriented culture, cooperative culture, open communication, and collective rewards culture are adapted from Denison (1990); Denison, Hart and Kahn (1996); Reynolds (1986) with the measurement used in each component measurement as a Likert rating scale of 7 levels, 18 questions.

Finally, to evaluate the level of competitiveness (COMPE) consisting of customers, market, profit, and product perspective are adapted from Vorhies and Morgan (2005); Moilanen et al., (2014); Lichtenthaler (2009). The measurement used in each component is a Likert rating scale of 7 levels, 16 questions.

4.3. Confirmatory Factor Analysis

Examined the consistency of the model with empirical data by the maximum likelihood method to evaluate the measurement model with the confirmatory factor analysis (CFA) for both validity and reliability of construct.

The first step was to analyze the first order confirmatory factor analysis manifested that the outcome of the casual factors of absorptive capacity consisted of 3 factors. In addition, the factor loadings were acknowledged, all values were positive from 0.25 - 0.86 and different from zero with a statistical significance level of.01, also the average variance extracted (AVE) from all factors had high construct reliability. For the second order confirmatory factor analysis to indicated that the model was consistent with empirical data with acceptable consistency indices as presented in test statistics as follows: x^2–test =30.19, df=27, p-value=0.31, CFI=1.00, GFI=0.98, AGFI=0.96, RMSEA=0.021, and SRMR=0.028. There were 10 causal factors of absorptive capacity in 3 aspects, which were ordered based on highest to lowest factor loading as follows: environmental turbulence (TURBO), external source (EXT), and social integration mechanism (CULT) with standardized factor loadings of 0.65, 0.54, and 0.43, respectively (Jundahuadong.,P and Chemsripong.,S, 2019).

For the first order confirmatory factor analysis manifested that the outcome of the casual factors of competitiveness consisted of 3 factors. In addition, the factor loadings were acknowledged, all values were positive from 0.61 - 0.90 and different from zero with a statistical significance level of.01, also the average variance extracted (AVE) from all factors had high construct reliability. For the second order confirmatory factor analysis to indicated that the model was consistent with empirical data with acceptable consistency indices as presented in test statistics as follows: x^2-test = 16.20, df = 13, p-value = 0.24, CFI = 1.00, GFI = 0.99, AGFI = 0.96, RMSEA = 0.030, and SRMR = 0.021. There were 8 causal factors of competitiveness in three aspects, which were ordered based on highest to lowest factor loading as follows: potential capacity (PCAB), realized capacity (RCAB), and competitiveness (COMPE) with standardized factor loadings of 0.86, 0.71, and 0.40 respectively (Jundahuadong., P and Chemsripong., S, 2019).

After having assessed the measurement model to study composite reliability and variance extracted from each latent variable. Which has presented analysis for the results and models above. Then analyze the causal of enhancing competitive advantage in the turbulent environment of the Thai gems and jewelry industry groups SMEs, by the important role of absorptive capacity which is the mediator variable. Both direct influence and indirect influence using Structural Equation Modeling (SEM) technique to answer research objectives and research hypotheses further.

V. Results

The total number of respondents was 270 people, mostly women 56.30 percent, between 30-40 years of age 38.89 percent. 63.33 percent had bachelor's degree level education, 15 years of work experience 43.70% and most of them are business owners 36.30%.

Characteristics of the establishment according to the ministerial regulations, mostly small enterprises the number of employments is not more than 50 people, representing 76.36 percent. Most of the registered capital is 1 million baht - 10 million baht, equivalent to 40.74 percent. There is a period of business operation since its inception more than 14 years, representing a percentage of 66.67 percent with the number of employees below 50 people, equivalent to 57.78 percent. Most businesses operate in Bangkok, 55.56%, followed by the central region, 33.70%, the rest are distributed in other regions, including the North, the East, the West and the North East respectively.

The types of jewelry and jewelry manufacturing industry can be divided into 4 categories, which are the real jewelry manufacturing industry with the highest amount being 77.04 percent followed by the gemstone cutting industry, which is 30.74 percent. The diamond cutting industry is 24.81 percent. The production of artificial jewelry industry is the lowest with 18.89 percent.

Most of the business operations are Thai businesses 75.56 percent, most of which are contract manufacturing by customers 78.89%, divided by industry structure, most of them are genuine jewelry manufacturers producing: diamond / gemstone / gold jewelry as a percentage 70.37. Most of them do not export to foreign markets, representing 32.59% and for businesses that are exported to foreign markets. The proportion of exports to foreign markets More than in the country is 36.67 percent.

The results of the causal analysis of enhancing competitive advantage in the turbulent environment of the Thai gems and jewelry industry groups SMEs: The interaction between social integration mechanisms and ABC in order to answer research questions and hypotheses, research, and the harmonization of causal relationship patterns. The initial structural equation model as figure 2.
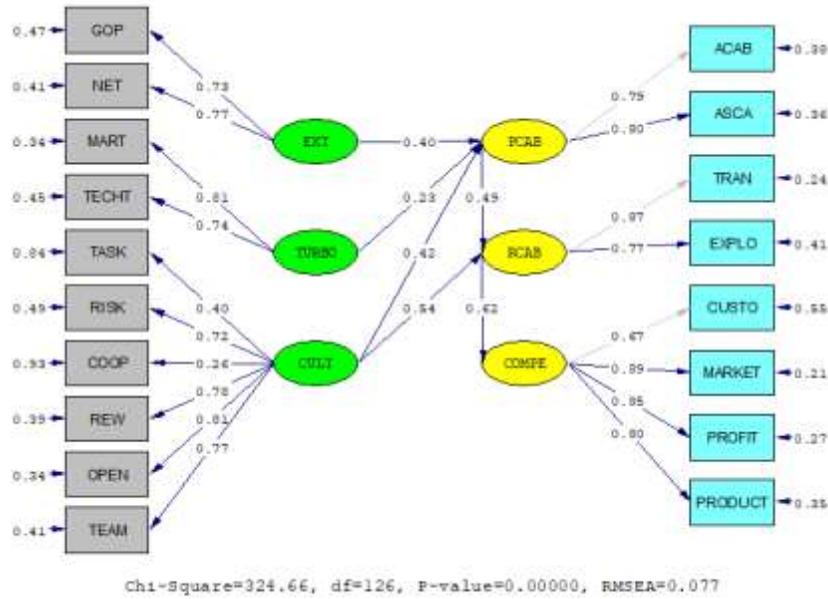
Chi-Square=324.66, df=126, P-value=0.00000, RMSEA=0.077

Figure 2: Initial Structural Equation Model

From the figure 2, the value of χ^2 is significant (p =.00). The RMSEA (.077) is higher than.05 the value of χ^2/df is 2.58, which is greater than 2.00. These values indicate that the model is not yet consistent with the empirical data. The researcher adjusted the model as appropriate and theoretical feasibility to consistent models with empirical data the result of the final model adjustment as shown in figure 3.

Table 3: The Result of Statistics the Influence of Variables in the Causal Model of Factors Affecting the Absorptive Capacity and Competitiveness

IV	PCAB			RCAB			EXT			TURBO			CULT		
DV	DE	IE	TE	DE	IE	TE	DE	IE	TE	DE	IE	TE	DE	IE	TE
PCAB	-	-	-	-	-	-	0.34**	-	0.34**	0.22*	-	0.22**	0.40*	-	0.40**
	-	-	-	-	-	-	(0.07)	-	(0.07)	(0.10)	-	(0.10)	(0.09)	-	(0.09)
RCAB	0.42**	-	0.42**	-	-	-	-	0.14**	0.14**	-	0.09**	0.09**	0.38*	0.17**	0.55**
	(0.08)	-	(0.08)	-	-	-	-	(0.04)	(0.04)	-	(0.04)	(0.04)	(0.07)	(0.05)	(0.06)
COMPE	-	0.24**	0.24**	0.57**	-	0.57**	-	0.08**	0.08**	-	0.05**	0.05**	-	0.31**	0.31**
	-	)0.05(	)0.05(	(0.06)	-	(0.06)	-	(0.02)	(0.02)	-	(0.03)	(0.03)	-	(0.04)	(0.04)

Chi – square 135.03 df=104 p=0.022 GFI = 0.95 AGFI = 0.91 RMR = 0.036
Variables GOP NET MART TECHT TASK RISK COOP REW OPEN TEAM
Reliability 0.53 0.60 0.66 0.55 0.14 0.50 0.05 0.59 0.65 0.59
Variables ACAB ASCA TRAN EXPLO CUSTO MARKET PROFIT PRODUCT
Reliability 0.62 0.64 0.79 0.61 0.52 0.55 0.53 0.88
PCAB RCAB COMPE
R-SQUARE 0.86 0.91 0.47
Note: p <.05 ** p <.01

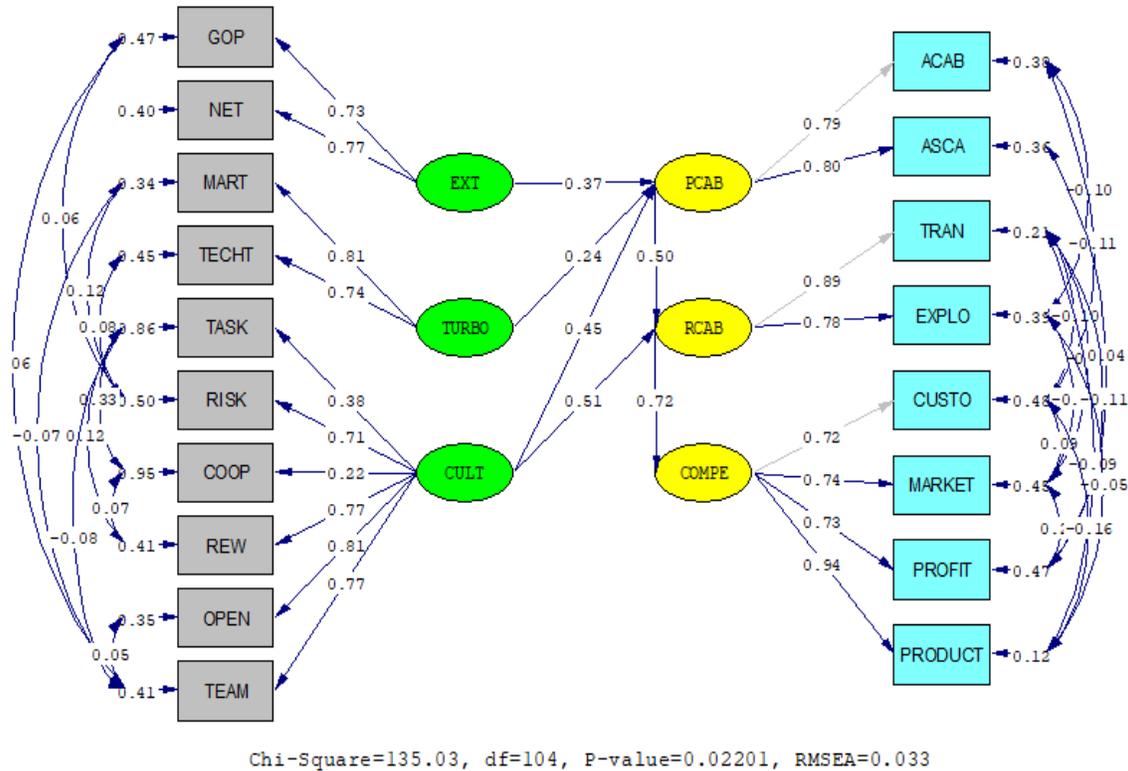Chi-Square=135.03, df=104, P-value=0.02201, RMSEA=0.033

Figure 3: Final Structural Equation Model

For the results from the analysis as in figure 3 to answer the research objectives no. 1 and no. 2, including answering according to research hypotheses, by the researchers presenting direct effects (DE), Indirect Effects (IE) and total effects (TE), which presents analytical results, as in Table 3.

Table 3 presents the consistency test results for the causal model based on assumptions with empirical data and considering the direct effect and indirect effect for answering research objectives no. 1 to study the causal relationship of factors that influence competition ability and the research hypothesis as follows.

The correlation coefficient between latent variables is between 0.48-0.93. All pairs of variables are in the same direction, with positive relationships. The variables with the highest correlation coefficients with the correlation coefficient of 0.93 are PCAB and RCAB.

From the results of developing a causal influence model showed that the RCAB affects the most competitiveness (COMPE), followed by CULT and PCAB respectively.

The external knowledge source (EXT) have positive direct effect to potential absorptive capacity (PCAB) which is equal to 0.34 and has positive and indirect effects to competitiveness (COMPE) through PCAB and RCAB with an indirect effect size of 0.13 is the influence of statistical significance at the level of.01. These finding support Hypotheses 1.

The environmental turbulent (TURBO) has positive direct effect to potential absorptive capacity (PCAB) which is equal to 0.22 and has a positive indirect effect to competitiveness (COMPE) through PCAB and RCAB has an indirect effect size which is equal to 0.09, which is a statistically significant with influence at the level of.01. These finding support Hypotheses 2.

The social Integration Mechanism (CULT) have positive direct effect to potential absorptive capacity (PCAB) which is equal to 0.40 and has positive direct effect to realized absorptive capacity (RCAB) which is equal to 0.38 and also has positive indirect effect to competitiveness (COMPE) through PCAB and RCAB with an indirect effect size which is equal to 0.16, which is a statistically significant influence at the level of.01.These finding support Hypotheses 3.

For observable variables, the precision is between 0.05-0.88 with the variable that has the highest precision is PRODUCT, followed by the ability to absorb knowledge of knowledge transformation (TRAN), which is a sub-dimension of empirical knowledge absorption (PCAB). The variable that has the lowest precision is the cooperative focus culture (COOP). For the prediction coefficient (R^2) of the internal latent variable structure equation, it is found that the variables in the model can explain the variance of COMPE by 47% and can explain the variance of ABC by 91 percent.

The correlation coefficient between latent variables is between 0.48-0.93, all variables were in the same direction which was positive. The variable with the highest correlation coefficient is 0.93 which is PCAB variable and RCAB variable.

The research results to answer the research objectives no. 2, in order to develop a model for the causal component of factors that influence competitiveness in conclusion, model as in figure 4. According to the assumption and empirical data it was found that the model was in harmony with empirical data, with an acceptable index value of the chi-square statistic (χ^2) was equal to 135.03, df = 104, p = 0.022. Square per degrees of freedom (χ^2 / df) together with the chi-square value. There are variations according to the sample size. If the sample size is small, the chi-square values tend to be statistically significant, found that χ^2 / df = 135.03 / 104 = 1. 298 according to the specified criteria (<2). Consider comparative fit index (CFI) = 1.00, goodness of fit index (GFI) = 0.95, adjusted goodness of fit index (AGFI) = 0.91, root mean square error of approximation (RMSEA) = 0.033, and standardized root mean square residual(SRMR)=0.036 Show that the model is consistent with the empirical data. Since the values are less than 0.05, the variables in the model can explain the variance of COMPE and ABC by 47% and 91% respectively. In addition, it was found that RCAB had the most effect on competitiveness, followed by CULT and PCAB respectively.

VI. Discussion and Conclusions

Discussion and summary to answer according to the research hypothesis as follows:

Hypotheses 1 confirms that the EXT has positive direct effect to the PCAB and has positive indirect effect to COMPE through PCAB and RCAB. This found a significant mediating effect of ABC on the relationship between EXT and competitiveness (COMPE).

This finding is consistent with a large amount of literature, such as Engelen et al., (2014); Hervas-Oliver et al., (2011); Kostopoulos et al., (2011); Sciascia et al., (2014) 's research. It found that SMEs entrepreneurs who have a variety of external knowledge, such as raw material suppliers, customers, competitors, research institutions universities and technology centers, for example, will have a positive direct influence on acquisition and have a positive indirect influence on financial, marketing and innovation performance. The level of performance will depend on the level of ability to absorb knowledge from the outside of the organization, consistent with the rule of Nagati and Rebolledo (2012) that found that customers and supplier have a positive relationship and influence to the transfer of knowledge in a routine that relates to production techniques and operations. This influences the improvement of operations and improvement of performance, especially for customers, and has a role in improving the competitiveness of SMEs in the manufacturing sector and will be more increased efficiency if new knowledge related to that market. This has acquisition, assimilation and transformation capability to combine the development within the organization by applying the correct strategy to generate economies of scale and economies of scope in accordance with the Sciascia et al., (2014); Van Gils and Zwar (2004) found that SMEs with dependence on external resources or to participate in strategic alliances to share knowledge seek cooperation and resources together. By having to develop and promote the efficiency of the process, the acquisition, assimilation, transformation and exploitation knowledge capability. Therefore, it will bring the competitiveness of entrepreneurs especially SMEs without in-house R&D departments to relying on cooperation with a variety of EXT. It will lead to an increased knowledge base, development of the ability to assimilate, develop, and apply to the correct strategy, thus benefiting from the knowledge and relationships between organizations, thus being an opportunity for acquiring and utilizing knowledge has increased (Kostopoulos et al., 2011; Rammer et al., 2009) while Moilanen et al., (2014) found that external sources such as customers in the domestic market. Influencing the performance of innovation without passing the acquisition, which is a mediator variable, or could be the flow of EXT which has a direct influence on the performance.

Considering the influence of EXT that affect the ability to PCAB of SMEs, Thai gems and jewelry industry groups found that EXT have direct influence which is positive for the PCAB is not very high. This may be because even though the EXT are diverse, reflecting the number of data information from outside to be a lot. But the organization is still faced with the difficulty of expanding the internal knowledge base with knowledge gained from outside

including creating a network of cooperation or business partners in addition to the ability for the experience of the corporate executives must also be based on trust with sincerity between each other and the goals must be consistent.

While EXT have a positive indirect influence on competitiveness. Through the PCAB and RCAB that is not too high. This may be due to the ability to compete when the ability for PCAB has been developed to deliver the effectiveness of the process. Which is positively influenced by important causal factors, i.e. various sources of external knowledge. This may be a cooperative network or business partner, such as customers, suppliers, educational institution, Independent researcher, chamber of commerce, trade association, competitor, government sector, exhibition, trade show and other agencies related to the industry and different industries etc. In addition to helping with dependence on cooperation, the amount of information received from this cooperation network will have a significant impact on the level of knowledge acquisition, assimilation, transformation and exploitation Moilanen et al., 2014; Sciascia et al., 2014).

This also affects the upgrading of the competitiveness of entrepreneurs as well as EXT. Although there are many, but it does not guarantee that the organization will be effective in identifying knowledge to seek to absorb, transform and use the knowledge commercially. Because within the organization it is more complex than society, the organization will learn that knowledge is useful for enhancing core competency of the organization and compatible with the corporate strategy. This may take more time than learning the skills and learning effects until they learn how to accomplish faster and with less errors in the experience curve which is not easy. For example, Zahra and George (2002) suggest that the ABC has three characteristics which are intensity, speed, and direction and can create value for the organization, especially absorbing new things from the dynamic external environment. Needing to use the prior knowledge-base to lead the cognitive process, understanding, creating or responding to new things that are quickly accepted, leading to the organization's ability to accept new values of external information to assimilate and apply to create value for the organization.

Therefore, for enhancing the competitiveness of SMEs, Thai gem and jewelry industry groups with limited resources, especially production factors, funding, and access to production technology and marketing knowledge. Therefore, it is necessary to create a network of cooperation with external agencies, both related to the industry and different industries. In order to seek dependence on various resources, having a network of partners or business partners and promoting the efficiency of the process of absorbing knowledge within the organization will help create value and growth opportunities for SMEs.

In Hypotheses 2, confirms that the TURBO have positive direct effect to PCAB and have positive indirect effect to COMPE through PCAB and RCAB. This found a significant mediating effect of ABC on the relationship between TURBO and competitiveness (COMPE).

The findings from this research are consistent with a large amount of literature, such as Guo and Wang, (2014); Jansen et al., (2005); Lichtenthaler,(2009); Wang et al., (2015), that found that the turbulence of technology and marketing has a positive influence on the acquisition in exploration, transform knowledge and exploit knowing that delivering product and financial performance results in, especially the acquisition this will have a strong influence on performance in the environment of highly turbulent marketing. Because having the acquisition under highly turbulent environments (TURBO) will help organizations choose the right strategy to use as a tool to strengthen the performance. And create a competitive advantage (Engelen et al., 2014). A TURBO is the source of competitive opportunities to meet the needs of consumers who have changed their preferences for products and services. The acquisition is a dynamic capability that creates value in a dynamic environment better than others (Engelen et al., 2014; Teece et al., 1997; Zahra et al., 2006; Zahra and George, 2002; Zhai et al., 2018).

Considering the direct influence of TURBO affecting the PCAB of SMEs, found that the turbulence in the environment is of direct influence, and a positive way to PCAB which is not very high. This may be due to TURBO that will create opportunities for organizations that could acquisition and if the environment is static. The acquisition, which is a dynamic capability, and may not be necessary. Because the dynamic capability is the ability to integrate transforming resources to be compatible with environments that are more dynamic than other environments (Jansen et al., 2005; Teece et al.,1997; Zahra and George, 2002).

However, from the results of the research, it reflects the importance that SMEs the Thai gem and jewelry industry faces the uncertainty of the external environment in marketing and technology (Zhai et al., 2018). Which is the driving force that creates opportunities that are favorable to the operations within the industry, rather than the obstacles but in such importance that entrepreneurs or executives within the organization must promote and support the identification of knowledge, seeking knowledge, assimilating knowledge within the organization for efficiency. Otherwise, changes in the environment may become an obstacle to the operation this means that the level of

volatility is difficult to predict in the external environment, such as marketing and technology and is an important causal factor that pushes the organization to increase the level of knowledge seeking. And absorbing knowledge, understanding, interpreting, and analyzing by using knowledge, competence, experience, expertise of all employees in business units (SBUs), as well as the organization must have a mechanism to encourage employees to be motivated, willing to devote their potential in Increasing efforts to learn, understand, share knowledge, integrate with regular work within the organization (Atuahene-Gima et al., 2006).

In addition, TURBO has a positive indirect influence on COMPE. Through the PCAB and RCAB that is not very high, this may be due to the SMEs Thai gem and jewelry industry groups are labor intensive industries rely on gradual technology management of household business, even though entrepreneurs are in the luxury goods industry. Including Thailand as the center of the world gem cutting and jewelry production for export and distribution in the country, but most are production orders (original enhance manufacture: OEM) which is one of the reasons for the change in the marketing environment and technology which does not directly affect the competitiveness of entrepreneurs in the industry. And within the organization, there is a process of knowledge absorptive that is an important factor that helps reduce operational risks due to changes in the external environment.

However, the results of this study also reflect the importance of the level of turbulence in marketing and technology environments. Which is a major causal factor for organizations to increase the efficiency of knowledge acquisition processes which assimilate knowledge, transform knowledge and exploit knowledge to seize and create opportunities from changes in the external environment in particular, SMEs, Thai gem and jewelry industry groups that have advantages in size, number of employees, and flexibility of operations are all factors that promote the ability to compete well.

In hypotheses 3, which confirms that the CULT have positive direct effect to PCAB and RCAB, also have positive indirect effect to COMPE through PCAB and RCAB. This found a significant mediating effect of ABC on the relationship between social integration mechanism (CULT) and competitiveness (COME).

The findings from this research are consistent with a large amount of literature, with research supporting this research, such as Chang and Lin (2015), who found that the organizational culture that focuses on freedom of control and job focus will have a positive influence on commitment to the knowledge management process, from the knowledge creation, storage, transfer, and use of knowledge In p articular, organizing cross-functional teams within the organization has a positive correlation with the ability to PCAB which is very much (Armstrong, 2006) in line with the Leal-Rodríguez et al., (2014) found that acquiring and assimilating knowledge from external sources was great, but without a link mechanism to exchange knowledge between members within the organization, it cannot guarantee that knowledge can be transformed and used in a way that the organization must find ways to educate and spread sharing to have a common understanding and practice in a way that is consistent with the organization strategy to reduce the gap which is an obstacle to applying knowledge.

In addition, the findings from this research are consistent with Zahra and George (2002) that found that having a CULT is a way that encourages the exchange of knowledge and utilizing the knowledge of members within the organization. If the CULT is low, there will be obstacles in exchanging information, in accordance with the Nagati and Rebolledo (2012), that the knowledge exchange mechanism is the key to SMEs that will cause knowledge transfer also corresponds to Sheremata (2000) found that the organizational structure will help increase interaction between employees within the organization and encourage problem solving and collaboration. The organization therefore must use social integration mechanisms for linking with various responsibilities for the responsible person in that position to realize the importance of the type of information that will be created as the ability to PCAB. However, Mustafa Kamal and Flanagan (2012) also found that culture has an influence on the ability to assimilate knowledge and use new technologies. While also being an obstacle in the process of assimilating knowledge such as cultural differences, politeness and diligence, may cause some organizations consisting of members from different cultures to not be able to assimilate knowledge between each other. And Santos et al., (2007) found that an organization with a commitment to innovation or new creativity must have a firm organizational culture.

In addition, from this research, it is found that CULT have a positive indirect influence on COMPE. Through the PCAB and RCAB that is not very high, which may be due to the competitiveness of SMEs, Thai gem and jewelry industry groups will be directly influenced from the RCAB. That must work together with the PCAB which the efficiency of both processes depends on the social integration mechanism of the organization. That reflects the organization's culture that there is a level of promotion that allows the organization to change its operations to be compatible with the internal environment and the external environment of the organization cooperation or business alliance which affects the ability to respond to market changes and technology in the gem and jewelry industry.

In addition to the above findings from this research it reflects the relationships that affect each other in society in SMEs of the Thai gem and jewelry industry groups. Although being a small and medium-sized enterprise, managing a kinship or bureaucratic business, but dealing with social capital within the organization is not easy and when unable to manage as a mechanism that promotes reducing the gap of learning exchange of acquisition processes, which has the dynamic capability to be able to work together effectively. It would not be able to seek external knowledge or seek cooperation with business partner networks to rely on resources and could not seize opportunities from the marketing and technology environments to enhance competitiveness whether products, customers, profitability and marketing.

This research is to test and develop a suitable model to be used to enhance the competitiveness of SMEs in the Thai gem and jewelry industry. By using the concept of absorptive capacity, competitiveness, organization culture and strategic alliance as a research framework. And construct the relationship model of linear structural equation and test with advanced statistics for research and empirical data which found that the model is consistent with the said context.

VII.   Limitations and Suggestions for Future Research

As does any study, this research contains limitations that should inform any interpretations of our results. First, this research is a quantitative research approach applied by collecting questionnaires from business owners, executives or managers. Therefore, not being able to receive cooperation and receiving information from just the entrepreneurial department may cause data to be unbelievable. Therefore, in the next research approach there should be a mixed method of research and collecting data from employees, customers or those involved in the business operations to obtain complete information. Second, this research is focused on low and medium technology Thailand firms. It may be that the relationships examined in different industries such as high technology industries or other industries. The complexity of knowledge based, and absorptive capacity (ABC) may determine the appropriate level. Third, this research has studied absorptive capacity in the role of being a mediator variable in the next research, it should study the moderator variable role, which will know that the ABC is a directing variable that causes the level of social integration to affect the ability. Or they should study the reciprocal causal relationship of each absorptive capacity. Fourth, this research is the development of a structural relationship model of the acquisition affecting the competitiveness of SMEs, of the Thai gem and jewelry industry groups. Since the conceptual framework used for research consists of contingency factors that are constantly changing, the management or manager must use different decision management methods in each situation. Which will affect the performance of the organization, in the next research, the researcher proposed to test the inversion of the model by the development curve method with latent growth curve or LGC and examine with the leadership type and organizational culture type on how to foster the absorptive capacity process.

Acknowledgments

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